

# Appendix C

## Board Order #131211-01

Requiring the City of Los Angeles to  
Undertake Measures to Control  
PM10 Emissions from the  
Dried Bed of Owens Lake



Theodore D. Schade  
Air Pollution Control Officer



## GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

157 Short Street, Bishop, California 93514-3537

760-872-8211 Fax: 760-872-6109

### **B O 131211-01**

December 11, 2013

**I HEREBY CERTIFY** that Board Order No. 131211-01 was duly adopted and issued by the Governing Board of the Great Basin Unified Air Pollution Control District at a regular meeting on December 11, 2013, held at Cerro Coso Community College, Room 208, Mammoth Lakes, California and entered as follows:

AGENDA ITEM #4: APPROVAL OF AN ORDER REVISING THE 2010 PM<sub>10</sub> MAINTENANCE PLAN FOR THE COSO JUNCTION PLANNING AREA TO MODIFY MAINTENANCE MEASURES UNDER BOARD ORDER 080128-01 RELATED TO CONTROLLING DUST FROM THE OWENS VALLEY

A motion was made by Hunt and seconded by Johnston adopting the proposed Board Order 131211-01 as presented. The following findings were also made:

1. That the Governing Board conducted a public hearing as required for a State Implementation Plan (SIP) revision.
2. That the Governing Board adopted the revisions to the Coso Junction PM<sub>10</sub> Maintenance Plan Appendix C with an amended Board Order 080128-01
3. That the Governing Board directed the Clerk of the Board to submit the SIP revision to the California Air Resources Board for forwarding to the United States Environmental Protection Agency.

Ayes: Board Members – Eastman, Hames, Rawson, Arcularius, Johnston, Hunt

Noes: Ø

Abstain: Ø

Absent: Board Member - Kingsley

Motion carried 6/0 and so ordered.

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**B/O #131211-01**

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ATTEST:



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Tori DeHaven, Clerk of the Board

**BOARD ORDER 131211-01****ORDER OF THE GOVERNING BOARD OF THE  
GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT  
REVISING THE 2010 PM<sub>10</sub> MAINTENANCE PLAN FOR THE  
COSO JUNCTION PLANNING AREA TO MODIFY MAINTENANCE  
MEASURES UNDER BOARD ORDER 080128-01 RELATED TO  
CONTROLLING DUST FROM THE OWENS VALLEY**

*December 11, 2013*

WHEREAS, on May 17, 2010, the Governing Board of the Great Basin Unified Air Pollution Control District ("District"), an agency organized pursuant to Division 26, Part 3, Chapter 3 of the California Health and Safety Code, approved the *2010 PM<sub>10</sub> Maintenance Plan and Redesignation Request for the Coso Junction Planning Area* ("Coso Junction Maintenance Plan").

WHEREAS, windblown dust from the Owens Lake bed and the Keeler Dunes has the potential to cause or contribute to exceedances of the National Ambient Air Quality for particulate matter less than 10 microns (federal PM<sub>10</sub> standard) in the Coso Junction Planning Area.

WHEREAS, the 2010 Coso Junction Maintenance Plan relies on Best Available Control Measures implemented at Owens Lake planning area through District Board Order 080128-01 as a maintenance measure to help ensure continued compliance with the federal PM<sub>10</sub> standard.

WHEREAS, on September 16, 2013, Board Order 080128-01 cited in Appendix C of the 2010 Coso Junction Maintenance Plan was revised as Board Order 130916-01 to amend the 2008 Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State Implementation Plan (SIP) to incorporate revisions to the date required for the implementation of Best Available Control Measures for the Phase 7a dust control areas and to modify certain Best Available Control Measure Descriptions. (Attachment 1)

WHEREAS, the dust control requirements for the Owens Valley SIP implemented under Board Order 080128-01 (SIP order, Attachment 1 - Exhibit 1) and approved as Appendix C of the Coso Junction Maintenance Plan were revised under Board Order 130916-01.

WHEREAS, the SIP order requires the City of Los Angeles, acting by and through its Los Angeles Department of Water and Power ("LADWP"), a municipal corporation organized under the Los Angeles City Charter and the Constitution and laws of the State of California, to construct Best Available Control Measure ("BACM") PM<sub>10</sub> controls on various emissive areas of the dried Owens Lake bed in Inyo County, California, and the SIP Order sets forth a methodology for identifying emissive lake bed areas that require BACM PM<sub>10</sub> controls.

WHEREAS, on September 25, 2009, the LADWP requested and was granted a conditional variance by the District Hearing Board (District Hearing Board Order Number GB09-06, Attachment 1 - Exhibit 2) to extend the deadline by one year for the completion of dust control measures in an approximately 3.1 square-mile area now known as "Phase 7a," which includes the six Dust Control Areas ("DCAs") designated as T37-1, T37-2, T1A-3, T1A-4, T-32-1 and T12-1.

WHEREAS, on March 17, 2011, the District Governing Board issued Stipulated Order for Abatement Number 110317-01 ("Order 110317-01") (Attachment 1 - Exhibit 3). Order 110317-01 extended the SIP Order and Hearing Board Order GB09-06 deadlines by which the LADWP was required to construct the Phase 7a dust control project. With the exception of DCA T12-1, Order 110317-01 required Phase 7a dust controls to be BACM controls. Order 110317-01 allows LADWP to conduct a BACM test of Tillage in DCA T12-1 and to transition approximately 3.0 square miles of existing BACM control areas to other types of BACM control ("Transition Area").

WHEREAS, Order 110317-01 requires LADWP to install the Phase 7a and Transition Area BACM controls by no later than December 31, 2013, and to install BACM controls in the T12-1 tillage test area by May 1, 2016. (*See also* Governing Board Order No. 120206-07.) Under Order 110317-01, all Phase 7a Areas and Transition Areas controlled by Managed Vegetation BACM are to achieve fully-compliant BACM vegetation cover by December 31, 2015.

WHEREAS, the LADWP subsequently determined that it would be unable to meet the deadlines set forth in Order No. 110317-01 and, after discussions with the District, entered into a settlement agreement with the District entitled *Phase 7a and Keeler Dunes Settlement Terms*, dated June 25, 2013 ("Term Sheet") that was approved by LADWP's Water and Power Commissioners on June 26, 2013, and the District's Governing Board on June 27, 2013. The Term Sheet is attached as Exhibit 4 in Attachment 1.

WHEREAS, the Term Sheet required the District and the LADWP to enter into a Settlement Agreement that formalized and approved the provisions of the Term Sheet. On August 19, 2013 and August 27, 2013, the District and LADWP, respectively, approved the *Settlement Agreement and Release Between the Great Basin Unified Air Pollution Control District and City of Los Angeles Acting by and Through its Department of Water and Power Concerning Modification to Phase 7a Stipulated Order for Abatement No. 110317 and Keeler Dunes Project* ("Settlement Agreement"). The Settlement Agreement is attached as Exhibit 5 in Attachment 1.

WHEREAS, the Term Sheet and Settlement Agreement required the District to modify Order 110317-01 to comply with the provisions of the Term Sheet and Settlement Agreement. On August 19, 2013, the Governing Board adopted Order No. 130819-01 – *Findings and Decision of District Governing Board Upon Hearing for Stipulated Modification to Stipulated Order for Abatement 110317-01* which modified Order 110317-01. Order 130819-01 is attached as Exhibit 6 in Attachment 1.

WHEREAS, the Term Sheet (Section II.B.1.c.) and Settlement Agreement (Section II.b.iii.) require that "The District shall amend the 2008 SIP and Board Order 080128-01 consistent with

the terms of this Agreement, ... and shall request the United States Environmental Protection Agency (“EPA”) and CARB [California Air Resources Board] to approve the amended Owens Valley SIP.”

WHEREAS, the District prepared and made available for review a written analysis of Board Order 080128-01 as required by Health & Safety Code §40727.2. (Attachment 2)

WHEREAS, the revisions to Board Order 080128-01 for PM10 control requirements in the Owens Valley are consistent with and not in conflict with or contradictory to, any existing statutes, court decisions, or State or federal regulations.

WHEREAS, the revisions to Board Order 080128-01 are written so that persons directly affected by it can easily understand its meaning.

WHEREAS, no changes have been made in the text of the revisions to Board Order 080128-01 originally made available to the public that are so substantial as to significantly affect its meaning.

WHEREAS, a proposed Notice of Exemption meeting the requirements of the California Environmental Quality Act was properly noticed and circulated, indicating the proposed revisions to Board Order 080128-01 are categorically and statutorily exempt from the requirements of CEQA.

NOW THEREFORE BE IT RESOLVED, in order to make Appendix C of the 2010 Coso Junction Maintenance Plan consistent with the requirements of Board Order 130916-01 the District Governing Board hereby amends the 2010 Coso Junction Maintenance Plan to replace Board Order 080128-01 in Appendix C with a revised Board Order 080128-01 as amended by Board Order 130916-01, and directs the Board Clerk to promptly submit the revised Board Order 080128-01 to the California Air Resources Board (“CARB”) for approval and forwarding to the U.S. Environmental Protection Agency (“EPA”) for its consideration and approval.

BE IT FURTHER RESOLVED, that the revisions to Board Order 080128-01 contained in Appendix C of the 2010 Coso Junction Maintenance Plan and shown in underline strike-out form in Attachment 3 and incorporated in a clean version in Attachment 4 are summarized as follows:

A. **PHASE 7a DUST CONTROLS**

1. **Deadline Extensions**: The deadlines for constructing dust controls in the “Moat & Row” areas (now known as the “Phase 7a” areas) are revised to be consistent with the new timeframes discussed below in subdivisions (a)-(d):
  - a. With the exceptions noted below, the deadline for LADWP to construct all infrastructure and install fully-compliant BACM PM<sub>10</sub> controls (other than Managed Vegetation BACM) in those portions of the “2008 Dust Control Area” known as the

- “Phase 7a” areas, which total approximately 3.1 square miles, shall be December 31, 2015. All infrastructure and plant materials for Phase 7a areas controlled with Managed Vegetation BACM will be installed by December 31, 2015. The Phase 7a areas are a portion of the 2008 Dust Control Area previously referred to in Board Order 080128-01 as “Moat & Row Dust Control Areas” and are shown and described in Exhibit 1 of the amended order.
- b. The deadline to achieve fully-compliant BACM vegetation cover for those Phase 7a areas controlled by the Managed Vegetation BACM shall be December 31, 2017.
  - c. The extensions of the deadlines set forth in sections A.1.a. and A.1.b. shall be contingent upon all of the following:
    - (1) LADWP timely receiving from California State Lands Commission (“CSLC”) and all other agencies all of the required permits, approvals, or leases necessary to allow LADWP to construct BACM controls within the deadlines set forth in sections A.1.a. and A.1.b..
    - (2) The timely removal from the Phase 7a areas of all California Register of Historical Resources (“CRHR”)-eligible areas plus necessary buffer areas, referred to as the “Eligible Cultural Resource (“ECR”) areas.” The ECR areas initially consist of 277 acres of the Phase 7a areas (the “Initial Phase 7b Areas”). The Initial ECR areas and any newly discovered CRHR-eligible and necessary buffer areas shall comprise the “Phase 7b” areas. The Phase 7b Areas are not limited to the initial 277 acres.
    - (3) Order 110317-01 being revised to state explicitly that any newly discovered potential ECRs in the Phase 7a areas are considered a condition of force majeure under paragraph 5(d) of that Order.
  - d. If any one of the above contingencies is not met, LADWP may seek further extensions of time under the provisions of paragraph 5 of Order 110317-01, as modified by Order 130819-01, and paragraphs 6 and 22 of Order 110317-01, which shall not be unreasonably denied by the District.
2. **Removal of Phase 7b Areas:** LADWP shall not be required to install dust controls in the Phase 7b areas (initially, 277 acres) under the provisions of the 2008 Owens Valley SIP, Order 080128-01 (adopted 1/28/2008) or Order 130819-01, and the following is added to amended Order 080128-01:

If the District Governing Board subsequently decides to order LADWP to install dust controls in Initial Phase 7b Areas, the District Governing Board will do so by issuing a new Board order or orders. The new Board order or orders shall include deadlines for constructing dust controls that accommodate project circumstances. Any future order or orders issued by the District for Phase 7b will give due consideration to the shared goal of the District and LADWP to control

air pollution and decrease the use of water as a dust control measure at Owens Lake. LADWP is not waiving its right to contest the new Board order or orders.

3. **Figure Revisions:** Board Order 080128-01, Exhibit 1 is revised to identify:
  - a. The Moat & Row Areas as “Phase 7a”
  - b. The location of “Brine Shallow Flooding” BACM
  - c. The existing shallow flooding areas to be transitioned to other BACM as part of the Phase 7a project, and
  - d. The completed BACM controls in the Phase 8 area.

**B. BEST AVAILABLE CONTROL MEASURE (BACM) MODIFICATIONS**

1. **Reduced Thickness Gravel:** As an alternative to the use of a gravel blanket at least four inches thick in 17.A. [of Board Order 080128-01], the Governing Board approves “Reduced Thickness Gravel” as an approved type of Gravel Blanket BACM. For Reduced Thickness Gravel the gravel thickness is reduced from a minimum of four inches (4”) to two inches (2”) and all reduced thickness gravel areas shall be underlain with geotextile fabric. One hundred percent of the control area shall be covered with a layer of gravel and all gravel material placed must be screened to a size greater than one-half inch (½ inch) in diameter. All geotextile fabric shall be Class I woven or nonwoven geotextile fabric meeting the minimum specifications set forth in the National Standard Materials Specification “Material Specification 592—Geotextile” (National Engineering Handbook, Chapter 3, Part 642), or equivalent as approved by the Air Pollution Control Officer. The gravel shall have resistance to leaching and erosion. It shall be no more toxic than the gravel from the Keeler fan site analyzed by the District in the Final Environmental Report prepared for the 1997 SIP. To minimize visual impacts, all gravel used shall be comparable in coloration to the existing lake bed soils.
2. **Brine Shallow Flood:** The Governing Board approves “Brine Shallow Flooding BACM” as a subcategory of Shallow Flooding BACM. Brine Shallow Flooding is defined per the “Shallow Flooding BACM” in the 2008 Owens Valley SIP except that the water used for dust control may contain elevated levels of dissolved salts. The Air Pollution Control Officer will develop a Brine Shallow Flood BACM compliance methodology with input from the LADWP. The District and LADWP acknowledge and agree that the District’s approval of Brine Shallow Flooding BACM shall not make LADWP liable for maintenance of the existing natural Brine Pool on Owens Lake. The existing “natural Brine Pool” is defined as those areas at Owens Lake below elevation 3,553.55 feet.
3. **BACM Testing and Approval:** The District shall work with LADWP on accelerated testing schedules and BACM approval, if warranted, for Engineered Roughness Elements and Tillage in soil type areas where these controls can be applied. The District Governing Board shall consider BACM approval of these candidate measures by September 28, 2014. If the accelerated testing does not result in approved BACM for the candidate measures, the District’s and LADWP’s respective Boards shall jointly assess why the accelerated testing did not result in the District Board’s BACM approval. The District and

LADWP shall also work on accelerated testing schedules and BACM approvals for other forms of BACM controls.

BE IT FURTHER RESOLVED, that the Governing Board of the Great Basin Unified Air Pollution Control District hereby finds and determines to be true, on the basis of substantial evidence, each statement of fact, and hereby adopts on the basis of the record of this proceeding each conclusion of law, set forth in the recitals to this resolution.

BE IT FURTHER RESOLVED, that on the basis of the foregoing, the Governing Board of the Great Basin Unified Air Pollution Control District hereby authorizes and directs the Air Pollution Control Officer to execute on behalf of the District a Notice of Exemption for these rule revisions, and to file or record the notice reflecting that action as provided by applicable law.

BE IT FURTHER RESOLVED, that the District shall prepare and maintain a record of this SIP amendment and Board Order revision in accordance with Health & Safety Code §40728.

BE IT FURTHER RESOLVED, that the effective date of this Order to amend the Coso Junction PM10 Maintenance Plan and revise Board Order 080128-01 as contained in Appendix C of the 2010 Coso Junction PM10 Maintenance Plan shall be December 11, 2013.

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APPROVED, ADOPTED and ORDERED by the Governing Board of the Great Basin Unified Air Pollution Control District this 11<sup>th</sup> day of December, 2013 by the following vote:

Yes: Board Members - Eastman, Hames, Rawson, Arcularius, Johnston, Hunt

No: 0

Abstain: 0

  
 John Eastman, Chair of the Governing Board

Attest:

  
 Tori DeHaven, Clerk of the Governing Board

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Attachment 1 – Governing Board Order 130916-01 with Exhibits 1 – 8.

Exhibit 1 *2008 Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State Implementation Plan* Board Order Number 080128-01 (“SIP Order”)

Exhibit 2 District Hearing Board Order GB09-06, *Findings and Order Granting Regular variance from Requirements set Forth in Governing Board Order 080128-01*, September 25, 2009.

Exhibit 3 Stipulated Order for Abatement Number 110317-01

Exhibit 4 *Phase 7a and Keeler Dunes Settlement Terms* dated June 25, 2013 (“Term Sheet”)

Exhibit 5 *Settlement Agreement and Release Between the Great Basin Unified Air Pollution Control District and City Of Los Angeles Acting by and Through its Department of Water and Power Concerning Modification to Phase 7a Stipulated Order for Abatement No. 110317 and Keeler Dunes Project*, dated August 19, 2013 (“Settlement Agreement”)

Exhibit 6 District Governing Board Order Number 130819-01 – *Findings and Decision of District Governing Board Upon Hearing for Stipulated Modification to Stipulated Order for Abatement 110317-01*, dated August 19, 2013

Exhibit 7 Map of Phase 7a areas

Exhibit 8 Map of Keeler and Other Dune Areas

Attachment 2 – Analysis of BO 080128-01 as Amended by BO 130916-01 Under CH&SC § 40727.2 (a)

Attachment 3 – Underline-strikeout Version of Revised Board Order 080128-01

Attachment 4 – Clean Version of Revised Board Order 080128-01

# Attachment 1

**Governing Board Order 130916-01 with Exhibits 1 – 8**



Theodore D. Schade  
Air Pollution Control Officer



## GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

157 Short Street, Bishop, California 93514-3537  
760-872-8211 Fax: 760-872-6109

### **B O 130916-01**

September 16, 2013

**I HEREBY CERTIFY** that Board Order No. 130916-01 was duly adopted and issued by the Governing Board of the Great Basin Unified Air Pollution Control District at a regular meeting on September 16, 2013, held in the Town of Mammoth Lakes Town Council Chambers, 437 Old Mammoth Road, Suite Z, Mammoth Lakes, California and entered as follows:

**AGENDA ITEM #4: APPROVAL OF AN ORDER AMENDING THE 2008 OWENS VALLEY PM<sub>10</sub> PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN**

A motion was made by Arcularius and seconded by Rawson adopting the proposed Board Order 130916-01 with a modification to remove reference in the order to the Coso Junction Maintenance Plan. The following findings were also made:

1. That the Governing Board conducted a public hearing as required for a State Implementation Plan (SIP) revision.
2. That the Governing Board adopted the amendment to the 2008 Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State Implementation Plan to incorporate revisions to the date required for the implementation of Best Available Control Measures for the "Phase 7a" dust control areas, modifying certain Best Available Control Measure Descriptions and modifying provisions for PM<sub>10</sub> control in the Keeler Dunes.
3. That the Governing Board directed the Clerk of the Board to submit the SIP revision to the California Air Resources Board for forwarding to the United States Environmental Protection Agency.

Ayes: Board Members – Eastman, Hames, Rawson, Arcularius, Kingsley, Johnston, Hunt

Noes: Ø

Abstain: Ø

Absent: Ø

Motion carried 7/0 and so ordered.

**B/O #130916-01**  
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ATTEST:



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Tori DeHaven, Clerk of the Board

**BOARD ORDER 130916-01**  
**ORDER OF THE GOVERNING BOARD OF THE**  
**GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT**  
**AMENDING THE 2008 OWENS VALLEY PM<sub>10</sub> PLANNING AREA**  
**DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN**  
**TO INCORPORATE REVISIONS TO THE DATE REQUIRED FOR THE IMPLEMENTATION OF**  
**BEST AVAILABLE CONTROL MEASURES FOR THE “PHASE 7A” DUST CONTROL AREAS,**  
**MODIFYING CERTAIN BEST AVAILABLE CONTROL MEASURE DESCRIPTIONS AND**  
**MODIFYING PROVISIONS FOR PM<sub>10</sub> CONTROL IN THE KEELER DUNES**

*September 16, 2013*

WHEREAS, on February 1, 2008, the Governing Board of the Great Basin Unified Air Pollution Control District (“District”), an agency organized pursuant to Division 26, Part 3, Chapter 3 of the California Health and Safety Code, approved the *2008 Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State Implementation Plan* (“2008 SIP”) and its associated implementing Board Order Number 080128-01 (“SIP Order”). The SIP Order is attached as Exhibit 1.

WHEREAS, the SIP order requires the City of Los Angeles, acting by and through its Los Angeles Department of Water and Power (“LADWP”), a municipal corporation organized under the Los Angeles City Charter and the Constitution and laws of the State of California, to construct Best Available Control Measure (“BACM”) PM<sub>10</sub> controls on various emissive areas of the dried Owens Lake bed in Inyo County, California. The SIP Order sets forth a methodology for identifying emissive lake bed areas that require BACM PM<sub>10</sub> controls.

WHEREAS, on September 25, 2009, the LADWP requested and was granted a conditional variance by the District Hearing Board (District Hearing Board Order Number GB09-06, Exhibit 2) to extend the deadline by one year for the completion of dust control measures in an approximately 3.1 square-mile area now known as “Phase 7a,” which includes the six Dust Control Areas (“DCAs”) designated as T37-1, T37-2, T1A-3, T1A-4, T-32-1 and T12-1.

WHEREAS, on March 17, 2011, the District Governing Board issued Stipulated Order for Abatement Number 110317-01 (“Order 110317-01”) (Exhibit 3). Order 110317-01 extended the SIP Order and Hearing Board Order GB09-06 deadlines by which the LADWP was required to construct the Phase 7a dust control project. With the exception of DCA T12-1, Order 110317-01 required Phase 7a dust controls to be BACM controls. Order 110317-01 allows LADWP to conduct a BACM test of Tillage in DCA T12-1 and to transition approximately 3.0 square miles of existing BACM control areas to other types of BACM control (“Transition Area”).

WHEREAS, Order 110317-01 requires LADWP to install the Phase 7a and Transition Area BACM controls by no later than December 31, 2013, and to install BACM controls in the T12-1 tillage test area by May 1, 2016. (*See also* Governing Board Order No. 120206-07.) Under Order 110317-01, all Phase 7a Areas and Transition Areas controlled by Managed Vegetation BACM are to achieve fully-compliant BACM vegetation cover by December 31, 2015.

WHEREAS, the LADWP subsequently determined that it would be unable to meet the deadlines set forth in Order No. 110317-01 and, after discussions with the District, entered into a settlement agreement with the District entitled *Phase 7a and Keeler Dunes Settlement Terms*, dated June 25, 2013 (“Term Sheet”) that was approved by LADWP’s Water and Power Commissioners on June 26, 2013, and the District’s Governing Board on June 27, 2013. The Term Sheet is attached as Exhibit 4.

WHEREAS, the Term Sheet required the District and the LADWP to enter into a Settlement Agreement that formalized and approved the provisions of the Term Sheet. On August 19, 2013 and August 27, 2013, the District and LADWP, respectively, approved the *Settlement Agreement and Release Between the Great Basin Unified Air Pollution Control District and City of Los Angeles Acting by and Through its Department of Water and Power Concerning Modification to Phase 7a Stipulated Order for Abatement No. 110317 and Keeler Dunes Project* (“Settlement Agreement”). The Settlement Agreement is attached as Exhibit 5.

WHEREAS, the Term Sheet and Settlement Agreement required the District to modify Order 110317-01 to comply with the provisions of the Term Sheet and Settlement Agreement. On August 19, 2013, the Governing Board adopted Order No. 130819-01 – *Findings and Decision of District Governing Board Upon Hearing for Stipulated Modification to Stipulated Order for Abatement 110317-01* which modified Order 110317-01. Order 130819-01 is attached as Exhibit 6.

WHEREAS, the Term Sheet (Section II.B.1.c.) and Settlement Agreement (Section II.b.iii.) require that “The District shall amend the 2008 SIP and Board Order 080128-01 consistent with the terms of this Agreement, ... and shall request the United States Environmental Protection Agency (“EPA”) and CARB [California Air Resources Board] to approve the amended SIP.”

THEREFORE, as required by the Term Sheet and Settlement Agreement, the District Governing Board hereby makes the following amendments to the 2008 SIP and the 2008 SIP Order, and directs the Board Clerk to promptly submit the two amended documents to the California Air Resources Board (“CARB”) for approval and forwarding to the U.S. Environmental Protection Agency (“EPA”) for its consideration and approval. The District requests that the CARB and EPA consider the above two amendments separately and approve those portions that are approvable. It is the intention of the Governing Board to only make such amendments that are necessary to implement and enforce the terms and provisions of the Term Sheet, Settlement Agreement and Abatement Order Number 130819-01.

The amendments to the 2008 SIP and 2008 SIP Order are as follows:

**A. PHASE 7a DUST CONTROLS**

1. **Deadline Extensions**: All of the locations in the 2008 SIP and SIP Order that discuss the deadlines for constructing dust controls in the “Moat & Row” areas (now known as the “Phase 7a” areas) shall be revised to be consistent with the new timeframes discussed below in subdivisions (a)-(d) and the following shall be added to the 2008 SIP and SIP Order:

- a. With the exceptions noted below, the deadline for LADWP to construct all infrastructure and install fully-compliant BACM PM<sub>10</sub> controls (other than Managed Vegetation BACM) in those portions of the “2008 Dust Control Area” (SIP Sec. 7.3 and SIP Order paragraphs 2 and 3) known as the “Phase 7a” areas, which total approximately 3.1 square miles, shall be December 31, 2015. All infrastructure and plant materials for Phase 7a areas controlled with Managed Vegetation BACM will be installed by December 31, 2015. The Phase 7a areas are a portion of the 2008 Dust Control Area previously referred to in the 2008 SIP and SIP Order as “Moat & Row Dust Control Areas” and are shown and described in Exhibit 7.
  - b. The deadline to achieve fully-compliant BACM vegetation cover for those Phase 7a areas controlled by the Managed Vegetation BACM shall be December 31, 2017. (See 2008 SIP Section 7.3 and SIP Order paragraph 3)
  - c. The extensions of the deadlines set forth in sections A.1.a. and A.1.b. shall be contingent upon all of the following:
    - (1) LADWP timely receiving from California State Lands Commission (“CSLC”) and all other agencies all of the required permits, approvals, or leases necessary to allow LADWP to construct BACM controls within the deadlines set forth in sections A.1.a. and A.1.b..
    - (2) The timely removal from the Phase 7a areas of all California Register of Historical Resources (“CRHR”)-eligible areas plus necessary buffer areas, referred to as the “Eligible Cultural Resource (“ECR”) areas.” The ECR areas initially consist of 277 acres of the Phase 7a areas (the “Initial Phase 7b Areas”). The Initial ECR areas and any newly discovered CRHR-eligible and necessary buffer areas shall comprise the “Phase 7b” areas. The Phase 7b Areas are not limited are not limited to the initial 277 acres.
    - (3) Order 110317-01 being revised to state explicitly that any newly discovered potential ECRs in the Phase 7a areas are considered a condition of force majeure under paragraph 5(d) of that Order.
  - d. If any one of the above contingencies is not met, LADWP may seek further extensions of time under the provisions of paragraph 5 of Order 110317-01, as modified by Order 130819-01, and paragraphs 6 and 22 of Order 110317-01, which shall not be unreasonably denied by the District.
2. **Removal of Phase 7b Areas:** All of the locations in the 2008 SIP and SIP Order that discuss or identify the boundaries of Moat & Row (now Phase 7a) shall be revised to recognize that LADWP shall not be required to install dust controls in the Phase 7b areas (initially, 277 acres) under the provisions of the 2008 SIP, the SIP Order, Order 110317-01 or Order 130819-01, and the following shall be added to the 2008 SIP and SIP Order:

If the District Governing Board subsequently decides to order LADWP to install dust controls in Initial Phase 7b Areas, the District Governing Board will do so by issuing a new Board order or orders. The new Board order or orders shall include deadlines for constructing dust controls that accommodate project circumstances. Any future order or orders issued by the District for Phase 7b will give due consideration to the shared goal of the District and LADWP to control air pollution and decrease the use of water as a dust control measure at Owens Lake. LADWP is not waiving its right to contest the new Board order or orders.

3. **Figure Revisions:** The existing figures in the 2008 SIP, including Figure 2.3 and 7.1, and SIP Order Exhibit 1 shall be revised to identify:
  - a. The Moat & Row Areas as “Phase 7a”
  - b. The location of “Brine Shallow Flooding” BACM
  - c. The existing shallow flooding areas to be transitioned to other BACM as part of the Phase 7a project, and
  - d. The completed BACM controls in the Phase 8 area.

**B. BEST AVAILABLE CONTROL MEASURE (BACM) MODIFICATIONS**

1. **Reduced Thickness Gravel:** All of the locations in the 2008 SIP and SIP Order that discuss the Gravel Blanket BACM control shall be revised to recognize that the District Governing Board approves “Reduced Thickness Gravel” as an approved type of the Gravel Blanket BACM. Reduced Thickness Gravel is defined per the 2008 SIP Section 5.4 and SIP Order paragraph 17 except that the gravel thickness is reduced from a minimum of four inches (4”) to two inches (2”) and all reduced thickness gravel areas shall be underlain with geotextile fabric. All geotextile fabric shall be Class I woven or nonwoven geotextile fabric meeting the minimum specifications set forth in the National Standard Materials Specification “Material Specification 592—Geotextile” (National Engineering Handbook, Chapter 3, Part 642), or equivalent as approved by the Air Pollution Control Officer.
2. **Brine Shallow Flood:** The following shall be added to the 2008 SIP and SIP Order:

The Governing Board approves “Brine Shallow Flooding BACM” as a subcategory of Shallow Flooding BACM. Brine Shallow Flooding is defined per the “Shallow Flooding BACM” in the 2008 SIP except that the water used for dust control may contain elevated levels of dissolved salts. The Air Pollution Control Officer will develop a Brine Shallow Flood BACM compliance methodology with input from the LADWP.

The District and LADWP acknowledge and agree that the District’s approval of Brine Shallow Flooding BACM shall not make LADWP liable for maintenance of

the existing natural Brine Pool on Owens Lake. The existing “natural Brine Pool” is defined as those areas at Owens Lake below elevation 3,553.55 feet.

3. **Removal of Moat & Row:** Remove the following sentence from the fourth paragraph of Section 2.1.1.1 “LOCATION” in the 2008 SIP:

If the Moat & Row control measures cannot achieve the necessary PM<sub>10</sub> control efficiency for the indicated areas (ranges from 50% to 99%), the unsuccessful Moat & Row areas must be converted to Shallow Flooding.

4. **BACM Testing and Approval:** The following shall be added to the 2008 SIP Section 7.9 “CHANGES TO BACM” and to the SIP Order as Paragraph 12.a.:

The District shall work with LADWP on accelerated testing schedules and BACM approval, if warranted, for Engineered Roughness Elements and Tillage in soil type areas where these controls can be applied. The District Governing Board shall consider BACM approval of these candidate measures by September 28, 2014. If the accelerated testing does not result in approved BACM for the candidate measures, the District’s and LADWP’s respective Boards shall jointly assess why the accelerated testing did not result in the District Board’s BACM approval. The District and LADWP shall also work on accelerated testing schedules and BACM approvals for other forms of BACM controls.

5. **Waterless BACM:** Revise the first sentence in Section 7.9 “CHANGES TO BACM” of the 2008 SIP adding the underlined text:

Existing BACM controls may be replaced with other BACM to help reduce implementation and operating costs and water usage. The District and LADWP shall make every effort to develop, approve and deploy high-confidence, waterless dust control measures in all areas where dust controls are ordered on Owens Lake. In addition, control measure research may identify new BACM control methods that are as effective as the BACM methods discussed in Chapter 5. Any approved BACM can be changed to any other approved BACM, however, with the exception of the provisions made in Order 110317-01 for “Transition Areas,” associated with the such transitions must be done in a manner that at all times results in the performance specifications for one or the other BACMs being met. Any environmental analyses, permits or leases required as a result of the transition are the sole responsibility of the City.

### C. **KEELER DUNES**

1. **2008 SIP Section 6.4:** The third paragraph in Section 6.4 of the 2008 SIP titled “ATTAINMENT DEMONSTRATION” shall be removed and replaced with the following:

Emissions from the Keeler dunes were excluded from the simulations to assess attainment in the 2008 SIP. As discussed in more detail in Section 7.5, the District

will work with federal, state and local agencies, other than LADWP, to develop a plan to control dust emissions from the Keeler dunes. Any PM<sub>10</sub> control measures necessary for the Keeler dunes will be implemented by the District, or by entities other than the LADWP, by December 31, 2015.

2. **2008 SIP Section 7.5:** Section 7.5 of the 2008 SIP titled “DUST CONTROLS FOR KEELER DUNES” shall be removed and replaced with the following:

The Keeler dunes are located northwest of the town of Keeler above the 3,600-foot elevation that defines the regulatory Owens Lake shoreline (Figure 4.14). The total area covered by deep sand is about 0.64 square kilometers (157 acres). Figure 7.4 shows a sand dune about one-half mile north of Keeler in the Keeler dune field that formed across the abandoned State highway. Sensitive and sand catchers have been installed in the Keeler dunes so that their PM<sub>10</sub> emissions can be modeled, and not attributed to lakebed sources.

Due to their proximity to the town of Keeler, dust emissions from the Keeler dunes contribute significantly to exceedances of the federal PM<sub>10</sub> standard in the town. After all the Owens Lake bed sources that cause or contribute to PM<sub>10</sub> standard exceedances are controlled, the Keeler dunes area is expected to be the only significant remaining dust source that causes exceedances of the PM<sub>10</sub> standard in the planning area.

In June 2013, in an agreement with the LADWP, the District committed to implement a PM<sub>10</sub> control project on the Keeler Dunes with funding provided by the LADWP. The District will work with federal, state and local agencies, other than the LADWP, to develop and implement a project to control dust emissions from the Keeler dunes. This project is known as the “Keeler Project.” The District shall have exclusive authority over, and responsibility for, the Keeler Project including, but not limited to, environmental impact analysis, design, permitting, construction, operation, maintenance, management, and monitoring. The Keeler Project includes all those portions of the Keeler Dunes owned by LADWP and the United States Bureau of Land Management (“BLM”). LADWP shall have no responsibility for the design, permitting, construction, operation, maintenance, management, monitoring and any other activities directly and exclusively related to the Keeler Project for as long as dust controls are required. Any dust monitoring undertaken by the District on LADWP’s Keeler Dunes property shall exclusively be for the Keeler Project and shall not be used for any other purpose.

In addition, the District forever releases LADWP from any and all liability under any and all federal, state and local laws that the District can enforce and settle, including but not limited to the Health and Safety Code, those portions of the 2008 SIP and SIP Order that can be enforced by the District, and fugitive dust emission rules, for dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of the Keeler Dunes owned by LADWP. The District forever agrees not to

request, encourage, or join in an enforcement action by any other agency against LADWP related to dust emissions from the Keeler Dunes, regardless of origin, including but not limited to portions of the Keeler Dunes owned by LADWP. A map defining the geographical boundaries of the Keeler Dunes is attached as Exhibit 8 and incorporated into the 2008 SIP and SIP Order. Keeler Dunes controls will be implemented by December 31, 2015.

The other major dune area, the Olancho dunes, is shown in Figure 4.14 and was not monitored or included in the model. The Olancho dunes are believed to be primarily natural dunes. If PM<sub>10</sub> violations are attributed to the Olancho dunes, these violations will be treated as natural events and a Natural Events Action Plan will be developed and implemented in accordance with the USEPA guidance and rules on Exceptional Events (see Section 2.2.3.3). In addition, the District forever releases LADWP from any and all liability under any and all federal, state, and local laws that the District can enforce and settle, including but not limited to the Health and Safety Code, those portions of the 2008 SIP and SIP Order that can be enforced by the District, and fugitive dust emission rules, for dust emissions from the Other Dunes Areas in the vicinity of Owens Lake, regardless of origin, including but not limited to portions of the Other Dunes Areas that may be owned by LADWP. The District forever agrees not to request, encourage, or join in an enforcement action by any other agency against LADWP related to dust emissions from the Other Dunes Areas in the vicinity of Owens Lake, regardless of origin. The LADWP is not released from liability for dust emissions resulting from any future groundwater pumping by LADWP at or below the 3600-foot contour in the Owens Lake area. Maps defining the geographical boundaries of the Other Dunes Areas is attached as Exhibit 8 and incorporated into the 2008 SIP and SIP Order.

3. **2008 SIP Section 7.10**: The fourth paragraph in Section 7.10 of the 2008 SIP titled "IMPLEMENTATION MILESTONES AND EMISSION REDUCTIONS" shall be removed and replaced with the following:

Attainment of the federal PM<sub>10</sub> standard is expected by the end of 2017. By this time, the District expects to have at least one year of air monitoring data that show no violations of the federal standard in the planning area.

4. **2008 SIP Section 7.11**: Section 7.11 of the 2008 SIP titled "REASONABLE FURTHER PROGRESS" shall be removed and replaced with the following:

Under CAAA Section 189(c), the demonstration of attainment SIP is required to include quantitative milestones that are to be achieved every three years until the area is redesignated attainment. These milestones must demonstrate reasonable further progress toward attainment of the NAAQS by the attainment date. Table 7.1 includes the estimated emissions reductions associated with the various control strategies to achieve the emission reduction trend as shown in Figure 7.5 to demonstrate reasonable further progress toward attaining the NAAQS. Milestones associated with this 2008 SIP include completion of Phase 7a dust controls by

December 31, 2015, with full compliance of BACM Managed Vegetation areas by December 31, 2017 (unless the time frames are extended as provided by Orders 110317-01 and 130819-01 or the Phase 7a areas become Phase 7b areas), and control of the Keeler dunes by December 31, 2015. The contingency measures shall not be triggered against LADWP for Phase 7b or the District's failure to control Keeler Dunes by December 31, 2015. As required by Section 189(c)(2) of the CAAA, the District shall submit to the USEPA, no later than 90 days after the date of each milestone, a demonstration that each milestone has been met.

5. **2008 SIP Table 7.1:** Table 7.1 titled "Control strategy milestones and estimated PM<sub>10</sub> emission reductions" shall be modified by":
- a. Renaming the Table "Estimated PM10 emissions for control strategies."
  - b. Replacing the "Milestone" category with "Control Strategy."
  - c. Removing the term "Moat & Row" and replacing it with "Phase 7a."
  - d. In the "Keeler dunes control area" row of the "1<sup>st</sup> Year in Full Operation" column, removing "2014" and replacing it with "2016."

**The effective date of this Order and all its amendments shall be September 16, 2013.**

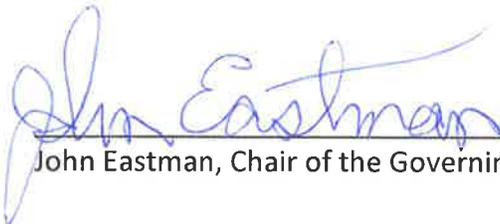
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APPROVED, ADOPTED and ORDERED by the Governing Board of the Great Basin Unified Air Pollution Control District this 16<sup>th</sup> day of September, 2013 by the following vote:

Yes: Board Members - Eastman, Hames, Rawson, Arcularius  
Kingsley, Johnston, Hunt

No: 0

Abstain: 0

  
John Eastman, Chair of the Governing Board

Attest:

  
Tori DeHaven, Clerk of the Governing Board

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**List of Exhibits**

- Exhibit 1      *2008 Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State Implementation Plan* Board Order Number 080128-01 (“SIP Order”)
- Exhibit 2      District Hearing Board Order GB09-06, *Findings and Order Granting Regular variance from Requirements set Forth in Governing Board Order 080128-01*, September 25, 2009.
- Exhibit 3      Stipulated Order for Abatement Number 110317-01
- Exhibit 4      *Phase 7a and Keeler Dunes Settlement Terms* dated June 25, 2013 (“Term Sheet”)
- Exhibit 5      *Settlement Agreement and Release Between the Great Basin Unified Air Pollution Control District and City Of Los Angeles Acting by and Through its Department of Water and Power Concerning Modification to Phase 7a Stipulated Order for Abatement No. 110317 and Keeler Dunes Project*, dated August 19, 2013 (“Settlement Agreement”)
- Exhibit 6      District Governing Board Order Number 130819-01 – *Findings and Decision of District Governing Board Upon Hearing for Stipulated Modification to Stipulated Order for Abatement 110317-01*, dated August 19, 2013
- Exhibit 7      Map of Phase 7a areas
- Exhibit 8      Map of Keeler and Other Dune Areas

***Great Basin Unified Air Pollution Control District***

2013 Amendment to the Owens Valley PM<sub>10</sub> SIP

**Board Order 130916-01**

Exhibit 1: 2008 Owens Valley PM<sub>10</sub> Planning Area  
Demonstration of Attainment State Implementation Plan  
Board Order Number 080128-01 (“SIP Order”)

**BOARD ORDER # 080128-01**  
**REQUIRING THE CITY OF LOS ANGELES TO UNDERTAKE MEASURES TO**  
**CONTROL PM<sub>10</sub> EMISSIONS FROM THE DRIED BED OF OWENS LAKE**

With regard to the control of PM<sub>10</sub> emissions from the bed of Owens Lake, the Governing Board of the Great Basin Unified Air Pollution Control District (District) orders the City of Los Angeles (City) as follows:

**PREAMBLE**

- A. WHEREAS, the 1998 Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State Implementation Plan (1998 SIP), dated November 16, 1998 and the 2003 Revision to the Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State Implementation Plan (2003 SIP), dated November 13, 2003, require the City to implement a series of measures and actions to reduce particulate emissions from the Owens Lake bed such that the Owens Valley Planning Area (OVPA) will attain and maintain the federal 24-hour National Ambient Air Quality Standards (NAAQS) for particulate matter (PM<sub>10</sub>) by the statutory deadlines;
- B. WHEREAS, the District is required by law to maintain its discretion to protect the environment, public health and safety, and this Order is intended to fulfill those duties without improperly constraining that lawful exercise of discretion;
- C. WHEREAS, based on additional information collected subsequent to the information used to adopt the 1998 SIP and 2003 SIP, the District has determined that additional measures and actions will be required to continue to reduce particulate emissions in the OVPA such that the OVPA will attain and maintain the federal 24-hour NAAQS for PM<sub>10</sub> by the statutory deadlines;
- D. WHEREAS, in 2006 a dispute arose between the District and the City regarding the District's requirements for the City to control dust from additional areas at Owens Lake beyond those areas identified in the 2003 SIP;
- E. WHEREAS, on December 4, 2006 a Settlement Agreement was approved by both the District and the City. Under the provisions of this agreement, the City agreed to implement additional dust control measures by April 1, 2010 and the District agreed to revise the 2003 SIP before March 1, 2008 to incorporate the provisions of the Settlement Agreement;
- F. WHEREAS, on March 23, 2007, the U.S. Environmental Protection Agency (USEPA) published a finding that the Owens Valley Planning Area did not attain the 24-hour NAAQS for particulate matter of 10 microns or less (PM<sub>10</sub>) by December 31, 2006 as mandated by the U.S Clean Air Act Amendments of 1990;
- G. WHEREAS, as a result of the USEPA finding, the 2003 SIP must be revised to include a control strategy that will provide for attainment in the Owens Valley Planning Area as

soon as practicable and that said revised SIP must be submitted to the USEPA by December 31, 2007;

- H. WHEREAS, in consideration of the District's continuing duties under federal and state law, including but not limited to the Clean Air Act, to control particulate emissions from the Owens Lake bed without interruption, the District intends, if this Order is stayed or disapproved, that Board Order #031113-01 (adopted on November 13, 2003) shall continue to be in effect, so that at all times there will be continuous control of these emissions;
- I. WHEREAS, the District thereby intends that if this Order is stayed due to a legal challenge, including but not limited to a challenge to this Order under California Health and Safety Code Section 42316, to the State Implementation Plan, or to the Environmental Impact Report for this SIP, or if this Order is disapproved by the California Air Resources Board (CARB), the District will revert to enforce the terms of Board Order #031113-01 which shall continue to be in effect and shall remain in full force for the duration of any stay or, in the case of disapproval, unless and until another Order is issued by this Board; and
- J. WHEREAS, to prevent the deterioration of air quality due to dismantling or "backsliding" on control measures that have already been implemented before any such stay or disapproval, the District intends that the City shall continue to operate and maintain all control measures already implemented at the time of any such stay or disapproval without interruption, unless and until a further Order of the District allows for such interruption, if the City has not appealed the control measures under Section 42316 within 30 days of the effective date of this Order, and if those control measures were not invalidated as a result of that appeal;
- K. WHEREAS, it is the District's intention that this 2008 revised SIP is consistent with the 2006 Settlement Agreement between the District and the City and that it is the District's intention to independently meet all its commitments and obligations under said Settlement Agreement.

**THEREFORE, IT IS HEREBY ORDERED AS FOLLOWS:**

**ORDER**

**IMPLEMENTATION OF OWENS LAKE BED PM<sub>10</sub> CONTROL MEASURES**

1. Existing PM<sub>10</sub> controls – From the date of adoption of this order, the City shall continue to operate and maintain the existing Best Available Control Measures (BACM) for PM<sub>10</sub>, as described in Paragraph 8 hereof, on 29.8 square miles of the Owens Lake bed within the 2003 Dust Control Area (DCA) delineated in Exhibit 1.
2. Additional Shallow Flood supplemental PM<sub>10</sub> controls – By April 1, 2010 the City shall implement a minimum of 9.2 square miles of additional Shallow Flooding BACM PM<sub>10</sub>

controls within the 12.7 square-mile area known as the 2006 Supplemental Dust Control Area (SDCA) delineated in Exhibit 1. The areas within the SDCA designated for Shallow Flooding only are delineated in Exhibit 1. Shallow Flooding BACM is described in Paragraphs 8, 9 and 15 hereof.

3. Other additional supplemental PM<sub>10</sub> controls – On a maximum of 3.5 square miles within the 2006 SDCA delineated in Exhibit 1, the City shall implement BACM for PM<sub>10</sub>, as described in Paragraphs 8, 9 and 15 through 17 hereof, or the City may implement the alternative non-BACM PM<sub>10</sub> control measure known as “Moat & Row,” as described in Paragraph 18. If BACM are installed, the controls shall be operational by April 1, 2010. If Moat & Row is installed, it shall be operational by October 1, 2009.
4. Channel Area PM<sub>10</sub> controls – A 0.5 square-mile area of natural drainage channels on the south area of the Owens Lake bed is known as the “Channel Area” and is delineated in Exhibit 1. The City shall control PM<sub>10</sub> emissions from the Channel Area by implementing and operating BACM, modified-BACM or alternative non-BACM controls approved by the District’s Air Pollution Control Officer (APCO), that take into account the resource issues in the Channel Area, by April 1, 2010. Portions of the Channel Area that are determined by the APCO to be naturally non-emissive (for example, adequately vegetated areas) will not require controls. If BACM are implemented in the Channel Area, they shall be as described in paragraphs 8, 9 and 15 through 17 hereof. If the City seeks to implement modified-BACM or alternative non-BACM, the City will apply such modifications as are permissible to resource agencies in this channel, with the primary objective of controlling dust, and provide the District with a monitoring plan aimed at identifying source areas that could cause or contribute to shoreline violations. Should such areas be identified after facilities are fully operational (including vegetative development), the District and the City will work with resource agencies to develop site-specific and implementable dust control approaches. Regardless of the approach selected for Channel Area dust control, the City shall prepare and submit to the District a detailed plan demonstrating the need and effectiveness of the control measures and their projected impacts to the environment, and obtain the prior approval of the District and any other applicable regulatory agencies with jurisdiction over the Channel Area for use of the modified-BACM. The City shall be responsible for any additional environmental analyses that may be required and for all required permits.
5. Total PM<sub>10</sub> control area – The 29.8 square-mile 2003 Dust Control Area (DCA), the 12.7 square-mile 2006 Supplemental Dust Control Area (SDCA) and the 0.5 square-mile Channel Area together comprise the 43.0 square-mile area known as the 2008 Total Dust Control Area (TDCA). These PM<sub>10</sub> control areas are delineated in Exhibit 1.
6. Minor adjustments to PM<sub>10</sub> control area boundaries – Upon written request by the City to the District and written approval by the District’s APCO, minor adjustments may be made to the interior and exterior boundaries of the 2006 SDCA, for example to avoid impacts to existing resources or features, or for constructability reasons, which approval shall not be unreasonably withheld. In the event of such modification, the boundaries of the 2008 TDCA shall also be modified to reflect the modified 2006 SDCA boundaries.

7. Study Areas – The District has identified four additional “Study Areas” on the Owens Lake bed totaling up to 1.85 square miles that may require some level of control in order to attain the PM<sub>10</sub> NAAQS. The four Study Areas are delineated in Exhibit 1. The District will study emissions from the Study Areas occurring between July 1, 2006 and April 1, 2010 to determine whether they will cause or contribute to PM<sub>10</sub> NAAQS exceedances such that controls will be required. The District will use the data collected during this period to make a determination after May 1, 2010 as to the need for additional controls, as set forth in Paragraph 10, below. However, if the City is not in compliance with Paragraphs 1 and 3 of this Order, the determination as to the need for additional controls in the Study Areas may be made prior to May 1, 2010.

#### PM<sub>10</sub> CONTROL MEASURES

8. The City shall implement BACM PM<sub>10</sub> control measures as set forth in this Order, described below in Paragraphs 15 through 17. The City may implement the alternative non-BACM PM<sub>10</sub> control measure as set forth in this Order, described below in Paragraph 18. To complete implementation of a specified control measure by a date as required by this Order means that the control measure shall be constructed, installed, operated and maintained without interruption, so as to comply with the performance standards for the specified control measure not later than 5:00 p.m. on the required date.
9. All PM<sub>10</sub> control measures within the 2006 SDCA shall be designed, constructed, installed, operated and maintained by the City to achieve the initial target minimum dust control efficiencies (MDCEs) shown on the MDCE Map, attached as Exhibit 2. MDCEs are the actual dust control measure control efficiencies required to meet the PM<sub>10</sub> NAAQS, based on data collected during the four-year period between July 2002 and June 2006. Prior to April 1, 2010, upon request of the City and written approval of the APCO, which approval shall not be unreasonably withheld, the initial target MDCEs may be modified if the modified target MDCEs meet the criteria set forth in the MDCE Selection Process Spreadsheet, as set forth in the 2006 Settlement Agreement between the District and the City. This Settlement Agreement is attached as Attachment A.

#### CONTINGENCY MEASURES – SUPPLEMENTAL CONTROL DETERMINATIONS

10. At least once per calendar year after May 1, 2010, the District’s APCO will make a written determination as to whether any areas, in addition to those described in Exhibit 1, require air pollution control measures in order to attain or maintain compliance with the NAAQS for PM<sub>10</sub>. The APCO’s determination will also contain an analysis of the minimum dust control efficiency provided by the PM<sub>10</sub> controls in the 2008 TDCA to determine if a higher level of control efficiency is required in order to attain or maintain compliance with the NAAQS for PM<sub>10</sub>. In making these determinations, the APCO shall employ the methods described in Paragraph 11 of this Order. If the City is not in compliance with Paragraphs 1 and 3 of this Order, the determination as to the need for additional controls may be made prior to May 1, 2010.
  - A. If the APCO determines under this Paragraph that additional areas require air pollution control measures or that existing PM<sub>10</sub> control measures require a higher level of control efficiency, the APCO shall issue a written determination to the City informing them that

the provisions of Paragraph 11 of this Order require the City to implement, install, operate and maintain PM<sub>10</sub> BACM on additional areas of the Owens Lake bed or that the control efficiency on existing PM<sub>10</sub> controls must be increased. The determination will identify those areas of the lake bed that will require PM<sub>10</sub> BACM and the control efficiency necessary to attain the PM<sub>10</sub> NAAQS. The City shall secure all permits and leases necessary to implement BACM and conduct any additional analysis, if any, required to comply with the California Environmental Quality Act and any other applicable laws.

- B. The APCO's annual determinations will use data collected after April 1, 2010, except as provided in Paragraph 7, above, for the four Study Areas. The annual determinations for the Study Areas will use data collected after July 1, 2006.
- C. In the event the City appeals the supplemental control determination under Health & Safety Code Section 42316, and pending a decision of the CARB, the City is not required to comply with any measure imposed by the supplemental control determination. The District relies upon action by the CARB to issue its decision on the City's appeal within 90 days. If CARB does not affirm the District supplemental control determination, or otherwise require the City to immediately undertake alternative supplemental control measures within 90 days in such circumstances where automatic control measures are required under Sections 172(c)(1) or 182(c)(9) of the federal Clean Air Act, 42 U.S.C. Sections 7502(c)(9) and 7511a(c)(9), the District relies upon the CARB to take these federal requirements into account in its determination of the City's appeal and to issue such interim orders as necessary to implement automatic supplemental control measures so that this Order complies with the Clean Air Act and can be approved by the U.S. Environmental Protection Agency as a proper State Implementation Plan. The foregoing is not intended to provide the CARB with any authority other than its authority under state law.
- D. Paragraph 11 fixes the period of time within which the implementation of the additional control measures must be completed. Upon implementation, the City shall continuously operate and maintain, without interruption, the control measures to comply with performance standards set forth for such measures in the control measure descriptions contained in this Order.

#### CRITERIA FOR DETERMINING THE NEED FOR ADDITIONAL PM<sub>10</sub> CONTROLS

- 11. The criteria, methods and procedures for the APCO's determination of the need for additional PM<sub>10</sub> controls described in Paragraph 10 shall be those described in detail in the "2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure" document incorporated as Attachment B along with its referenced "2008 Owens Lake Dust Source Identification Program Protocol" incorporated as Attachment C.

#### NEW BACM, ADJUSTMENTS TO EXISTING BACM, AND BACM TRANSITIONS

- 12. Upon written request by the City, the APCO may approve new BACM, a modification or adjustment to the existing BACMs described in Paragraphs 15, 16 and 17 of this Order, and/or the transition from one BACM to another provided that, at all times, the performance

standards of one or the other BACM are continuously met during the transition to assure that the transition shall not prevent the OVPA from attaining or maintaining the NAAQS for PM<sub>10</sub>. The City's request shall contain a detailed description of the proposed alternative and a demonstration that the request satisfied all requirements of law and this Order. The APCO shall have full discretion to consider any such application for a change in BACM, and to accept, reject or condition its approval of such application. Non-compliance with any such condition shall be enforceable as noncompliance with a District Order. Without limiting the District's discretion as provided herein, the procedures for transitions of implemented control measures or adjustments to BACM shall be those described in Attachment D, "2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area."

#### ALTERNATIVE METHODS FOR IMPLEMENTING CONTINGENCY MEASURES AND SUPPLEMENTAL CONTROLS

13. Notwithstanding any other provision of this Order, the District shall maintain its authority under Health and Safety Code Section 42316 to order the City to implement additional controls, to control additional emissive areas and/or to undertake additional reasonable measures necessary to mitigate the air pollution caused in the District by the City's water-gathering activities in order to prevent the OVPA from failing to attain or maintain the NAAQS for PM<sub>10</sub>, if circumstances arise that are not specifically addressed in Paragraphs 10 or 12 of this Order.

#### RELATIONSHIP TO BOARD ORDER 031113-01

14. The District hereby stays the force and effect of Board Order 031113-01 for all times that this Order is in full force and effect. In the event this Order, or any provision of this Order, is stayed due to a legal challenge, including but not limited to a challenge to this Order under Health & Safety Code Section 42316, or any other law, to the State Implementation Plan, or to the Environmental Impact Report for this Revised SIP, or in the event the Order is disapproved by the CARB, the following shall apply:
- A. If the stay or disapproval causes Paragraph 1 through 5 of this Order to cease its operative force and effect, Board Order #031113-01 shall immediately be in effect and shall remain in full force for the duration of any stay or, in the case of disapproval, until another Order is issued by this Board. In addition, the City shall continue to operate and maintain without interruption all control measures already implemented in any area if those control measures were not appealed under Health & Safety Code Section 42316 within 30 days of the date of this Order, and if those measures were not invalidated as a result of that appeal.
  - B. If the stay or disapproval causes Paragraph 10 and/or 11 of this Order to cease its operative force and effect, but does not affect Paragraphs 1 through 5 of this Order, the City shall continue to operate and maintain all control measures already implemented without interruption.
  - C. If the stay or disapproval does not affect Paragraphs 1 through 7, 10 or 11 of this Order, those Paragraphs and any other terms of this Order that are not stayed or disapproved

shall be in effect, and shall remain in full force for the duration of any stay. In all cases, the City shall continue to operate and maintain, without interruption, all control measures already implemented.

- D. If a stay of this Order is imposed, then lifted so that this Order is in effect, the City shall, immediately, meet all requirements and deadlines set by this Order as if no stay had been imposed. The City shall not remove or decrease any control measures without the express written permission of the APCO, and the provisions of Board Order 031113-01 shall again be stayed. If the stay of this Order is only partially lifted such that any portion of this Order remains stayed, Board Order 031113-01 shall remain in effect as provided under Paragraphs 14.A., 14.B. and 14.C, above.

### PM<sub>10</sub> CONTROL MEASURES

#### 15. BACM Shallow Flooding

The “Shallow Flooding” PM<sub>10</sub> control measure will apply water to the surface of those areas of the lake bed where Shallow Flooding is used as a PM<sub>10</sub> control measure. Water shall be applied in amounts and by means sufficient to achieve the following performance standards:

A. For Shallow Flooding areas within the 29.8 square-mile 2003 DCA:

- i. Until April 1, 2010: At least 75 percent of each square mile of the designated areas shall continuously consist of standing water or surface-saturated soil, substantially evenly distributed for the period commencing on October 1 of each year, and ending on June 30 of the next year. If a contiguous Shallow Flood dust control area is less than one square mile, 75 percent of the entire contiguous area shall consist of substantially evenly distributed standing water or surface-saturated soil.
- ii. After April 1, 2010:
  - a. At least 75 percent of each square mile of the designated areas shall continuously consist of standing water or surface-saturated soil, substantially evenly distributed for the period commencing on October 16 of each year, and ending on May 15 of the next year. If a contiguous Shallow Flood dust control area is less than one square mile, 75 percent of the entire contiguous area shall consist of substantially evenly distributed standing water or surface-saturated soil.
  - b. Beginning May 16 and through May 31 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 70 percent.
  - c. Beginning June 1 and through June 15 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 65 percent.
  - d. Beginning June 16 and through June 30 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 60 percent.
  - e. If for any Shallow Flooding area, the percent of areal wetness cover in the periods specified in Paragraphs 15.A.ii,b, c, and d, above, is below the minimum percentages specified for each shallow flood area based on the air quality model for the analysis period from July 2002 through June 2006, and there were no monitored or modeled exceedances of the federal standard at the historic

shoreline, that area will be deemed to be in compliance, if the City demonstrates in writing and the APCO reasonably determines in writing that maximum water delivery mainline flows were maintained throughout the applicable period.

- B. For Shallow Flooding areas within the 12.7 square-mile 2006 SDCA:
- i. The percentage of each area that must have substantially evenly distributed standing water or surface-saturated soil shall be based on the Shallow Flood Control Efficiency Curve (SFCE Curve) attached as Exhibit 3 to achieve the control efficiency levels in the MDCE Map (Exhibit 2).
  - ii. For Shallow Flooding areas with control efficiencies of 99 percent or more:
    - a. Beginning May 16 and through May 31 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 70 percent.
    - b. Beginning June 1 and through June 15 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 65 percent.
    - c. Beginning June 16 and through June 30 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 60 percent.
    - d. If for any Shallow Flooding area, the percent of areal wetness cover in the periods specified in Paragraph 15.B.ii.a,b, and c, above, is below the minimum percentages specified for each shallow flood area based on the air quality model for the analysis period from July 2002 through June 2006, and there were no monitored or modeled exceedances of the federal standard at the historic shoreline, that area will be deemed to be in compliance if the City demonstrates in writing and the APCO reasonably determines in writing that maximum water delivery mainline flows were maintained throughout the applicable period.
- C. Beginning on April 1, 2010, if modeled or monitoring data shows an exceedance or exceedances of the PM<sub>10</sub> NAAQS at the historic shoreline as a result of excessive dry areas within Shallow Flooding control areas during the dust control periods for each year between October 1 and June 30 of the next year, the provisions of Paragraph 10 shall apply.
- D. From July 1 through September 30 of each year, the City is not required by the 2008 SIP to apply water to Shallow Flooding areas for dust control purposes, but is required to maintain minimum areal wetness cover as required by applicable environmental documents, permits, leases and approvals.
- E. Aerial photography, satellite imagery or other methods approved at the sole discretion of the APCO shall be used to confirm wetness coverage.
- F. The following portions of the areas designated for control with Shallow Flooding are exempted from the requirement of dust control by means of a saturated surface:

- i. Raised berms, roadways and their shoulders necessary to access, operate and maintain the control measure which are otherwise controlled and maintained to render them substantially non-emissive and
  - ii. Raised pads containing vaults, pumping equipment or control equipment necessary for the operation of Shallow Flooding infrastructure which are otherwise controlled and maintained to render them substantially non-emissive.
- G. “Substantially non-emissive” shall be defined to mean that the surface is protected with gravel, durable pavement or other APCO-approved surface protections sufficient to meet the requirements of District Rules 400 and 401 (visible emissions and fugitive dust).
- H. Excess surface waters and shallow groundwaters above the annual average water table that existed before site construction that reach the lower boundary of the dust control areas will be contained, collected and recirculated for reapplication to dust control areas or otherwise lawfully discharged. The dust control measure areas shall have lateral boundary edge berms and/or drains as necessary to contain excess waters in the control areas and to isolate the dust control measure areas from each other and from areas not controlled. If drains are used, they shall be designed and constructed so that they may be regulated such that groundwater levels, surface water extent and wetlands in adjacent uncontrolled areas are not impacted. These requirements do not apply to Shallow Flood area T36-4, due to its adjacency to the Lower Owens River Project (LORP) and the City’s intention to integrate the design and operation of T36-4 into the LORP.
- I. The City shall remove all exotic pest plants, including salt cedar (*Tamarix ramosissima*), that invade any of the areas designated for control by Shallow Flooding.
- J. As necessary to protect human health, the City shall prevent, avoid and/or abate mosquito, other pest vector and biting nuisance insect breeding and swarming within and in the vicinity of the control areas, including within communities less than three miles from a PM<sub>10</sub> control area, by effective means that minimize adverse effects upon adjacent wildlife.

## 16. BACM Managed Vegetation

### A. Existing Managed Vegetation areas

For areas controlled with the Managed Vegetation PM<sub>10</sub> control measure prior to January 1, 2007, the areas shall be operated and maintained in accordance with a Managed Vegetation Operation and Management Plan to be approved in writing by the APCO, which approval shall not be unreasonably withheld. The requirements of the Plan may be revised upon written request by the City and written approval of the APCO, which approval shall not be unreasonable withheld,. The City’s request shall contain a specific description of the modification requested and provide a demonstration regarding the effect of the modification on the environment and PM<sub>10</sub> control effectiveness.

B. New Managed Vegetation areas

In PM<sub>10</sub> control areas constructed after January 1, 2007 where Managed Vegetation is used as a PM<sub>10</sub> control measure, the following performance standard shall be achieved commencing on October 1 of each year, and ending on June 30 of the next year: substantially evenly distributed live or dead vegetation coverage of at least 50 percent on each acre designated for Managed Vegetation.

C. All Managed Vegetation areas

- i. The vegetation planted for dust control shall consist only of locally-adapted native species approved by the APCO or other species approved by both the APCO and the California State Lands Commission (CSLC). To date, the only approved locally-adapted native species is saltgrass (*Distichlis spicata*). However, other appropriate species may be approved upon written request of the City and written approval of both the APCO and CSLC.
- ii. Vegetation coverage shall be measured by the point-frame method, by ground-truthed remote sensing or by other methods approved at the sole discretion of the APCO.
- iii. The following portions of the areas designated for control with Managed Vegetation are exempted from the requirements set forth in Paragraphs 16.A. and 16.B., above:
  - a. Portions consistently inundated with water, such as reservoirs, ponds and canals,
  - b. Roadways and equipment pads necessary to access, operate and maintain the control measure which are otherwise controlled and maintained to render them substantially non-emissive, and
  - c. Portions used as floodwater diversion channels or desiltation/retention basins.
- iv. "Substantially non-emissive" shall be defined to mean that the surface is protected with gravel, durable pavement or other APCO-approved surface protections sufficient to meet the requirements of District Rules 400 and 401 (visible emissions and fugitive dust).
- v. Excess surface waters and shallow groundwaters above the root zone depths that reach the lower boundary of the dust control areas shall be collected and recirculated for reapplication to dust control areas or otherwise lawfully discharged. The dust control measure areas shall have lateral boundary edge berms and/or drains as necessary to contain excess waters in the control areas and to isolate the dust control measure areas from each other and from areas not controlled. Drains shall be designed and constructed so that they may be regulated such that groundwater levels, surface water extent and wetlands in adjacent uncontrolled areas are not impacted.
- vi. To protect the Managed Vegetation control measure from flood damage and alluvial deposition, the City shall incorporate stormwater and siltation control facilities into and around Managed Vegetation areas adequate to maintain the dust mitigation function of Managed Vegetation. The Managed Vegetation protection facilities shall be designed to dissipate flood waters and capture the alluvial material carried by

flood waters, so as to avoid greater than normal water flows and deposition of alluvial material into the Owens Lake brine pool.

- vii. The City shall remove all exotic pest plants, including salt cedar (*Tamarix* spp.), that invade any of the areas designated for control by Managed Vegetation.
- viii. As necessary to protect human health, the City shall prevent, avoid and/or abate mosquito, other pest vector and biting nuisance insect breeding and swarming within and in the vicinity of the dust control areas, including within communities less than three miles from a PM<sub>10</sub> control area, by effective means that minimize adverse effects upon adjacent wildlife.

#### 17. BACM Gravel Blanket

- A. In areas where Gravel Blanket is used as a PM<sub>10</sub> control measure, the City shall meet the following performance standard: one hundred percent of the control area shall be covered with a layer of gravel at least four inches thick. All gravel material placed must be screened to a size greater than one-half inch (½ inch) in diameter. Where it is necessary to support the gravel blanket, it shall be placed over a permanent permeable geotextile fabric. The gravel shall have resistance to leaching and erosion. It shall be no more toxic than the gravel from the Keeler fan site analyzed by the District in the Final Environmental Report prepared for the 1997 SIP. To minimize visual impacts, all gravel used shall be comparable in coloration to the existing lake bed soils.
- B. To protect the Gravel Blanket control measure from flooding, the City shall incorporate drains and channels into and around the control measure areas adequate to maintain the dust mitigation function of the Gravel Blanket, and outlet flood waters into the Owens Lake brine pool, Shallow Flooding areas, or reservoirs. The drains and channels shall be designed to incorporate features such as desiltation or retention basins that are adequate to capture the alluvial material carried by the flood waters and to avoid greater than normal deposition of this material into the Owens Lake brine pool.
- C. The gravel placement design and implementation shall adequately protect the graveled areas from the deposition of wind- and water-borne soil or infiltration of sediments from below. All graveled areas will be visually monitored to ensure that the Gravel Blanket is not filled with sand, dust or salt and that it has not been inundated or washed out from flooding. If any of these conditions are observed over areas larger than one acre, additional gravel will be transported to the playa and applied to the playa surface such that the original performance standard is maintained. The City shall apply best available control measures (BACM) and New Source Performance Standard (NSPS) emission limits to its gravel mining and transportation activities occurring within the District's geographic boundaries as required by the District in the City's District-issued Authority to Construct and Permit to Operate.

#### 18. Alternative Non-BACM Moat & Row Control Measure

- A. The Moat & Row PM<sub>10</sub> control measure is not a currently-approved BACM. The preliminary form of Moat & Row is described in Exhibit 4 of the 2006 Settlement

Agreement between the District and the City (Attachment A). The final form of the Moat & Row PM<sub>10</sub> control measure will be determined from the results of a demonstration project and testing to be conducted by the City on the lake bed. All Moat & Row controls will be designed, constructed and operated to achieve the MDCEs described in Paragraph 9.

- B. The PM<sub>10</sub> control effectiveness of Moat & Row may be enhanced by combining it with other dust control methods such as vegetation, water, gravel, or the addition of other features that enhance sand capture and sheltering or directly protect the lake bed surface from wind erosion. The effectiveness of the array can also be increased by adding additional moats and rows to the array.
- C. Final design for the Moat & Row control measure will be determined solely by the City after consultation with and written notification to the District. The City shall consider the following elements in its final design:
  - i. Test results demonstrating that the required MDCE for each Moat & Row area can be met,
  - ii. Completion of all required environmental documentation, approvals, permits and leases, and
  - iii. Inclusion of monitoring in the infrastructure design to continuously monitor compliance with the target MDCE for each area.
- D. Upon written request of the City, the APCO shall determine in writing if any given Moat & Row design constitutes BACM or MDCE-BACM in accordance with Attachment D, “2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area.”
- E. Areas of Moat & Row that do not function as designed or that cause or contribute to an exceedance of the federal 24-hour PM<sub>10</sub> NAAQS will be remediated as specifically provided in Attachment B, the “2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure.”

#### PM<sub>10</sub> CONTROL MEASURE COMPLIANCE AND ENFORCEMENT

19. The District and City will work collaboratively to develop improved wetness and vegetative cover measurement techniques, control efficiency relationships, and compliance specifications for all PM<sub>10</sub> control measures. Final acceptance and implementation of all compliance measurement techniques and PM<sub>10</sub> control measure compliance specifications with regulatory impact will be at the sole discretion of the APCO.

#### STORMWATER MANAGEMENT

20. The City shall design, install, continually operate and maintain flood and siltation control facilities to protect the all PM<sub>10</sub> control measures installed on the lake bed at all times, and in a manner that groundwater levels, surface water extent, and wetlands in adjacent

uncontrolled areas are not impacted by induced drainage. Flood and siltation control facilities shall be integrated into the design and operation of the PM<sub>10</sub> control measures. All flood and siltation control facilities and PM<sub>10</sub> control measures damaged by stormwater runoff or flooding shall be promptly repaired and restored to their designed level of protection and effectiveness. All flood and siltation control facilities shall be designed and operated in a manner to prevent any greater threat of alluvial material contamination to the existing trona mineral deposit lease area (State Lands Commission leases PRC 5464.1, PRC 3511 and PRC 2969.1) than would have occurred under natural conditions prior to the installation of PM<sub>10</sub> control measures.

### SCHEDULE

21. The Control Measures shall be implemented on the areas set forth in Paragraphs 1 through 4 by the dates set forth in those Paragraphs. Supplemental Control Requirements shall be met on the schedule provided for in Attachment B.

### PERFORMANCE MONITORING PLAN

22. The City, in consultation with the District, shall annually develop and provide to the District in writing a Performance Monitoring Plan (PMP) to aid in its operation of the Owens Lake dust mitigation program on the Owens Lake bed.

- A. The PMP shall describe the measurements and methods used to verify the performance of the constructed DCMs. The PMP shall also describe the measurements and methods used to maximize information on dust emissions from any areas of special interest.
- B. The City shall implement the PMP, and will use the results as a guide for making operational decisions about the type, location, timing, and level of dust control measures needed to prevent exceedances of the federal standard at the shoreline.
- C. The District may use information from the PMP to assist in determining the likely sources of dust emissions causing or contributing to exceedances (if any) of the federal standard at the shoreline.
- D. The PMP for each calendar year shall be submitted to the APCO by March 31 of the following calendar year.

### ADDITIONAL REQUIREMENTS

23. The District Board orders the City of Los Angeles to satisfy the following requirements related to the implementation of the Shallow Flooding, Managed Vegetation, Gravel Blanket and Moat & Row control measures:

- A. The City's construction, operation and maintenance activities shall comply with all Mitigation Measures set forth in Final Environmental Impact Reports, EIR Addendums and Mitigated Negative Declarations associated with the areas on which dust controls are placed, and all subsequent environmental documents adopted by the District for implementation of the requirements of this SIP.

- B. The City shall comply with any and all applicable requirements of the Mitigation Monitoring and Reporting Programs adopted by the District and associated with the Final Environmental Impact Reports and Final Environmental Impact Report Addendums for this project, and with all subsequent environmental documents adopted by the District for implementation of the requirements of this SIP. All mitigation measures required in certified environmental documents associated with the implementation, operation and maintenance of PM<sub>10</sub> control measures required by this order are hereby incorporated as requirements of this order and may be enforced as such.
- C. The City shall apply best available control measures (BACM) to control air emissions from its construction/implementation activities occurring in the District's geographic boundaries.

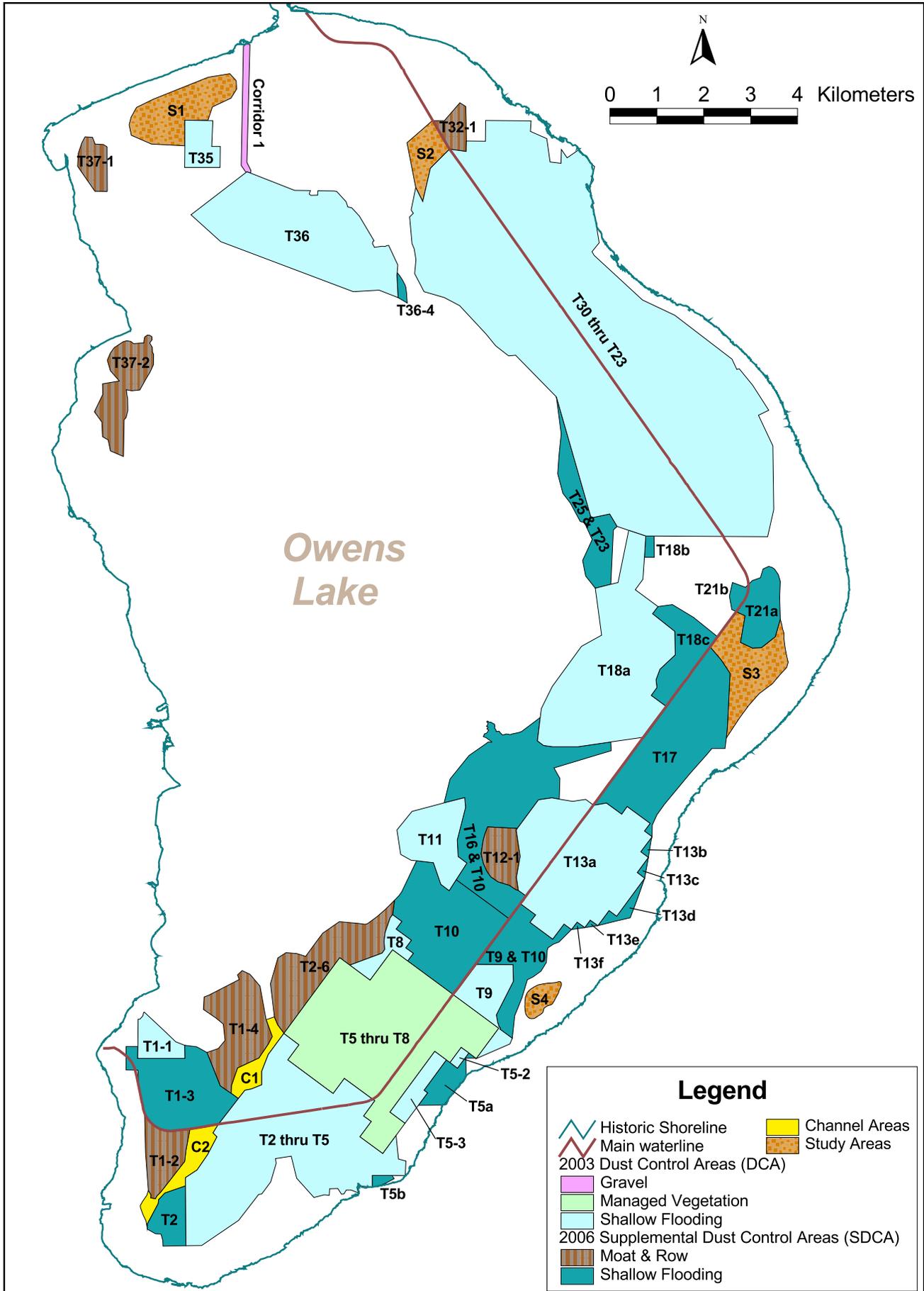
**Exhibits**

- Exhibit 1 Map and Coordinates of PM<sub>10</sub> Control Areas
- Exhibit 2 Minimum Dust Control Efficiency Map
- Exhibit 3 Shallow Flood Control Efficiency Curve

**Attachments**

- Attachment A 2006 Settlement Agreement between the Great Basin Unified Air Pollution Control District and the City of Los Angeles
- Attachment B 2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure
- Attachment C 2008 Owens Lake Dust Source Identification Program Protocol
- Attachment D 2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area

# Exhibit 1 - Map and coordinates of PM<sub>10</sub> control areas



**Exhibit 1 - Map and coordinates of PM<sub>10</sub> control areas**

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)				
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates			
T32-1	0.17	SDCA	415,639.7810	4,042,385.2695	T25 & T23	0.57	SDCA	418754.0310	4033026.4648			
			415,283.2810	4,043,000.1953				418552.9690	4033287.6914			
			415,539.4060	4,042,999.0234				418484.0000	4033621.1133			
			415,866.3750	4,043,383.8359				418689.0940	4034066.4102			
			415,994.4060	4,043,304.2109				418529.0310	4034424.5078			
			416,002.6250	4,042,981.9922				418434.8130	4034452.0664			
			416,005.6250	4,042,568.5234				418325.1880	4034653.5234			
			416,000.9380	4,042,344.1055				418224.7810	4034845.3438			
			415,872.2190	4,042,360.3477				418067.7500	4035047.7852			
			415,645.7500	4,042,391.2070				417953.1880	4035467.4961			
			415,639.7810	4,042,385.2695				417980.5000	4035865.3203			
								418027.9060	4036319.6094			
								417924.7190	4037107.5195			
T37-1	0.21	SDCA	408,348.9690	4,041,492.4844	T18b	0.03	SDCA	419802.4690	4033687.7656			
			408,085.5000	4,041,493.3164				420012.7190	4033690.4844			
			407,718.8130	4,042,027.7422				420006.8750	4034140.9297			
			407,731.5000	4,042,299.3945				419832.0310	4034141.9609			
			407,804.9060	4,042,524.2148				419802.4690	4033687.7656			
			407,873.2810	4,042,654.1211				T21a	0.43	SDCA	421766.0310	4032526.5938
			408,032.2500	4,042,647.6875				421758.4690	4032529.3477			
			408,089.5630	4,042,502.0625				421806.2810	4032593.7305			
			408,267.6560	4,042,491.4219				421884.3440	4032697.7148			
			408,347.0630	4,042,440.3203				421918.7190	4032746.2988			
			408,348.9690	4,041,492.4844				421948.4060	4032795.7422			
								421977.7500	4032858.2227			
								421994.8130	4032902.9766			
T36-4	0.03	SDCA	414,532.5630	4,039,759.7188	T21b	0.06	SDCA	422021.5000	4033108.1875			
			414,583.3750	4,039,699.2617				422019.3130	4033018.7031			
			414,643.3130	4,039,605.6250				422022.5630	4033079.4023			
			414,700.5000	4,039,498.9766				422021.5000	4033108.1875			
			414,718.6880	4,039,441.7188				422103.3750	4033191.3320			
			414,729.1250	4,039,314.2500				422274.9380	4033248.8359			
			414,747.2500	4,039,108.7500				422331.4380	4033437.2383			
			414,550.5940	4,039,224.6563				422451.9060	4033492.2617			
			414,528.0310	4,039,697.5039				422530.2190	4033470.0195			
			414,532.5630	4,039,759.7188				422579.0940	4033430.6797			
								422659.7190	4033313.9453			
								422698.6880	4033173.2383			
								422688.0630	4032830.0469			
T37-2	0.59	SDCA	408,694.5000	4,035,836.9883				422701.7500	4032367.5195			
			408,417.2190	4,035,957.7344				422592.2190	4031994.7988			
			408,370.5940	4,036,191.9453				422299.6560	4031762.5020			
			408,249.5940	4,036,258.3164				422105.2500	4031749.0176			
			408,231.6880	4,036,571.0625				421854.9690	4031871.4102			
			408,075.5000	4,036,791.1719				421952.1880	4032442.4199			
			408,254.4060	4,037,157.2813				421827.1560	4032498.3555			
			408,249.9060	4,037,387.3789				421778.4380	4032522.0762			
			408,606.5630	4,037,448.5391				421766.0310	4032526.5938			
			408,414.0000	4,037,664.3359				422021.5000	4033108.1875			
			408,348.8750	4,037,888.7227				421959.5000	4033044.5586			
			408,415.9060	4,038,042.2422				421680.6250	4033146.5156			
			408,494.0000	4,038,156.0977				421615.5310	4032859.4297			
			408,687.9380	4,038,284.6484				421668.6250	4032569.9238			
			408,762.7190	4,038,303.7813				421758.4690	4032529.3477			
			408,853.0940	4,038,290.2422				421806.2810	4032593.7305			
			408,911.3130	4,038,246.2109				421884.3440	4032697.7148			
			409,028.9380	4,038,251.5742				421918.7190	4032746.2988			
			409,126.1560	4,038,258.7344				421948.4060	4032795.7422			
			409,134.0630	4,038,309.6602				421977.7500	4032858.2227			
			409,144.5940	4,038,382.5547				421994.8130	4032902.9766			
			409,201.0630	4,038,424.0508				422010.1880	4032960.1484			
			409,255.5940	4,038,422.9180				422019.3130	4033018.7031			
			409,299.1250	4,038,391.3789				422022.5630	4033079.4023			
			409,304.7190	4,038,329.9609				422021.5000	4033108.1875			
			409,254.9380	4,038,259.1797				422103.3750	4033191.3320			
			409,308.0940	4,038,163.0195				422274.9380	4033248.8359			
			409,312.7190	4,038,061.7695				422331.4380	4033437.2383			
			409,335.7190	4,038,017.0195				422451.9060	4033492.2617			
			409,334.3750	4,037,792.3008				422530.2190	4033470.0195			
			409,260.5630	4,037,628.4492				422579.0940	4033430.6797			
			409,184.9060	4,037,508.1055				422659.7190	4033313.9453			
			409,044.0630	4,037,256.8359				422698.6880	4033173.2383			
408,869.9060	4,037,236.6055				422688.0630	4032830.0469						
408,755.8130	4,037,260.8867				422701.7500	4032367.5195						
408,768.2810	4,037,143.0156				422592.2190	4031994.7988						
408,784.9690	4,037,079.6914				422299.6560	4031762.5020						
408,789.7190	4,036,817.3555				422105.2500	4031749.0176						
408,751.4060	4,036,667.7344				421854.9690	4031871.4102						
408,706.5940	4,036,616.2422				421952.1880	4032442.4199						
408,694.5000	4,035,836.9883				421827.1560	4032498.3555						

**Exhibit 1 - Map and coordinates of PM<sub>10</sub> control areas**

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates
T18c	0.53	SDCA	420,276.9060	4,030,498.4297	T16 & T10 continued	2.00	SDCA	416449.2500	4029947.3340
			419,947.7810	4,030,741.5820				416459.1250	4029961.2246
			420,067.1880	4,030,907.8086				416462.9690	4029976.8418
			420,051.5940	4,031,073.7539				416471.5630	4029988.3965
			420,132.5000	4,031,300.5000				416481.0000	4029994.3359
			420,460.9690	4,031,604.8574				416483.2500	4030000.4590
			420,448.8130	4,032,104.4238				416476.4690	4030004.0684
			420,133.6880	4,032,354.6504				416464.6250	4030013.5332
			419,976.0000	4,032,480.4629				416452.1250	4030020.7266
			420,091.3440	4,032,635.9063				416447.3130	4030031.0762
			420,399.6560	4,032,679.1270				416454.8750	4030042.8809
			420,847.1880	4,032,406.2988				416467.7500	4030052.9766
			421,369.5310	4,031,989.5391				416466.0630	4030067.6035
			421,208.0630	4,031,771.3574				416454.5310	4030077.5586
			421,204.5310	4,031,775.5723				416440.6250	4030076.0938
			420,996.0630	4,031,494.8789				416437.6250	4030084.6914
			420,276.9060	4,030,498.4297				416445.8130	4030098.3496
T17	1.77	SDCA	419,965.0000	4,027,728.2129	416459.0310	4030110.6875			
			419,803.2190	4,027,847.7363	416465.9060	4030126.0488			
			419,922.8440	4,028,009.4902	416467.1560	4030142.7871			
			419,437.4690	4,028,368.0195	416461.5310	4030157.1523			
			419,317.9690	4,028,206.2617	416450.1560	4030168.0938			
			418,994.5310	4,028,445.2656	416439.0940	4030177.2402			
			418,723.3130	4,028,395.6211	416443.8750	4030188.7227			
			418,709.8750	4,028,405.5527	416458.4380	4030192.3809			
			418,741.5630	4,028,448.9863	416470.3130	4030190.8789			
			419,397.6250	4,029,329.5273	416479.0310	4030177.9727			
			419,791.5940	4,029,850.3008	416493.8130	4030171.2637			
			419,798.7500	4,029,851.3320	416510.6250	4030166.2656			
			420,276.9060	4,030,498.4297	416527.2190	4030165.8828			
			420,996.0630	4,031,494.8789	416541.7810	4030161.9238			
			421,204.5310	4,031,775.5723	416568.0630	4030143.3945			
			421,439.0940	4,031,498.2363	416585.0000	4030137.3281			
			421,631.0310	4,031,208.7773	416601.6250	4030130.7734			
			421,571.8750	4,030,077.3184	416608.7190	4030112.7188			
			421,548.9690	4,029,833.7383	416614.8750	4030093.7324			
			421,523.2500	4,029,607.1328	416614.1560	4030081.1367			
			421,241.1880	4,029,607.8887	416606.9690	4030057.0176			
			421,116.0000	4,029,457.7559	416610.2810	4030041.6328			
			420,776.0000	4,029,075.9551	416621.0310	4030029.7910			
			420,233.7500	4,028,421.8027	416626.8440	4030016.4492			
			420,070.9690	4,028,193.2832	416634.6560	4030003.4863			
			419,973.2500	4,027,978.3457	416639.6560	4029988.0273			
			419,965.0000	4,027,728.2129	416642.2500	4029973.2676			
			T16 & T10	2.00	SDCA	416,930.1250	4,025,968.3438	416656.7190	4029972.4727
						415,789.8440	4,026,810.3555	416688.3750	4029977.5293
						416,016.5310	4,027,163.7949	416704.9380	4029976.5762
						415,829.9690	4,027,301.7383	416715.9690	4029964.5742
						415,812.0000	4,027,654.7695	416723.1250	4029949.7949
						415,987.3440	4,028,348.7813	416734.4690	4029937.7109
415,969.6880	4,028,562.7461	416747.7190				4029929.2070			
415,530.3750	4,028,446.4922	416759.0310				4029916.4004			
415,660.2500	4,028,955.4551	416768.4690				4029902.2207			
416,062.8130	4,029,458.0664	416781.8130				4029898.3633			
416,386.1560	4,029,683.9746	416790.3750				4029900.3945			
416,436.9060	4,029,720.7148	416827.0940				4029907.2129			
416,449.5000	4,029,732.7207	416838.2500				4029915.7813			
416,468.5940	4,029,742.7246	416845.7500				4029917.9492			
416,489.8750	4,029,746.4355	416852.5940				4029916.0938			
416,529.4060	4,029,741.9941	416867.9690				4029916.1543			
416,547.9690	4,029,741.4180	416880.3440				4029917.7637			
416,541.4060	4,029,755.8789	416895.6880				4029914.7402			
416,528.0940	4,029,767.9277	416925.9380				4029904.3965			
416,515.2190	4,029,777.7969	416940.7190				4029903.4805			
416,501.9690	4,029,786.2637	416954.8130				4029907.8730			
416,489.6560	4,029,794.9004	416966.3750				4029914.2246			
416,430.1250	4,029,834.6543	417119.3130				4029946.7070			
416,415.3750	4,029,843.4570	417187.6250				4029971.9180			
416,400.7190	4,029,849.4766	417581.8750				4030267.7148			
416,387.3130	4,029,856.1563	417521.0310				4029772.5156			
416,372.5940	4,029,860.3105	417653.4060				4029674.6738			
416,368.5310	4,029,870.0703	417852.7810				4029647.5566			
416,375.7810	4,029,880.6270	418383.2810				4029647.0859			
416,384.4690	4,029,895.7617	419085.9690				4029748.5098			
416,385.5310	4,029,910.9023	419093.6560				4029564.0527			
416,395.3130	4,029,918.6621	417877.2810				4029195.6055			
416,406.0630	4,029,922.9727	418000.2190				4028968.8594			
416,419.9060	4,029,929.8086	417985.4380				4028529.5684			
416,435.1560	4,029,936.6543	417827.8440				4028557.0566			
		417546.5630				4028514.7832			
		417094.6880				4027903.0527			

**Exhibit 1 - Map and coordinates of PM<sub>10</sub> control areas**

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates
T16 & T10 continued	2.00	SDCA	416,457.7500 416,404.6880 416,365.0310 416,321.9690 416,373.0940 416,439.1560 416,529.0000 416,679.5310 416,794.3130 416,918.4690 417,059.9690 417,118.0940 417,289.0630 416,930.1250	4,027,936.9766 4,027,788.4297 4,027,655.1465 4,027,364.6660 4,027,155.4727 4,026,996.8691 4,026,870.1172 4,026,765.2285 4,026,730.5000 4,026,690.9277 4,026,600.0957 4,026,580.9805 4,026,454.5645 4,025,968.3438	T2-6	0.97	SDCA	411915.1560 411828.0940 411988.0310 412161.8440 412387.4060 412577.3130 412752.9380 412942.5940 413298.0630 413700.7190 413843.4060 413892.3750 414103.4380 414294.0310 414474.4380 414432.8750 414383.9380 414275.7810 414249.7810 414265.6560 414210.4380 413520.9060 413307.2500 412118.5000 411983.4060 411915.1560	4023883.7793 4024594.2207 4025141.2695 4025254.5859 4025234.3184 4025175.8184 4025413.6777 4025667.2090 4025913.1816 4025878.1113 4025859.0313 4025869.0625 4026021.7207 4026188.3672 4026371.4551 4026064.3691 4025998.1035 4025684.7422 4025496.0488 4025321.0762 4025245.9102 4024987.7734 4025145.6113 4023536.9766 4023714.6152 4023883.7793
T12-1	0.33	SDCA	417,094.6880 416,457.7500 416,404.6880 416,365.0310 416,321.9690 416,373.0940 416,439.1560 416,529.0000 416,679.5310 416,794.3130 416,918.4690 417,059.9690 417,118.0940 417,075.7810 417,153.0940 417,068.6250 417,094.6880	4,027,903.0527 4,027,936.9766 4,027,788.4297 4,027,655.1465 4,027,364.6660 4,027,155.4727 4,026,996.8691 4,026,870.1172 4,026,765.2285 4,026,730.5000 4,026,690.9277 4,026,600.0957 4,026,580.9805 4,026,862.2246 4,027,305.2637 4,027,867.7852 4,027,903.0527	T9 & T10	0.70	SDCA	416221.4060 416930.1250 417169.6250 417483.0630 417363.6560 417848.8440 418087.8130 418249.6250 417981.1560 417862.3130 417742.6560 417731.0940 417711.4060 417596.9060 417427.9690 417308.1560 417192.2500 417038.6560 416987.0630 416718.5940 416734.5000 416700.3130 416688.8130 416678.0000 416644.1880 417009.4380 416999.7190 416221.4060	4025003.5195 4025968.3438 4026292.8027 4026061.2207 4025899.4727 4025540.9238 4025864.4414 4025744.9199 4025483.1621 4025432.8262 4025357.7832 4025299.8848 4025042.9023 4024857.0391 4024735.2051 4024673.9160 4024288.4082 4023907.3789 4023427.0801 4023625.4961 4023647.0195 4023672.3301 4023734.0977 4023742.0566 4023924.8242 4024643.3945 4024998.1367 4025003.5195
T13B	0.02	SDCA	419,887.6880 419,726.0630 419,965.0000 419,949.5310 419,887.6880	4,027,285.1777 4,027,404.7207 4,027,728.2129 4,027,659.1582 4,027,285.1777	T13e	0.01	SDCA	418530.9060 418650.3750 418812.1880 418722.7810 418530.9060	4025787.1563 4025948.9160 4025829.3945 4025817.3457 4025787.1563
T13c	0.02	SDCA	419,810.5000 419,648.7500 419,887.6880 419,878.5000 419,810.5000	4,026,842.1797 4,026,961.7246 4,027,285.1777 4,027,228.6270 4,026,842.1797	T13f	0.01	SDCA	418249.6250 418369.0940 418530.9060 418416.1250 418249.6250	4025744.9199 4025906.6797 4025787.1563 4025770.9355 4025744.9199
T10	1.51	SDCA	414,755.7190 414,875.1560 414,713.3750 414,832.8130 414,509.4060 414,628.8750 414,432.8750 414,474.4380 414,574.5630 414,628.3130 414,946.8130 415,303.7810 415,463.6880 415,641.0630 415,789.8440 416,930.1250 416,221.4060 415,803.2190 415,788.3750 415,755.0630 415,740.0630 415,730.9380 414,755.7190	4,025,075.7422 4,025,237.4785 4,025,356.9609 4,025,518.7363 4,025,757.7637 4,025,919.4863 4,026,064.3691 4,026,371.4551 4,026,473.5742 4,026,552.7695 4,027,212.2402 4,027,171.2852 4,026,710.9355 4,026,578.4043 4,026,810.3555 4,025,968.3438 4,025,003.5195 4,024,437.5703 4,024,419.2480 4,024,385.7285 4,024,367.4102 4,024,355.1348 4,025,075.7422	T1-4	0.81	SDCA	410989.3130 410984.9060 410759.9060 410472.0310 410718.0630 410862.1250 410821.5940 410665.3750 410401.5000 410411.4380 410520.6560 411162.2810 411124.9690 411222.3440	4022252.0020 4022253.3125 4022411.6719 4023123.1973 4023206.8965 4023378.8164 4023731.0039 4023862.7910 4024041.8867 4024308.5215 4024349.3066 4024681.8047 4024778.6250 4024873.7930
T13d	0.08	SDCA	418,812.1880 419,051.1560 419,212.9380 419,810.5000 419,654.8130 419,499.9380 419,182.9690 418,812.1880	4,025,829.3945 4,026,152.9102 4,026,033.3887 4,026,842.1797 4,026,404.0859 4,025,999.3496 4,025,925.2813 4,025,829.3945					





Chapter 8 - Enabling Legislation to Implement Control Strategy

Exhibit 1 - Map and coordinates of PM<sub>10</sub> control areas

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)				
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates			
C2	0.29	Channel	409,223.5310	4,020,182.5996	T23 thru 30 continued	13.19	DCM	417385.2500	4042993.4570			
			409,280.3750	4,020,086.8984				417370.0940	4042770.4766			
			409,276.4690	4,020,023.0879				417719.9060	4042619.4531			
			409,360.9380	4,020,010.4766				417792.5000	4042117.6719			
			409,373.6560	4,020,006.3652				418026.3130	4042090.2539			
			409,409.3130	4,020,065.3262				418032.4690	4042385.2734			
			409,487.5940	4,020,143.3262				418154.9060	4042206.3711			
			409,998.0310	4,020,801.4766				418410.5000	4042382.5898			
			410,027.5940	4,021,036.2754				418608.9380	4042170.9414			
			410,109.0000	4,021,484.2637				418642.5940	4042098.0430			
			410,174.2810	4,021,494.7188				418743.9060	4042022.1406			
			410,242.0940	4,021,502.6836				418637.1560	4041594.2695			
			410,335.4060	4,021,518.5000				418839.1560	4040396.7852			
			410,438.7190	4,021,533.8438				418687.1250	4040203.3438			
			410,529.8750	4,021,556.1816				418733.7190	4040126.7656			
			410,712.3750	4,021,582.9375				419760.8750	4039175.2695			
			410,604.9060	4,021,412.4785				420448.8750	4038850.6133			
			410,687.5940	4,021,327.9746				421672.5630	4037910.9570			
			410,488.7190	4,020,946.6582				421774.5940	4037694.9570			
			410,264.9380	4,020,620.1895				421823.2190	4037710.5156			
			410,015.6880	4,020,454.4141				422114.0310	4037354.1172			
			410,016.8750	4,020,278.1387				422453.6250	4036821.3398			
			409,576.6880	4,020,126.1250				422236.8440	4036716.3086			
			409,445.4060	4,019,983.3887				422544.5630	4036065.0313			
			409,435.7810	4,019,902.2852				422559.9380	4034701.7969			
			409,208.0310	4,019,472.8008				422429.2810	4034127.0234			
			409,201.5000	4,019,370.5664				419832.0310	4034141.9609			
			409,173.3130	4,019,532.8418								
			409,115.7190	4,019,657.4395				T36	2.41	DCM	414532.5630	4039759.7188
			409,058.5940	4,019,813.5703							414544.1880	4039918.4961
			409,055.4380	4,019,859.0117							414347.2810	4040341.8281
			409,098.6560	4,019,944.7520							414341.6250	4040340.8398
			409,192.5940	4,020,079.2344							414296.4060	4040328.5234
409,223.5310	4,020,182.5996				414287.8440	4040319.8633						
					414268.3750	4040314.5508						
					414211.2190	4040321.9883						
					414047.5000	4040298.1172						
					414003.0000	4040378.3242						
					414010.8750	4040412.9063						
					414039.0940	4040436.0195						
					413723.0940	4040965.9141						
					413561.2500	4041141.6016						
					413478.6880	4041158.2148						
					413443.2190	4041269.5156						
					413241.1250	4041488.5234						
					413191.5310	4041500.2969						
					412841.4380	4041505.7500						
					412833.7190	4041412.9141						
					412690.1560	4041406.0313						
					412652.2190	4041436.0781						
					412682.0630	4041508.1523						
					412344.1560	4041513.1602						
					411328.8130	4041911.0039						
					410132.5940	4040993.3945						
					410766.2190	4040418.8281						
					413592.7810	4039353.6953						
					414146.5000	4039386.4141						
					414550.5940	4039224.6563						
					414528.0310	4039697.5039						
					414532.5630	4039759.7188						
					T18a	2.67	DCM	417581.8750	4030267.7148			
								417605.5940	4030460.9473			
								417838.7500	4030929.0918			
								418459.9380	4031788.9746			
								418889.0940	4032024.0352			
								418754.0310	4033026.4648			
								419239.5310	4033150.5156			
								419467.0940	4034262.6992			
								419832.0310	4034141.9609			
								419771.8750	4033218.0078			
								419606.1560	4032994.4258			
								420091.3440	4032635.9063			
								419976.0000	4032480.4629			
								420133.6880	4032354.6504			
								420448.8130	4032104.4238			
								420460.9690	4031604.8574			
								420132.5000	4031300.5000			
								420051.5940	4031073.7539			
								420067.1880	4030907.8086			
								419947.7810	4030741.5820			
								420276.9060	4030498.4297			
								419798.7500	4029851.3320			

Chapter 8 - Enabling Legislation to Implement Control Strategy

Exhibit 1 - Map and coordinates of PM<sub>10</sub> control areas

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates	
T18a continued	2.67	DCM	418,383.2810 417,852.7810 417,653.4060 417,521.0310 417,581.8750	4,029,647.0859 4,029,647.5566 4,029,674.6738 4,029,772.5156 4,030,267.7148	T5 thru T8 continued	3.53	DCM	413307.2500 413954.0000 414432.0940 416696.5940 416218.7190 415895.2810 415656.1880 415332.7190 414376.5630 414700.1560 414505.9690	4025145.6113 4024667.7598 4025314.7227 4023641.5605 4022994.5840 4023233.6211 4022910.1016 4023149.1055 4021855.0645 4021616.0996 4021353.3281	
T11	0.67	DCM	415,789.8440 415,641.0630 415,463.6880 415,303.7810 414,829.7500 414,603.4060 414,525.4380 414,845.5630 415,969.6880 415,987.3440 415,812.0000 415,829.9690 416,016.5310 415,789.8440	4,026,810.3555 4,026,578.4043 4,026,710.9355 4,027,171.2852 4,027,225.6699 4,027,348.4004 4,027,872.6914 4,028,265.1602 4,028,562.7461 4,028,348.7813 4,027,654.7695 4,027,301.7383 4,027,163.7949 4,026,810.3555	T9	0.46	DCM	416218.7190 416696.5940 415730.9380 415740.0630 415755.0630 415788.3750 415803.2190 416221.4060 416999.7190 417009.4380 416644.1880 416678.0000 416688.8130 416700.3130 416734.5000 416718.5940 416987.0630 416933.0310 416218.7190	4022994.5840 4023641.5605 4024355.1348 4024367.4102 4024385.7285 4024419.2480 4024437.5703 4025003.5195 4024998.1367 4024643.3945 4023924.8242 4023742.0566 4023734.0977 4023672.3301 4023647.0195 4023625.4961 4023427.0801 4023305.0703 4022994.5840	
T13a	2.47	DCM	417,169.6250 417,289.0630 417,118.0940 417,075.7810 417,153.0940 417,068.6250 417,546.5630 417,827.8440 418,270.9380 418,552.2190 418,723.3130 418,994.5310 419,317.9690 419,437.4690 419,922.8440 419,803.2190 419,965.0000 419,726.0630 419,887.6880 419,648.7500 419,810.5000 419,212.9380 419,051.1560 418,812.1880 418,650.3750 418,530.9060 418,369.0940 418,249.6250 418,087.8130 417,848.8440 417,363.6560 417,483.0630 417,169.6250	4,026,292.8027 4,026,454.5645 4,026,580.9805 4,026,862.2246 4,027,305.2637 4,027,867.7852 4,028,514.7832 4,028,557.0566 4,028,479.7695 4,028,522.0059 4,028,395.6211 4,028,445.2656 4,028,206.2617 4,028,368.0195 4,028,009.4902 4,027,847.7363 4,027,728.2129 4,027,404.7207 4,027,285.1777 4,026,961.7246 4,026,842.1797 4,026,033.3887 4,026,152.9102 4,025,829.3945 4,025,948.9160 4,025,787.1563 4,025,906.6797 4,025,744.9199 4,025,864.4414 4,025,540.9238 4,025,899.4727 4,026,061.2207 4,026,292.8027	T1-1	0.24	DCM	410001.3440 410005.2500 408999.6250 409007.7810 409051.0310 409110.8440 409125.3750 409135.9380 409555.1250 409806.6880 410001.3440	4023280.3730 4022997.9414 4023000.2637 4023833.0859 4023839.1992 4023908.2500 4023977.1719 4023986.4395 4023595.2637 4023351.0098 4023280.3730	
T8	0.21	DCM	413,520.9060 413,954.0000 414,432.0940 414,755.7190 414,875.1560 414,713.3750 414,832.8130 414,509.4060 414,628.8750 414,432.8750 414,383.9380 414,275.7810 414,249.7810 414,265.6560 414,210.4380 413,520.9060	4,024,987.7734 4,024,667.7598 4,025,314.7227 4,025,075.7422 4,025,237.4785 4,025,356.9609 4,025,518.7363 4,025,757.7637 4,025,919.4863 4,026,064.3691 4,025,998.1035 4,025,684.7422 4,025,496.0488 4,025,321.0762 4,025,245.9102 4,024,987.7734	T2 thru 5	3.62	DCM	410025.1560 410015.6880 410264.9380 410488.7190 410687.5940 410604.9060 410718.8440 411285.7500 411422.2810 411641.2190 411641.7810 411698.3750 411783.0000 412112.0000 412435.5630 412196.4380 413088.5940 413166.9380 413406.0630 414053.0940 413814.0000 413975.7810 413736.8130 414222.0630 414505.9690 414557.3750 414717.5310 414704.8750 414001.4690 414001.2500 413767.6560 413695.4380 413677.0630 413700.3440 413549.0940 413444.4060 413394.0000 413343.6560 413266.1250	4019002.0527 4020454.4141 4020620.1895 4020946.6582 4021327.9746 4021412.4785 4021593.2148 4022320.5957 4022348.0508 4022434.6367 4022726.1934 4022867.5078 4023082.8359 4023528.1816 4023289.1914 4022965.6328 4022306.4473 4022248.5879 4022572.1836 4022094.1016 4021770.5449 4021651.0234 4021327.4629 4020969.0215 4021353.3281 4020853.0215 4020809.5039 4020499.7988 4020502.4766 4020257.5078 4020273.3301 4020332.7383 4020225.3008 4020128.3535 4020190.3926 4020190.3945 4020105.0723 4020101.2031 4020221.4121	
T5 thru T8	3.53	DCM	414,505.9690 414,222.0630 413,736.8130 413,975.7810 413,814.0000 414,053.0940 413,406.0630 413,166.9380 412,196.4380 412,435.5630 412,112.0000	4,021,353.3281 4,020,969.0215 4,021,327.4629 4,021,651.0234 4,021,770.5449 4,022,094.1016 4,022,572.1836 4,022,248.5879 4,022,965.6328 4,023,289.1914 4,023,528.1816						

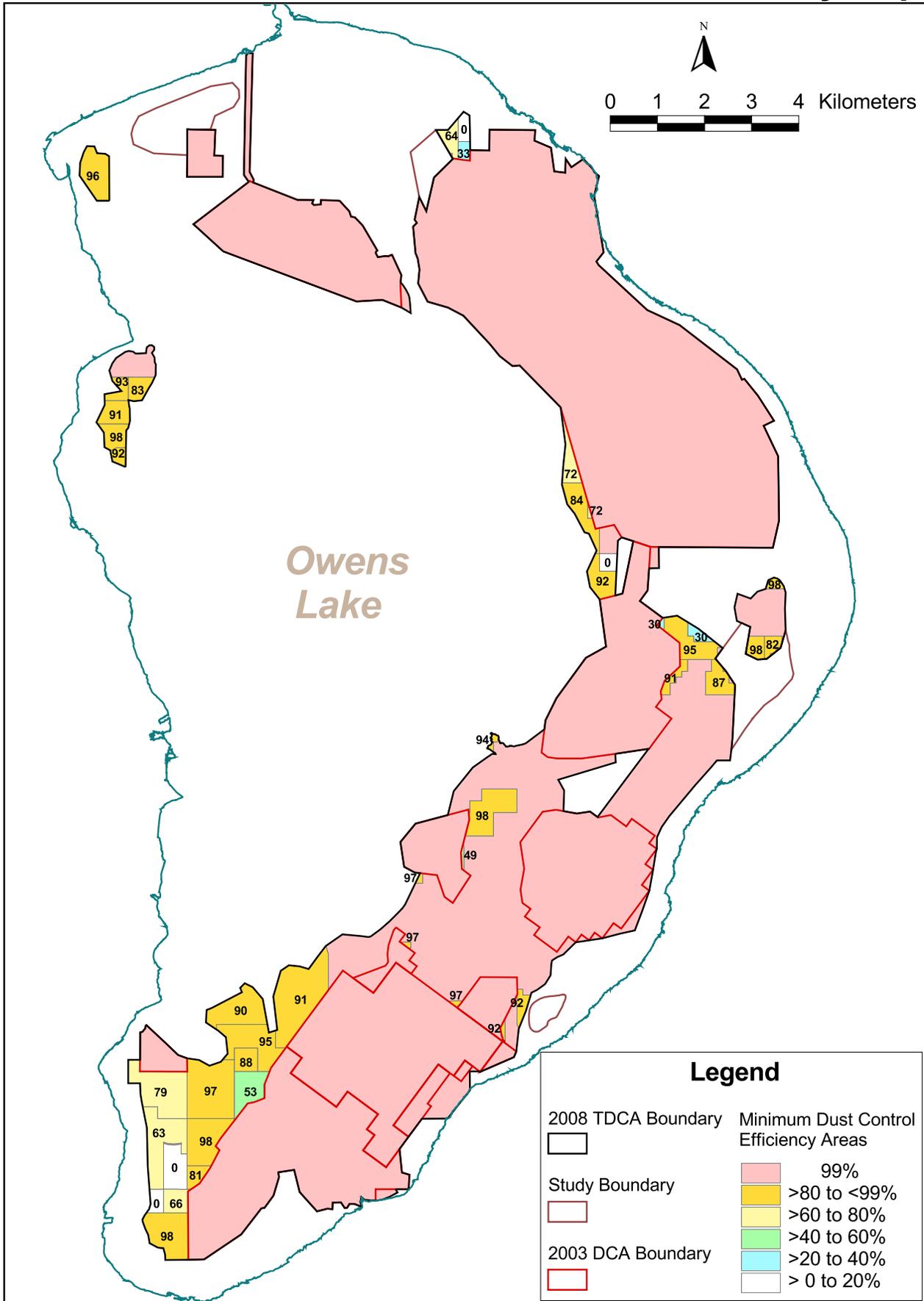
**Exhibit 1 - Map and coordinates of PM<sub>10</sub> control areas**

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates
T2 thru 5 continued	3.62	DCM	413090.0310	4020217.8281
			413082.4060	4020077.9375
			412973.9060	4020085.6738
			412756.6880	4020031.3984
			412389.2810	4020442.0293
			412270.9690	4020910.1992
			411937.4060	4020860.1270
			411952.8130	4020757.8945
			411835.6880	4020364.6348
			411,644.0940	4,020,105.5039
			411,579.3750	4,020,095.7637
			411,149.7500	4,019,542.1543
			410,360.7190	4,019,008.5000
			410,025.1560	4,019,002.0527
T5-2	0.03	DCM	415,656.1880	4,022,910.1016
			415,817.9380	4,022,790.5840
			416,056.9690	4,023,114.1348
			415,895.2810	4,023,233.6211
			415,656.1880	4,022,910.1016
T5-3	0.22	DCM	414,700.1560	4,021,616.0996
			414,376.5630	4,021,855.0645
			415,332.7190	4,023,149.1055
			415,581.1880	4,022,965.4980
			415,103.1880	4,022,318.4160
			415,178.0630	4,022,263.0664
			414,700.1560	4,021,616.0996

Total SDCA 12.86  
 Total Study 1.86  
 Total Channel 0.50  
 Total DCM 30.12

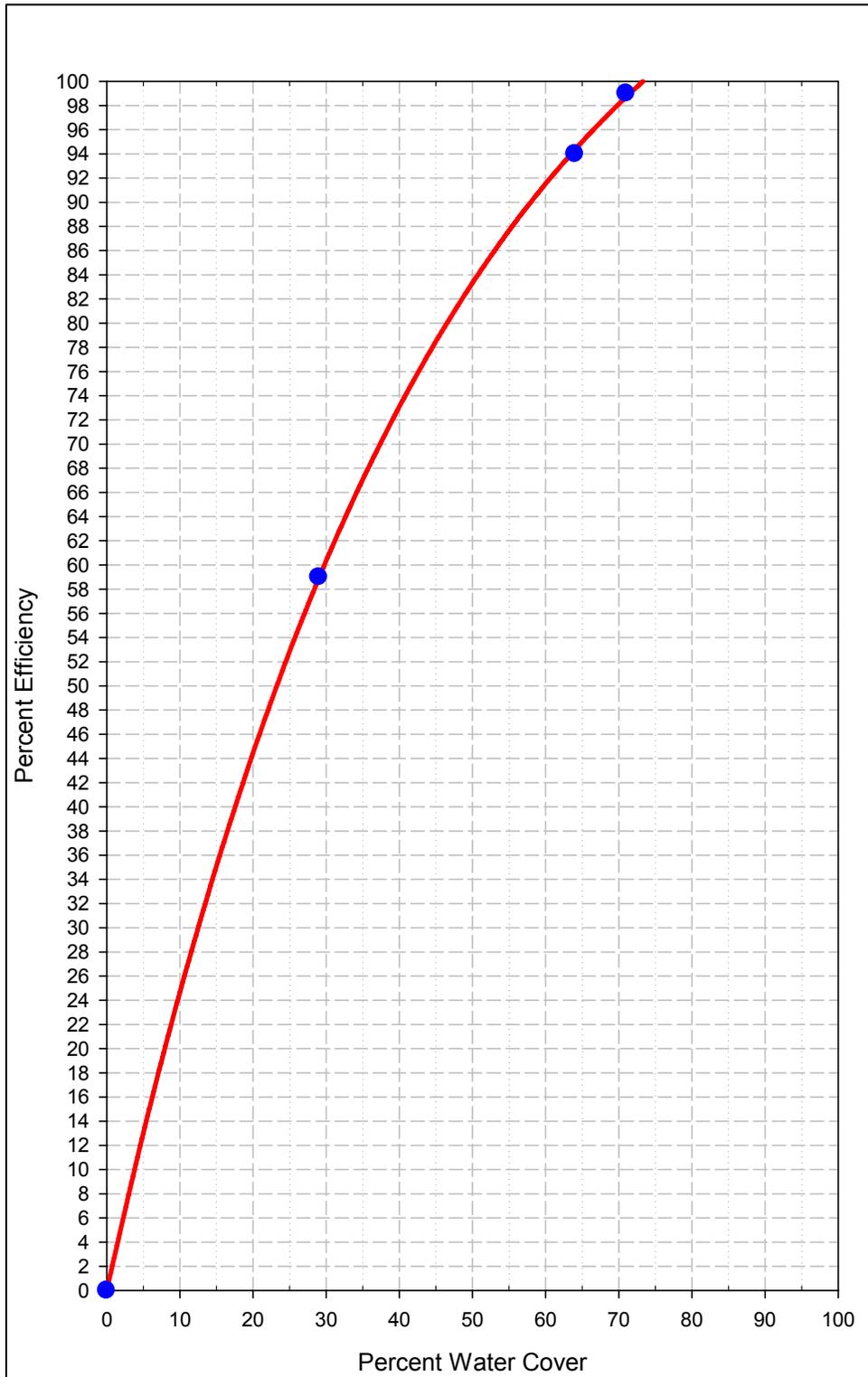
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# Exhibit 2 - TDCA Minimum Dust Control Efficiency map



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### Exhibit 3 - Shallow Flood control efficiency curve



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## SETTLEMENT AGREEMENT

This Settlement Agreement (Agreement) is entered into between the Great Basin Unified Air Pollution Control District (District) and the City of Los Angeles by and through its Department of Water and Power (collectively “City”) (the City and District to be referred to as the “Parties”) to resolve the City’s challenge to the District’s Supplemental Control Requirement (SCR) determination for the Owens Lake bed issued on December 21, 2005, and modified on April 4, 2006.

### RECITALS

#### WHEREAS:

- A. Owens Lake is located in Inyo County in eastern California, south of the town of Lone Pine and north of the town of Olancho.
- B. Large portions of the Owens Lake bed are comprised primarily of dry saline soils and crusts.
- C. The lake bed soils and crusts are a source of wind-borne dust during significant wind events, and contribute to elevated concentrations of particulate matter less than 10 microns in diameter (PM<sub>10</sub>).
- D. PM<sub>10</sub> is a criteria pollutant regulated by the federal Clean Air Act, 42 U.S.C. Section 7401 *et seq.*, as amended (CAA).
- E. Under the National Ambient Air Quality Standard (NAAQS) adopted pursuant to the CAA, PM<sub>10</sub> levels may not exceed an average concentration of 150 micrograms per cubic meter (µg/m<sup>3</sup>) during a 24-hour period more than one time per calendar year averaged over three years.
- F. The District has regulatory authority over air quality issues in the region where Owens Lake is situated.
- G. Under Health and Safety Code Section 42316, enacted by the California Legislature in 1983, the District has authority to require the City to undertake reasonable measures at Owens Lake in order to address the impacts of its activities that cause or contribute to violations of federal and state air quality standards, including but not limited to the NAAQS for PM<sub>10</sub>.
- H. In 1987, the United States Environmental Protection Agency (EPA) identified the Owens Valley Planning Area (OVPA), which encompasses

Owens Lake, as an area not meeting the NAAQS for PM<sub>10</sub>. In 1993, the OVPA was reclassified as a serious non-attainment area under the CAA.

- I. In 1997, the District adopted the Owens Valley PM<sub>10</sub> Demonstration of Attainment State Implementation Plan as required by the CAA (1997 SIP). In 1998, the District and the City agreed that the City would construct control measures on 16.5 square miles of the Owens Lake bed by the end of 2003 as part of a SIP revision in 1998.
- J. In 2003, through District Board Order 03111-01 (Order), the District required the City to construct dust control measures (DCMs) on an additional 13.3 square miles of the Owens Lake bed by the end of 2006, for a total of 29.8 square miles of dust control measures, as part of a Revised SIP (2003 SIP). The Order and 2003 SIP also established a process whereby the Air Pollution Control Officer of the District (APCO) must evaluate on at least an annual basis the potential need for additional DCMs and “watch areas” at Owens Lake bed in order to attain the NAAQS. The process involves a determination by the APCO and an opportunity for the City to present an alternative analysis.
- K. On December 21, 2005, the APCO issued the 2004/2005 SCR determination finding that the City would be required to implement DCMs on an additional 9.31 square miles of Owens Lake bed and identifying 0.66 square miles as “watch area.”
- L. On January 20, 2006, the City appealed the 2004/2005 SCR determination to the California Air Resources Board (CARB). The District disagreed that the determination was subject to such an appeal.
- M. On February 22, 2006, the City submitted an Alternative Analysis contesting aspects of the 2004/2005 SCR determination.
- N. On April 4, 2006, the APCO modified the SCR determination issued on December 21, 2005 to reduce the supplemental DCM area to 8.66 square miles and increased the “watch area” to 0.79 square miles (Modified SCR determination).
- O. On May 3, 2006, the City filed an appeal of the April 4, 2006 Modified SCR determination with the CARB. The District disagreed that the determination was subject to such an appeal.
- P. On May 4, 2006, the City filed a petition for writ of mandate challenging the APCO’s April 4, 2006 Modified SCR determination (*City of Los Angeles Department of Water and Power v. Great Basin Unified Air Pollution Control District*, Kern County Superior Court Case No. S-1500-

CV-258678, RJO). The Parties entered into mediation and a temporary stay of the litigation.

#### AGREEMENT

NOW, THEREFORE, in consideration of the provisions herein contained and to resolve the disputes over methods to address air quality at Owens Lake, including the disputes over the SCR determination issued on December 21, 2005, and modified on April 4, 2006, the City and the District hereby agree as follows:

#### DUST CONTROL MEASURES (DCMs)

1. The City shall apply DCMs as provided in this Agreement on additional areas of the lake bed beyond the 29.8 square miles required in the 2003 SIP.
  - A. The areas on the lake bed on which DCMs will be applied are designated in this Agreement as follows:
    - (i) The 12.7 square-mile area of additional DCMs shall be known as the 2006 Supplemental Dust Control Area (SDCA).
    - (ii) The 29.8 square miles of DCMs required by the 2003 SIP shall be known as the 2003 Dust Control Area (DCA).
    - (iii) The 0.5 square miles of natural drainage channels on the south area of the lake bed shall be known as the Channel Area.
    - (iv) The combined 43.0 square miles of DCMs and Channel Area shall be known as the Total Dust Control Area (TDCA).
    - (v) The SDCA, DCA, Channel Area and TDCA are delineated on the TDCA Map, attached as Exhibit 1. The SDCA and Channel Area coordinate descriptions are attached as Exhibit 2. The DCA coordinate description is contained in the 2003 SIP.
  - B. Minor adjustments may be made to the boundaries of the SDCA upon written request by the City to the District and written approval by the APCO, which approval shall not be unreasonably withheld. In the event of such modification, the boundaries of the TDCA shall also be modified to reflect the modified SDCA boundaries.
  - C. The City may, at its sole option, apply DCMs to additional areas outside the TDCA.
  - D. The City shall begin full operation of the DCMs within the SDCA as follows:

- (i) Moat and row controls shall be operational by October 1, 2009.
  - (ii) All other controls shall be operational by April 1, 2010.
- E. Following the dates set out above in this Section, the City shall continuously operate and maintain the DCMs within the TDCA. The City shall continuously operate and maintain DCMs within the DCA as required under the 2003 SIP, except as otherwise provided in this Agreement.
- 2. A. The City shall construct within the SDCA a minimum of 9.2 square miles of Shallow Flood dust controls. The Shallow Flood areas are delineated on the Dust Control Measure Map, attached as Exhibit 3.
- B. On the remaining 3.5 square miles of the SDCA not specifically designated for Shallow Flood on the DCM Map (Exhibit 3), the City shall
  - (i) construct Shallow Flood, Managed Vegetation, or gravel cover, as described in the Dust Control Measures Description, attached as Exhibit 4, and which are currently approved as Best Available Control Measures (BACM) under the 2003 SIP; or
  - (ii) subject to Sections 3, 7 and 8, treat up to 3.5 square miles of the SDCA with the alternative dust control measure known as “Moat and Row,” as described in the DCM Description (Exhibit 4).
- C. TDCA areas designated as Channel Area represent areas containing natural drainage channels having potentially significant resource issues and regulatory constraints. While these areas are not a part of the SDCA, they shall be addressed as part of the control strategy for the SDCA. However, it is acknowledged that the control strategy in this area may be subject to additional regulatory constraints, design considerations, and impacts caused by adjacent DCMs.
- D. The internal control measure boundaries delineated on the DCM Map (Exhibit 3) are approximate and are subject to final written approval by the APCO. The areas designated on the DCM Map (Exhibit 3) for Shallow Flood and Moat and Row may be modified upon written request by the City to the District and written approval by the APCO, which approval shall not be unreasonably withheld.
- 3. All DCMs within the SDCA shall be designed, constructed, operated and maintained by the City to achieve the initial target minimum dust control efficiencies (MDCEs) shown on the MDCE Map, attached as Exhibit 5. The initial target MDCEs (Target MDCEs):

- A. Are based on the results of air quality modeling, as described in the 2003 SIP, conducted by the City and approved by the APCO for the period July 2002 through June 2006;
  - B. Assume 100 percent control efficiency in the 29.8 square miles of the DCA required under the 2003 SIP, except during the fall and spring ramping periods as described in Section 26, and achievement of the target MDCEs for the areas in the SDCA. Control efficiencies during the fall and spring ramping periods shall be based on modeling that accounts for reduced wetness cover pursuant to Sections 5 and 26;
  - C. Have been selected to achieve PM<sub>10</sub> concentrations that will not exceed the federal 24-hour PM<sub>10</sub> ambient air quality standard of 150 µg/m<sup>3</sup> (federal standard) at all historic shoreline (elevation 3600 feet above sea level) receptors.
4. Prior to April 1, 2010, the Target MDCEs may be modified, upon request of the City and written approval of the APCO, which approval shall not be unreasonably withheld, if the modified MDCEs meet the criteria set forth in the MDCE Selection Process Spreadsheet, attached as Exhibit 6, pursuant to Section 3.
  5. For the Shallow Flood areas identified in DCM Map (Exhibit 3), the percentage of each area that must be wetted shall be based on the Shallow Flood Control Efficiency Curve (SFCE Curve) attached as Exhibit 7, or an update of the SFCE Curve mutually agreeable to the Parties, to achieve the control efficiency levels in the MDCE Map (Exhibit 5).
  6. The Parties believe that the City's existing Managed Vegetation site may currently achieve a control efficiency of 99 percent. Therefore, the City shall continue to maintain and the District shall continue to monitor the site to ensure that it achieves 99 percent control efficiency. No later than July 1, 2007, the City shall submit to the District an operation and management plan for the City to maintain cover conditions that achieve 99 percent control efficiency in the Managed Vegetation areas. The plan shall be subject to written approval by the APCO, which approval shall not be unreasonably withheld. Prior to the time that the Managed Vegetation area is in compliance with an approved SIP, the District will not issue a Notice of Violation (NOV) for the existing Managed Vegetation area as long as:
    - A. From January 1, 2007, to the earlier of July 1, 2007 or the date when the City's operation and management plan is approved by the APCO, the City maintains its current operation and management practices for its Managed Vegetation areas; and

- B. After the APCO's written approval of the operation and management plan, the City implements all provisions of its operation and management plan; and
  - C. The City's Managed Vegetation area site does not cause an exceedance of the federal standard at the historic shoreline.
7. As Moat and Row is not a currently approved BACM dust control measure under the 2003 SIP, the City will develop, in consultation with the District, and conduct Moat and Row Demonstration Projects on the lake bed. These Demonstration Projects will be conducted on two or more locations on the lake bed outside of the DCA. The proposed location of these Demonstration Project areas are shown on attached Moat and Row Demonstration Project Map (Exhibit 8). The actual locations of the projects may be changed by the City, and in such event, the City shall notify the APCO in writing of the changed locations. The City will be the California Environmental Quality Act (CEQA) lead agency for implementation of the Moat and Row Demonstration Projects.
8. Based on results of the Moat and Row Demonstration Projects described in Section 7 and subject to Sections 2 and 3, the City in its sole discretion may decide which DCMs to implement in the areas designated for Moat and Row in Section 2 and Exhibit 3 of this Agreement. The City shall consult with the District before making its decision and inform the District of its decision in writing.
- A. Depending on the results of the Moat and Row Demonstration Projects, the measures implemented in these areas by the City may include Moat and Row, enhanced Moat and Row (*e.g.*, closer Moat and Row spacing, Moat and Row with some Shallow Flooding, Moat and Row with some vegetation), combined Moat and Row/Shallow Flood, MDCE-BACM, or BACM.
  - B. If the City implements Moat and Row, it shall design and construct Moat and Row to achieve the Target MDCEs described in Section 3. The Moat and Row configuration required to achieve these Target MDCEs will be decided solely by the City, after consultation with and written notification to the District.
  - C. In the event of a dispute regarding the City's proposed decision or action pursuant to Section 8.A or 8.B, either Party may initiate the Dispute Resolution Process pursuant to Section 32.
  - D. Upon written request of the City, the APCO shall determine in writing if Moat and Row and/or Enhanced Moat and Row constitutes BACM or MDCE-BACM, in accordance with the revisions to the 2003 SIP provided in Section 28.

DUST IDENTIFICATION (DUST ID) PROGRAM

9. The Parties mutually recognize that a method for identifying sources of potential exceedances of the federal standard at the historic shoreline could be developed that is superior to and could replace or modify the current Dust ID Program.
  - A. The Parties will work cooperatively, with the participation of a mutually agreeable independent third party technical expert or experts under contract to the District and jointly managed by the Parties, in a good faith effort to develop, before April 1, 2010, an improved Dust ID Program. The APCO will implement all mutually-agreeable changes to the Dust ID Program and notify the City in writing of those changes.
  - B. The District will continue to work with the City after April 1, 2010 to further improve the Dust ID Program and will implement all additional mutually agreeable changes in a written decision.
  - C. In furtherance of efforts to improve the Dust ID Program:
    - (i) The Parties will promptly begin a mediated process for refining the Dust ID Program and resolving disputes.
    - (ii) The Parties will select a mutually agreeable expert or panel of independent third-party technical experts.
    - (iii) The District, after consultation with the City, will increase the number of PM<sub>10</sub> monitors at or near the historic shoreline. In all cases, the District will notify the City of the location of the monitors within 30 days of placement of the monitors. If a PM<sub>10</sub> monitor is located above the historic shoreline, the District will make reasonable attempts to account for non-lake bed sources that may affect the monitor.
    - (iv) The District, after consultation with the City, will modify the existing sand flux monitor network to concentrate on areas of special interest, and will, in all cases, notify the City of the modifications within 30 days of any modification.
    - (v) The Parties will establish mutually agreeable model performance measures. Such measures may, but are not required to, include a minimum model performance standard.
    - (vi) The District will make reasonable efforts to account for impacts of DCM construction activities.

10. The City will lead a joint effort with the District to develop methods for directly measuring PM<sub>10</sub> emission rates from the lake bed. The District will incorporate mutually agreeable methods into the Dust ID Program.
11.
  - A. If the City is in compliance with Sections 1 and 2 of this Agreement, the following shall apply to the time period before April 1, 2010.
    - (i) The APCO will not issue any further determinations regarding the need for SCRs that provide for additional requirements beyond those in this Agreement. However, the District will continue to use the Dust ID Program, as that program may be modified pursuant to Sections 9 and 10. The District will periodically advise the City of results in writing and may recommend actions to the City based on the model results.
    - (ii) Data collected before April 1, 2010 will not be used in future determinations requiring SCRs, except in those areas delineated as Study Areas on the Study Area Map attached as Exhibit 9 and described in Exhibit 2. Data collected from the Study Areas between July 1, 2006 and April 1, 2010 may only be used in SCR determinations after April 1, 2010, and may be used only in accordance with the current form of the Dust ID Program that is in effect after April 1, 2010.
    - (iii) The District will not issue an order requiring the City to implement any additional controls on any lake bed dust source areas in order to achieve the state PM<sub>10</sub> standard of 50 micrograms per cubic meter unless compelled to issue such an order by state law.
  - B. The District shall determine compliance with the state PM<sub>10</sub> standard based on concentrations only in the surrounding communities, unless otherwise compelled by state law.
12. The City, in consultation with the District, shall annually develop and provide to the District a Performance Monitoring Plan (PMP) to aid in its operation of the Owens Lake dust mitigation program on the Owens Lake bed.
  - A. The PMP will describe the measurements and methods used to verify the performance of the constructed DCMs and Moat and Row test areas. The PMP will also describe the measurements and methods used to maximize information on dust emissions from areas of special interest.
  - B. The City shall implement the PMP, and will use the results as a guide for making operational decisions about the type, location, timing, and level of dust control measures needed to prevent exceedances of the federal standard at the shoreline.

- C. The District may use information from the PMP to assist in determining the likely sources of dust emissions causing or contributing to exceedances (if any) of the federal standard at the shoreline.

#### SHALLOW FLOOD BACM REFINEMENT

- 13. The City shall have the option to conduct field testing to refine the wetness cover requirement to achieve 99 percent control efficiency in Shallow Flood areas within the DCA (Shallow Flood Cover Test).
  - A. The Shallow Flood Cover Test shall occur on one or more areas totaling not more than 1.5-square-miles, to be selected by the City and approved by the APCO, which approval shall not be unreasonably withheld, from within the TDCA areas requiring 99 percent control.
  - B. The Shallow Flood Cover Test design shall be prepared by the City and approved by the APCO, which approval shall not be unreasonably withheld, prior to implementation. Based on that design, the APCO will reasonably determine wetness cover requirements for the Shallow Flood Cover Test.
  - C. The City will be CEQA lead agency for the Shallow Flood Cover Test.
- 14. If the APCO reasonably determines in writing that DCMs in the TDCA have been operational for one full year (defined as 365 consecutive days) with no exceedance of the federal standard at monitors located at or above the historic shoreline caused solely by sources within the TDCA, the City shall be permitted to reduce the wetness cover by an average of 10 percent over Shallow Flood areas requiring 99 percent control efficiency, excluding areas identified in Section 14.C, provided that:
  - A. Application of the 10 percent reduction in wetness cover during the Fall and Spring Shallow Flood DCM Compliance periods set out in Sections 25 and 26 shall result in the lower of:
    - (i) The areal cover resulting from a 10 percent reduction; or
    - (ii) The areal cover required in Section 26.A.
  - B. To implement the reductions set out in this Section, the City shall be required to first submit a written Wetness Cover Plan to the District for reducing the wetness cover on the eligible areas. The Wetness Cover Plan shall take into account:

- (i) the results of testing carried out pursuant to Section 13, if conducted; and
    - (ii) the results of fall and spring Shallow Flood wetness cover reduction operations carried out pursuant to Section 26.
  - C. If, in any year, the Wetness Cover Plan proposes reductions in wetness cover greater than 10 percent in any portion of the Shallow Flood areas covered by the Plan (consistent with the 10 percent limit on the overall average reduction), the City shall obtain the additional written approval of the APCO, which approval shall not be unreasonably withheld.
  - D. In the event shoreline monitors show an exceedance of the federal standard, whether that exceedance is caused by sources within, outside, or both within and outside of the TDCA, no further reductions in wetness cover shall be permitted for any Shallow Flood area that has contributed to the exceedance, as determined by the methodology in Section 18 and subject to the provisions of Section 16.
  - E. Except as provided in Section 16, the City may continue to operate using reductions of wetness cover pursuant to a previously approved Wetness Cover Plan.
15. For each Dust Control Season (October 1 of each year through June 30 of the next year) that wetness cover reductions have taken place under the provisions of Section 14, the City shall prepare and submit to the District a written report summarizing the results of the wetness cover reductions within 90 days after conclusion of the corresponding Dust Control Season. The report shall document the percentage of wetness cover for Shallow Flood areas and the effect(s) of wetness cover reductions on PM<sub>10</sub> concentrations at the historic shoreline.
16. Any areas for which wetness cover has been reduced pursuant to Section 14 and that cause or contribute to an exceedance of the federal standard at the historic shoreline shall be remediated by the City under the Remedial Action Plan requirements pursuant to Sections 18 and 22 below.
- A. Subject to APCO written approval, which approval shall not be unreasonably withheld, the City may further reduce the wetness cover beyond that allowed in Section 14 provided that:
    - (i) The maximum 24-hour PM<sub>10</sub> shoreline monitor values for at least 365 consecutive days of operation following initiation of the last approved Wetness Cover Plan does not exceed 130 µg/m<sup>3</sup>; and
    - (ii) The City demonstrates to the reasonable satisfaction of the APCO that the modeled contributions from the lake bed for the same time

period set forth in Section 16.A.(i) plus the background of 20  $\mu\text{g}/\text{m}^3$  do not exceed 120  $\mu\text{g}/\text{m}^3$  at the historic shoreline.

- B. If the monitored values at the historic shoreline exceed 130  $\mu\text{g}/\text{m}^3$ , and it is determined that non-lake bed sources are contributing greater than 20  $\mu\text{g}/\text{m}^3$ , then the District will expeditiously seek to identify and require control of those non-lake bed sources so that the City may continue to implement efficient DCMs on the lake bed.
- C. If the City is entitled to further reduce wetness cover pursuant to this Section, the City shall prepare and submit an updated Wetness Cover Plan to the District to describe the wetness cover proposed for the subsequent, applicable Dust Control Season. The updated Wetness Cover Plan shall include:
  - (i) A map that depicts the eligible Shallow Flood areas;
  - (ii) The proposed amount of wetness cover for each eligible Shallow Flood area; and
  - (iii) The method for determining effectiveness of the proposed wetness cover.
- D. The Wetness Cover Plan shall be subject to approval of the APCO, which approval shall not be unreasonably withheld.

#### ACTIONS TO ADDRESS STANDARD VIOLATIONS

- 17. After May 1, 2010, the APCO will recommence written SCR determinations under the revisions to the 2003 SIP as provided in Section 28. Recommended determinations will use Dust ID data collected only after April 1, 2010, except as provided in Section 11.A.(ii) for Study Areas, and shall be made at least once in every calendar year.
- 18. If, pursuant to Section 17, the APCO determines that a monitored or modeled exceedance of the federal standard caused by emissions from the lake bed has occurred at or above the historic shoreline:
  - A. The APCO, based on all available information, including visual observation, monitoring and modeling, and in consultation with the City, will identify the need for additional controls, monitoring, or both.
  - B. (i) If the APCO identifies the need for additional controls, the APCO shall issue a SCR determination.

- (ii) If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an Alternative Analysis. If the City submits an Alternative Analysis, the APCO shall consider the Analysis and may withdraw, modify or confirm the SCR determination.
  - (iii) If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's action, the City may initiate the Dispute Resolution Process pursuant to Section 32. The APCO may modify the SCR determination based on the Dispute Resolution process.
  - (iv) In the event the Parties are unable to resolve disagreements over future SCR determinations through the Dispute Resolution Process, the City may appeal future determinations to CARB under the provisions of Health and Safety Code Section 42316 (Section 42316), provided that the Parties expressly intend that this Agreement be the final resolution regarding the existing disputes between the Parties that are the subject of this Agreement. Based on the foregoing, the City stipulates and agrees that all of the provisions and determinations, including the measures and procedures, contained in the 2003 SIP, the provisions of this Agreement to be included in modifications to the 2003 SIP pursuant to this Agreement, and the SCR determination dated April 4, 2006, which the City in good faith disputed, shall be deemed to be valid and reasonable, and that the City will not challenge those provisions or determinations by appeal under Section 42316 or in any other proceeding, including any other administrative or judicial forum. Subject to this Paragraph, the City may challenge any future SCR determination under Section 42316; however any arguments or challenges must be based on data and information that do not currently exist, but that exist after the execution of this Agreement.
- C. The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Section 21 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.
  - D. The District may, as appropriate, also issue a notice of violation.
19. In the event:
- A. The APCO has made a written determination pursuant to Section 18 that an exceedance of the federal standard, occurring after April 1, 2010,

resulted from a Control Area or portion of a Control Area treated with Moat and Row; and

- B. That Control Area or portion of a Control Area causing the exceedance was remediated by the City as provided in Section 21 below; and
- C. That Control Area or a portion of that Control Area is subsequently the sole cause of an exceedance of the federal standard at or above the historic shoreline, (*i.e.*, an exceedance occurred after the City attempted to remediate that area under Section 21);

then the City shall convert that Control Area, or that portion of that Control Area, from Moat and Row to MDCE-BACM or BACM, to address the exceedance described in Section 19.C., for all or the portion of that Control Area that caused the subsequent exceedance, under the time deadlines provided for in Section 24.

- 20. If the APCO determines that Moat and Row constitutes BACM or MDCE-BACM, then upon issuance of such written determination, the provisions of Section 19 that require the City to convert to BACM or MDCE-BACM may be satisfied by applying the BACM or MDCE-BACM approved under this Section 20.
- 21. A Remedial Action Plan prepared by the City pursuant to Section 18 will contain a description of:
  - A. Any and all needed changes, repairs or enhancements to DCMs, including one or some combination of the following:
    - (i) Maintenance of facilities (*e.g.*, berms, moats and rows);
    - (ii) Changes to Shallow Flood or Managed Vegetation facilities or operations (*e.g.*, increase in wetness cover extent, improved wetness cover distribution, enhancement of vegetation);
    - (iii) Augmentation (*e.g.*, more moats and rows) or enhancement (*e.g.*, addition of sand fences, surface wetting, armoring, vegetation, surface roughening) of Moat and Row areas;
    - (iv) Transition of Moat and Row areas to BACM, or MDCE-BACM.
  - B. Any and all needed expansion of DCMs, and specific plans for expanding the measures.
  - C. A schedule for the work to be performed to implement the changes, clearly indicating the point at which facilities will be operational and effective at design levels.

22. The Schedule of Contingency Measures attached to this Agreement as Exhibit 10 sets forth a non-exclusive list of items that shall be included by the City in its Remedial Action Plans, described in Section 21, and the timing required for their implementation.
23. Before any full-scale Moat and Row areas are operational, the City shall submit to the District a conceptual design and schedule for possible implementation of BACM or MDCE-BACM to each Moat and Row area consistent with Section 19. These designs and schedules are the potential contingency measures to be implemented by the City where a transition from Moat and Row to another DCM is needed, or where such transition is required pursuant to Section 19.
24. Areas to be transitioned from Moat and Row to BACM or MDCE-BACM will be operational within the times set forth in the Moat and Row Transition Schedule attached as Exhibit 11. DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule attached as Exhibit 12.

#### FALL AND SPRING SHALLOW FLOOD DCM COMPLIANCE

25. For the time period from October 16 of each year through May 15 of the next year, the Shallow Flood Control Areas shall be considered to be in compliance with this Agreement and applicable laws and regulations, if the areal wetness cover within each Shallow Flood Control Area in the TDCA meets the MDCE required in Exhibit 6 using the SFCE Curve in Exhibit 7.
26. The provisions set forth in this section shall apply to all Shallow Flood areas with target control efficiencies of 99 percent or more, except those which the City and the District may mutually agree to exclude.
  - A. Beginning on April 1, 2010, compliance of TDCA Control Areas with 99 percent control efficiency Shallow Flood requirements shall be as follows:
    - (i) Beginning May 16 and through May 31 of every year, Shallow Flood may be reduced to a minimum of 70 percent areal wetness cover.
    - (ii) Beginning June 1 and through June 15 of every year, Shallow Flood may be reduced to a minimum of 65 percent areal wetness cover.
    - (iii) Beginning June 16 and through June 30 of every year, Shallow Flood may be reduced to a minimum of 60 percent areal wetness cover.

- (iv) If for any Shallow Flood area, the percent of areal wetness cover in the periods specified in Sections 26A.(i), (ii) and (iii) is below the minimum percentages specified in those sections, and there were no monitored or modeled exceedances of the federal standard at the historic shoreline, that area will be deemed to be in compliance with this Agreement and applicable laws and regulations if the City demonstrates in writing and the APCO reasonably determines in writing that maximum mainline flow was maintained in the applicable period.
  - B. From July 1 through September 30 of each year, the City is not required by the 2003 SIP to apply water for dust control, but is required to maintain minimum areal wetness cover as required by applicable environmental documents and approvals.
  - C. Beginning on April 1, 2010, if modeled or monitoring data shows an exceedance or exceedances of the federal standard at the historic shoreline as a result of excessive dry areas on Shallow Flood Control Areas during the dust control periods for each year between May 16 through June 30, and October 1 through October 15, the provisions of Sections 17 and 18 shall apply.
27. The provisions of Sections 25 and 26 are subject to the results of air quality modeling, to be conducted by the City and approved by the APCO, that demonstrates attainment of the federal standard at the historic shoreline using the reduced areal wetness covers set forth in Section 26. The modeling shall be conducted as described in the 2003 SIP using data for the period July 2002 through June 2006. The control efficiency of the areal wetness covers shall be modeled using the SFCE Curve as provided in Section 5.

REVISION OF THE STATE IMPLEMENTATION PLAN (SIP)

- 28. A. The APCO will propose a District Board Order that will revise the 2003 SIP to incorporate all of the terms and conditions of this Agreement, except such terms and conditions, if any, that may not lawfully be included in the SIP. The APCO will propose the Board Order and SIP revision at a time sufficient to allow the proposed revisions to be considered and adopted by the District Board by July 1, 2008. The time for consideration and adoption shall take into account, without limitation, the time for legally required environmental review and public notice and hearing. The District Board will act on the proposed SIP revisions by July 1, 2008.
- B. If the District Board has the legal ability to act and fails to act by November 1, 2008 on a proposed District Board Order as described in Subsection 28.A, the City may terminate this Agreement by providing

written notice to the District, provided, however, that the City will not provide such notice prior to the conclusion of the Dispute Resolution Process pursuant to Section 32, which process may be initiated by either Party.

- C. The Parties have developed this Agreement with the intention that its provisions will be incorporated into a revision of the 2003 SIP and are consistent with applicable provisions of the Health and Safety Code, including Section 42316, and applicable provisions of federal law regarding attainment of the NAAQS.
- D. The APCO shall confer in good faith with the City to develop procedures to modify and authorize MDCE-BACM for incorporation into the revisions to the 2003 SIP.
- E. The District will be CEQA lead agency and will prepare, in consultation with the City, and will consider for certification on or before March 1, 2008 an environmental impact report (EIR) on the proposed SIP revisions.

- F. (i) In the event:
  - (a) the District Board adopts a District Board Order revising the 2003 SIP that does not incorporate all the terms and conditions of this Agreement, except such terms and conditions, if any that may not lawfully be included in the SIP; or
  - (b) the District Board adopts a District Board Order revising the 2003 SIP that incorporates all the terms and conditions of this Agreement except such terms and conditions, if any, that may not lawfully be included in the SIP, and subsequent judicial action causes the revised SIP to be materially inconsistent or materially in conflict with the terms and conditions of this Agreement,

the City may terminate this Agreement in the case of Section 28.F(i)(a), and either Party may terminate this Agreement in the case of Section 28.F(i)(b), within 30 days of such action by providing written notice to the other Party.

- (ii) If the City does not elect to terminate this Agreement pursuant to Section 28.F(i) and any inconsistencies or conflicts exist between this Agreement that preclude compliance with both, the provisions of the District Board Order shall prevail.

- G. The City will support and will not appeal or in any other way challenge or oppose revisions to the 2003 SIP and resulting District Board Order that incorporate all of the terms and conditions of this Agreement, except such terms and conditions, if any, that may not lawfully be included in the SIP. After issuance of the District Board Order provided for in this Section, the City shall not challenge the order under CEQA to the extent that Order is consistent with this Agreement.
- H. In the event the District Board fails to certify the EIR by March 1, 2008 or to act on the proposed SIP revisions by July 1, 2008, the Parties shall meet and confer as provided in Section 33.A.
- I. Any provisions of this Agreement that are incorporated into the District Board Order as provided in Section 28.A. shall, upon adoption of that Order by the District Board, cease to have any further force and effect as part of this Agreement, and shall instead be effective as part of the District Board Order.
- J. Any provisions of this Agreement that are not incorporated into the District Board Order as provided in Section 28.A shall remain in full force and effect as part of this Agreement until May 1, 2012, at which time those provisions shall cease to be of any further force or effect as part of this Agreement, provided that the Parties may mutually agree in writing to extend this date.

#### COVER MEASUREMENT TECHNIQUES AND PERFORMANCE SPECIFICATIONS

- 29. The District and City will collaboratively develop wetness and vegetative cover measurement techniques, control efficiency relationships, and compliance specifications. Final acceptance of those cover measurement techniques and compliance specifications with regulatory impact will be at the sole discretion of the APCO.

#### KEELER DUNES

- 30. The Parties acknowledge that dust emissions from the area known as the Keeler Dunes may cause or contribute to exceedances of federal and state standards for PM<sub>10</sub>. The City hereby agrees to cooperate with the District and other federal, state and local agencies and experts as necessary to develop a plan to reduce dust emissions from the Keeler Dunes.

#### COOPERATION BETWEEN PARTIES AND DISPUTE RESOLUTION

- 31. In carrying out the terms of this Agreement, the Parties intend to cooperate fully and to consult with each other effectively and on a regular basis. The Parties will make good faith efforts to provide each other with relevant documents and

technical information in a timely manner, and they will keep each other informed of their respective progress in actions to implement the actions set forth in this Agreement, including, without limitation, progress in entering into consultant and construction contracts and in securing permits from agencies with permitting authority.

32. Notwithstanding the Parties' commitment to cooperate in implementing the terms of this Agreement, they recognize that differences may arise between them. To address this situation, the Parties agree that, in the event either Party believes that a dispute exists regarding implementation or interpretation of any provision of this Agreement, that Party may, by informing the other Party in writing within 21 days of the decision or determination, action or proposed action triggering the dispute, initiate non-binding mediation between the Parties. A party may not seek non-binding mediation for issues that were already the subject of mediation under this Section unless both Parties agree in writing.
- A. The mediator shall be a mediator mutually acceptable to the Parties. The Parties may also by mutual agreement include in the mediation, one or more of the technical experts selected pursuant to Section 9.C.(ii), or any other technical experts, such experts to be under contract to the District and jointly managed by the Parties. The City shall be responsible for the cost of the mediator and the technical experts pursuant to Health and Safety Code Section 42316. The mediation will be conducted and completed within 60 days of the notice initiating the Dispute Resolution Process unless that time period is extended by mutual agreement of the Parties. The mediation will be conducted under all applicable California laws regarding mediation, including but not limited to Cal. Evidence Code Sections 1115-1128.
- B. Neither Party will commence any litigation concerning the implementation of terms of this Agreement unless that Party has first initiated the mediation described in this Section, and the sooner of the following two events takes place:
- (i) Sixty (60) days has expired from the date that Party first sent written notice to commence the mediation; or
  - (ii) Both Parties agree, or the mediator(s) states, in writing that the mediation has been completed.
  - (iii) Notwithstanding the provisions of this Section 32.B, a Party may commence litigation at an earlier time if necessary to pursue a claim or cause of action that would otherwise be time barred under an applicable statute of limitations.

- C. If the Dispute Resolution Process pursuant to this Section 32 is initiated to address a dispute regarding a SCR determination issued by the APCO pursuant to Section 18.B, then that SCR determination shall not be deemed final until the conclusion of this process under Section 32.B.
- D. Nothing in this section is intended to or shall be construed to restrict or eliminate a Party's right to utilize available legal remedies following completion of the mediation process.

#### EXTENSIONS OF TIME

33. A. In the event that the District

- (i) Anticipates that it will fail to certify or fails to certify an environmental impact report on the proposed SIP revisions and related actions by March 1, 2008; or
- (ii) Anticipates that it will fail to act on or fails to act on a proposed District Board Order pursuant to Section 28.A by July 1, 2008,

the District shall promptly notify the City, and Parties shall meet and confer to determine what if any revisions to other dates contained in this Agreement may be appropriate. The Parties may mutually agree to the participation of a mediator in the meet and confer process.

B. In the event the City

- (i) Anticipates that it will be unable to complete implementation or fails to complete implementation of moat and row controls pursuant to this Agreement by October 1, 2009; or
- (ii) Anticipates that it will be unable to complete implementation or fails to complete implementation of all other controls by April 1, 2010,

the City may seek relief for such failure or delay by obtaining a variance from the Hearing Board of the Great Basin Unified Air Pollution Control District pursuant to District Regulation VI and all applicable law for variance relief from a District Order, including but not limited to Health and Safety Code Section 42350 *et seq.* In such event, the District shall, at the request of the City, meet with the City, prior to or after the filing of a request for a variance, in order to ascertain whether the District will support the City's variance request. In the event the District will not support the City's variance request, the City may invoke the Dispute Resolution Process pursuant to Section 32.

- C. Nothing in this Section is intended to or shall limit the ability of the City to seek a variance from requirements not included in this Section.
  - D. Each Party will undertake to inform the other Party as early as practicable of the fact that it anticipates that it will not meet or has failed to meet any of the dates set out in this Section.
34. In the event either Party claims that the other Party is in material breach of the terms of this Agreement, including without limitation, a claim by the District that the City is in material breach under Section 11, the Party claiming the breach shall provide written notice of the claimed breach to the other Party. In the event the Party claimed to be in breach contests such claim, the issue shall be subject to the Dispute Resolution Process in Section 32.

#### LAWSUIT/APPEAL SETTLEMENT CONDITIONS

- 35. Within 15 days of execution of this Agreement, the APCO shall issue a revised SCR determination that incorporates the terms of this Agreement and that supersedes all previous determinations.
- 36. Upon issuance by the APCO of the revised SCR determination as described in Section 35, the City shall immediately commence the process for implementing additional DCMs on the Owens Lake bed consistent with the terms of this Agreement.
- 37. Upon issuance by the APCO of the revised SCR determination as described in Section 35, the City shall within seven days dismiss with prejudice its CARB appeals and the litigation against the District as described in the Recitals at Paragraphs L, O. and P.

#### DEFINITIONS

- 38. Definitions of terms used in this Agreement are contained herein and in Exhibit 13. Where specifically identified in Exhibit 13, these terms as used in this Agreement and Exhibits shall have the meanings provided in this Exhibit 13. Where no definition is provided herein or in Exhibit 13, the words and terms shall have their meaning as provided in the federal Clean Air Act or state air pollution law in the Health and Safety Code, and where no definition is found there, shall have their ordinary meaning as read in the context of this Agreement and consistent with the expressed intent of the Parties.

#### NOTICES

- 39. Whenever, under the terms of this Agreement, written notice is required to be given or a report or other document is required to be sent by one Party to another, it shall be sent by overnight mail and directed to the individual at the address

specified below, unless that individual or his or her successor gives notice of a change to the other Party in writing.

As to the City:

Ronald F. Deaton  
General Manager  
Los Angeles Department of Water and Power  
111 North Hope Street, Room 1550  
Los Angeles, CA 90012

As to the District:

Theodore D. Schade  
Air Pollution Control Officer  
Great Basin Unified Air Pollution Control District  
157 Short Street  
Bishop, California 93514

ADDITIONAL PROVISIONS

40. By this Agreement, the City and the District intend to settle their disputes regarding methods to address air quality issues at Owens Lake, including disagreements over the SCR determination issued on December 21, 2005, and the Modified SCR determination issued on April 4, 2006.
41. This Agreement is the final integrated agreement between the Parties regarding the matters addressed herein, and may not be modified except in a writing signed by both Parties.
42. This Agreement shall be construed in accordance with the laws of the State of California.
43. In the event any provision of this Agreement is judicially determined to be unenforceable, the Parties shall meet and confer and following such meeting, the Parties may amend the Agreement, or continue the Agreement without amendment, or either Party may terminate the Agreement.
44. This Agreement shall not create any rights in any third party.

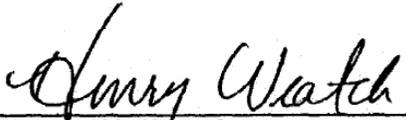
- 45. No failure by a Party to insist on strict performance of any term or condition of this Agreement shall constitute a waiver of such term or condition or a breach hereof.
- 46. Each Party represents that their respective signatories below have the authority to bind them to the terms of this Agreement.

REVIEWED AND AGREED TO:

Dated: November 30, 2006

Dated: December 4, 2006

  
 \_\_\_\_\_  
 Ronald F. Deaton  
 General Manager, Los Angeles Department of  
 Water and Power

  
 \_\_\_\_\_  
 Henry "Skip" Weatch  
 Board Chairman

The City of Los Angeles  
 By and Through the  
 Los Angeles Department of Water and Power

Great Basin Unified Air Pollution Control  
 District

APPROVED AS TO FORM AND LEGALITY  
 ROCKARD J. DELGADILLO, CITY ATTORNEY

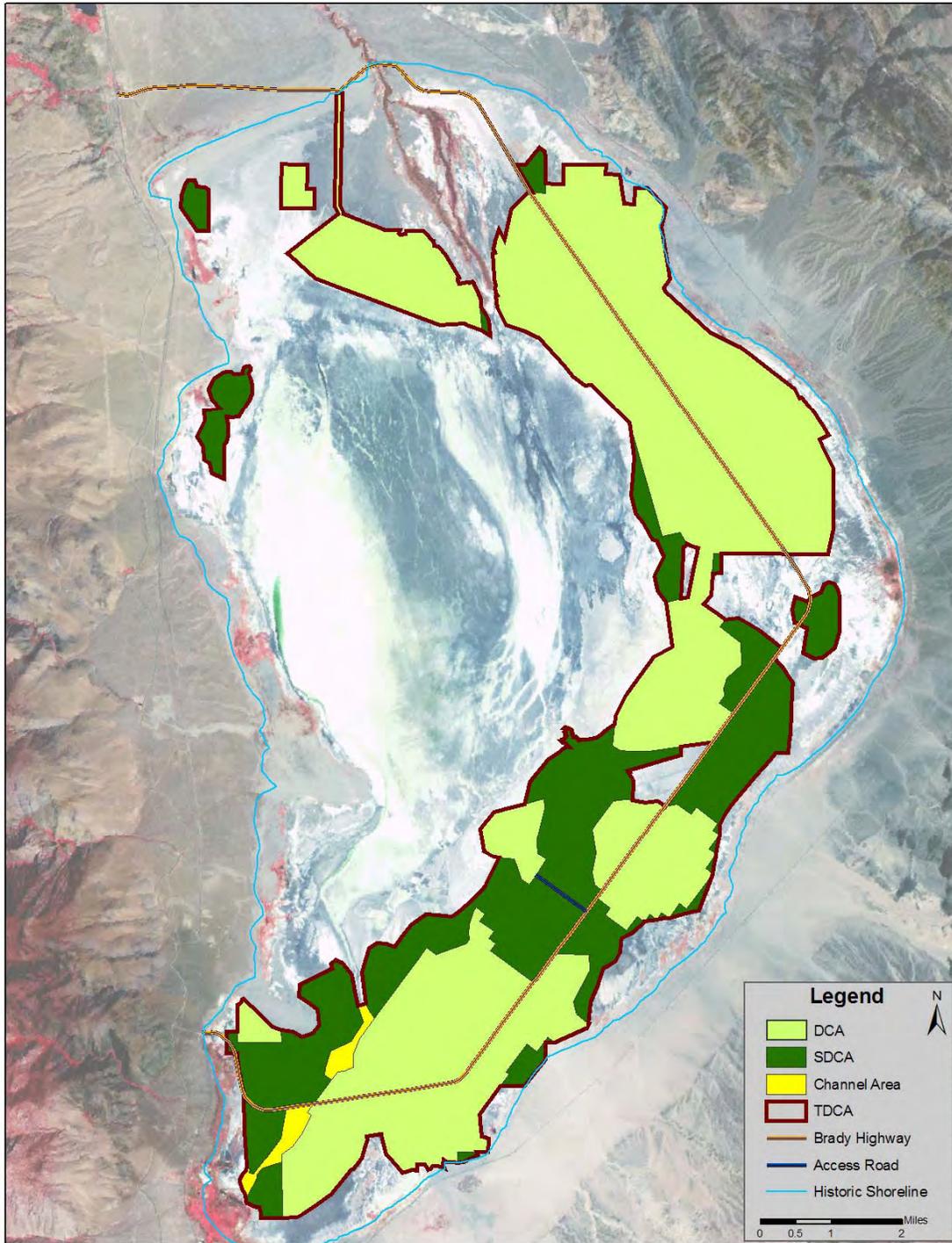
NOV 30 2006  
 BY   
 JULIE A. CONBOY  
 Deputy City Attorney

## List of Exhibits

1. Total Dust Control Area Map
2. 2006 Supplemental Dust Control Area Coordinate Description
3. Dust Control Measure Map
4. Dust Control Measures Description
5. Minimum Dust Control Efficiency Map
6. MDCE Selection Process Spreadsheet
7. Shallow Flood Control Efficiency Curve
8. Moat and Row Demonstration Project Location Map
9. Study Area Map
10. Schedule of Contingency Measures
11. Moat and Row Transition Schedule
12. DCM Operation Schedule
13. Definitions

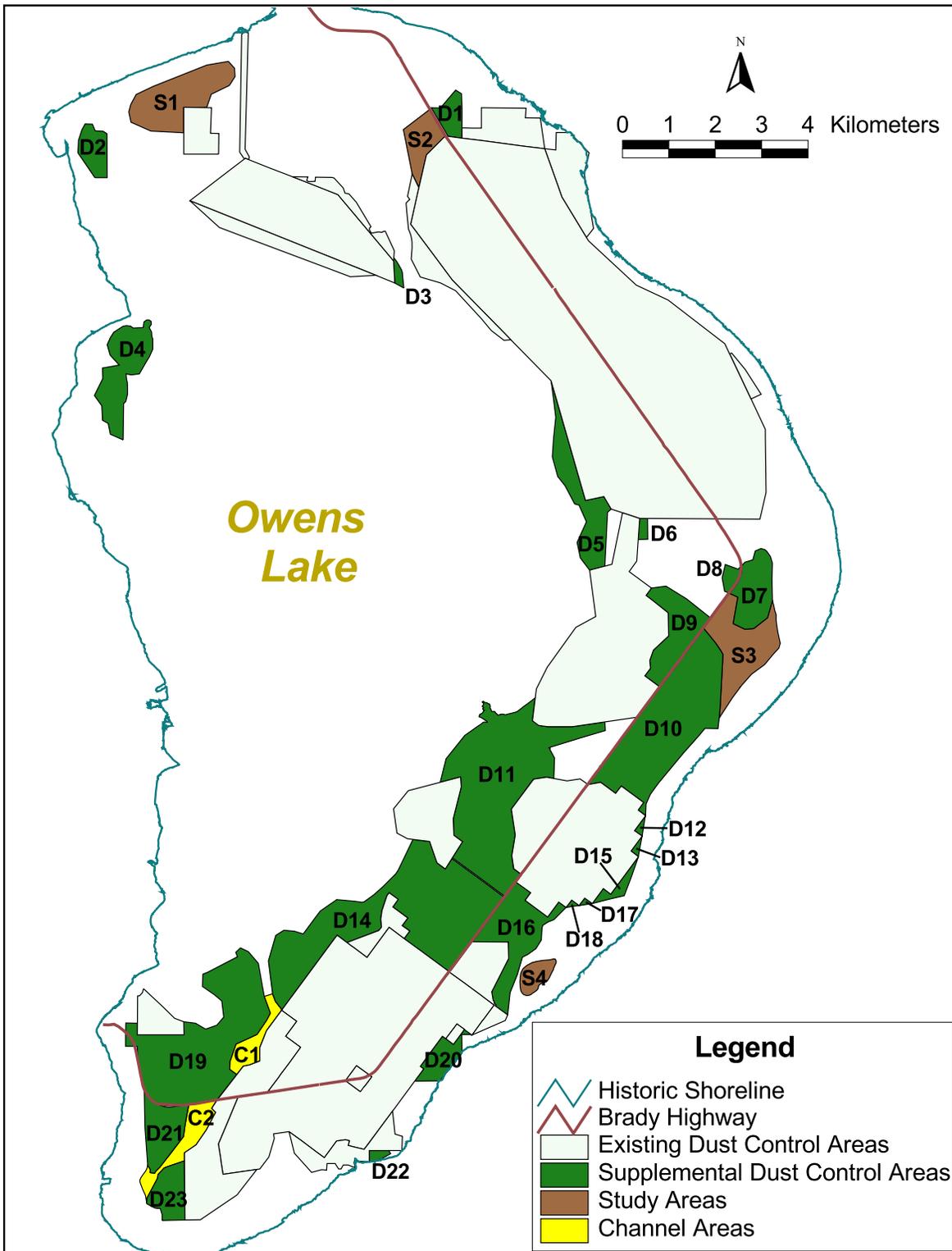
### EXHIBIT 1 -- TOTAL DUST CONTROL AREA MAP

The Total Dust Control Area (TDCA) is comprised of the 2006 Supplemental Dust Control Area (SDCA) and the 2003 Dust Control Area (DCA).



# EXHIBIT 2 -- 2006 SUPPLEMENTAL DUST CONTROL AREA COORDINATE DESCRIPTIONS

KEY MAP



## EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)				
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates			
D1	0.16	SDCA	416,001.0310	4,042,347.3789	D5	0.57	SDCA	418754.0310	4033026.5000			
			415,701.7500	4,042,385.7617				418552.9690	4033287.6914			
			415,343.2810	4,042,999.8633				418484.0000	4033621.1133			
			415,539.4060	4,042,999.0234				418689.0940	4034066.4102			
			415,866.3750	4,043,383.8359				418529.0310	4034424.5078			
			415,994.4060	4,043,304.2109				418434.8130	4034452.0664			
			416,002.6250	4,042,981.9922				418325.1880	4034653.5234			
			416,005.6250	4,042,568.5234				418224.7810	4034845.3438			
			416,001.0310	4,042,347.3789				418067.7500	4035047.7852			
								417953.1880	4035467.4961			
D2	0.21	SDCA	408,085.5000	4,041,493.3164	417980.5000	4035865.3203						
			407,718.8130	4,042,027.7422	418027.9060	4036319.6094						
			407,731.5000	4,042,299.3945	417924.4060	4037110.5117						
			407,804.9060	4,042,524.2148	418666.3750	4034527.9844						
			407,873.2810	4,042,654.1211	419065.6880	4034610.9648						
			408,032.2500	4,042,647.6875	419223.4690	4034342.1406						
			408,089.5630	4,042,502.0625	419141.3750	4034271.8047						
			408,267.6560	4,042,491.4219	419084.1880	4033110.8086						
			408,347.0630	4,042,440.3203	418754.0310	4033026.5000						
D3	0.03	SDCA	414,747.2500	4,039,108.7500	D6	0.03	SDCA	419801.2810	4033687.7539			
			414,550.5000	4,039,224.6641				419831.7500	4034141.1016			
			414,528.0310	4,039,697.5156				420006.8130	4034139.3281			
			414,532.5000	4,039,759.7891				420012.7190	4033690.4844			
			414,583.3750	4,039,699.2617				419801.2810	4033687.7539			
			414,643.3130	4,039,605.6250				D7	0.43	SDCA	422105.2500	4031749.0176
			414,700.5000	4,039,498.9766							421854.9690	4031871.4102
			414,718.6880	4,039,441.7188							421952.1880	4032442.4199
			414,729.1250	4,039,314.2500							421827.1560	4032498.3555
			414,747.2500	4,039,108.7500							421778.4380	4032522.0762
		421882.0310	4032660.6934									
		421931.3130	4032728.7031									
		421954.3130	4032765.7129									
		421966.3130	4032785.8828									
		421992.7810	4032841.0703									
D4	0.59	SDCA	408,694.5000	4,035,836.9883	422013.5310	4032894.8164						
			408,417.2190	4,035,957.7344	422030.0630	4032956.1914						
			408,370.5940	4,036,191.9453	422039.5000	4033014.7422						
			408,249.5940	4,036,258.3164	422042.1560	4033068.7461						
			408,231.6880	4,036,571.0625	422042.4380	4033082.8008						
			408,075.5000	4,036,791.1719	422040.7810	4033127.2188						
			408,254.4060	4,037,157.2813	422103.3750	4033191.3320						
			408,249.9060	4,037,387.3789	422274.9380	4033248.8359						
			408,606.5630	4,037,448.5391	422331.4380	4033437.2383						
			408,414.0000	4,037,664.3359	422451.9060	4033492.2617						
			408,348.8750	4,037,888.7227	422530.2190	4033470.0195						
			408,415.9060	4,038,042.2422	422579.0940	4033430.6797						
			408,494.0000	4,038,156.0977	422659.7190	4033313.9453						
			408,687.9380	4,038,284.6484	422698.6880	4033173.2383						
			408,762.7190	4,038,303.7813	422688.0630	4032830.0469						
			408,853.0940	4,038,290.2422	422701.7500	4032367.5195						
			408,911.3130	4,038,246.2109	422592.2190	4031994.7988						
			409,028.9380	4,038,251.5742	422299.6560	4031762.5020						
			409,126.1560	4,038,258.7344	422105.2500	4031749.0176						
			409,134.0630	4,038,309.6602	D8	0.06	SDCA	421758.4690	4032529.3477			
			409,144.5940	4,038,382.5547				421668.6250	4032569.9238			
			409,201.0630	4,038,424.0508				421615.5310	4032859.4297			
			409,255.5940	4,038,422.9180				421680.6250	4033146.5156			
			409,299.1250	4,038,391.3789				421959.5000	4033044.5586			
			409,304.7190	4,038,329.9609				422021.5000	4033108.1875			
			409,254.9380	4,038,259.1797				422022.5630	4033079.4023			
			409,308.0940	4,038,163.0195				422019.3130	4033018.7031			
			409,312.7190	4,038,061.7695				422010.1880	4032960.1484			
			409,335.7190	4,038,017.0195				421994.8130	4032902.9766			
			409,334.3750	4,037,792.3008	421977.7500	4032858.2227						
409,260.5630	4,037,628.4492	421948.4060	4032795.7422									
409,184.9060	4,037,508.1055	421918.7190	4032746.2988									
409,044.0630	4,037,256.8359	421884.3440	4032697.7148									
408,869.9060	4,037,236.6055	421806.2810	4032593.7305									
408,755.8130	4,037,260.8867	421758.4690	4032529.3477									
408,768.2810	4,037,143.0156											
408,784.9690	4,037,079.6914											
408,789.7190	4,036,817.3555											
408,751.4060	4,036,667.7344											
408,706.5940	4,036,616.2422											
408,694.5000	4,035,836.9883											

**EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions**

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates
D9	0.53	SDCA	420,265.8440	4,030,508.7188	D11 continued	2.32	SDCA	416481.0000	4029994.3359
			419,947.7500	4,030,741.5176				416483.2500	4030000.4590
			420,067.1880	4,030,907.7324				416476.4690	4030004.0684
			420,051.5940	4,031,073.7461				416464.6250	4030013.5332
			420,132.5000	4,031,300.5000				416452.1250	4030020.7266
			420,460.9690	4,031,604.7441				416447.3130	4030031.0762
			420,449.4060	4,032,103.9551				416454.8750	4030042.8809
			419,975.9690	4,032,480.4902				416467.7500	4030052.9766
			420,091.3750	4,032,635.9316				416466.0630	4030067.6035
			420,399.6560	4,032,679.1270				416454.5310	4030077.5586
			420,847.1880	4,032,406.2988				416440.6250	4030076.0938
			421,363.7810	4,031,994.1230				416437.6250	4030084.6914
			420,995.8750	4,031,495.0273				416445.8130	4030098.3496
			420,265.8440	4,030,508.7188				416459.0310	4030110.6875
			D10	1.75				SDCA	419,965.0000
419,803.2190	4,027,847.7363	416467.1560			4030142.7871				
419,922.8440	4,028,009.4902	416461.5310			4030157.1523				
419,437.5940	4,028,368.0176	416450.1560			4030168.0938				
419,317.9690	4,028,206.2617	416439.0940			4030177.2402				
418,994.5310	4,028,445.2656	416443.8750			4030188.7227				
418,730.3440	4,028,397.0371	416458.4380			4030192.3809				
419,406.8750	4,029,323.4316	416470.3130			4030190.8789				
421,010.9060	4,031,484.3145	416479.0310			4030177.9727				
421,216.1560	4,031,761.8594	416493.8130			4030171.2637				
421,439.0940	4,031,498.2363	416510.6250			4030166.2656				
421,631.0310	4,031,208.7773	416527.2190			4030165.8828				
421,571.8750	4,030,077.3184	416541.7810			4030161.9238				
421,548.9690	4,029,833.7383	416568.0630			4030143.3945				
421,523.2500	4,029,607.1328	416585.0000			4030137.3281				
421,241.1880	4,029,607.8887	416601.6250	4030130.7734						
421,116.0000	4,029,457.7559	416608.7190	4030112.7188						
420,776.0000	4,029,075.9551	416614.8750	4030093.7324						
420,233.7500	4,028,421.8027	416614.1560	4030081.1367						
420,070.9690	4,028,193.2832	416606.9690	4030057.0176						
419,973.2500	4,027,978.3457	416610.2810	4030041.6328						
419,965.0000	4,027,728.2520	416621.0310	4030029.7910						
D11	2.32	SDCA	416,924.2190	4,025,991.8965	416626.8440	4030016.4492			
			416,906.7190	4,026,000.2598	416634.6560	4030003.4863			
			416,817.3750	4,026,065.2832	416639.6560	4029988.0273			
			415,808.9380	4,026,810.0977	416642.2500	4029973.2676			
			415,803.8440	4,026,822.5840	416656.7190	4029972.4727			
			415,810.1250	4,026,837.9219	416688.3750	4029977.5293			
			416,016.5310	4,027,163.7559	416704.9380	4029976.5762			
			415,829.9690	4,027,301.7383	416715.9690	4029964.5742			
			415,812.0000	4,027,654.7500	416723.1250	4029949.7949			
			415,987.3440	4,028,348.8008	416734.4690	4029937.7109			
			415,969.6880	4,028,562.7461	416747.7190	4029929.2070			
			415,530.3750	4,028,446.4922	416759.0310	4029916.4004			
			415,660.2500	4,028,955.4551	416768.4690	4029902.2207			
			416,062.8130	4,029,458.0664	416781.8130	4029898.3633			
			416,386.1560	4,029,683.9746	416790.3750	4029900.3945			
			416,436.9060	4,029,720.7148	416827.0940	4029907.2129			
			416,449.5000	4,029,732.7207	416838.2500	4029915.7813			
			416,468.5940	4,029,742.7246	416845.7500	4029917.9492			
			416,489.8750	4,029,746.4355	416852.5940	4029916.0938			
			416,529.4060	4,029,741.9941	416867.9690	4029916.1543			
			416,547.9690	4,029,741.4180	416880.3440	4029917.7637			
			416,541.4060	4,029,755.8789	416895.6880	4029914.7402			
			416,528.0940	4,029,767.9277	416925.9380	4029904.3965			
			416,515.2190	4,029,777.7969	416940.7190	4029903.4805			
			416,501.9690	4,029,786.2637	416954.8130	4029907.8730			
			416,489.6560	4,029,794.9004	416966.3750	4029914.2246			
			416,430.1250	4,029,834.6543	417119.3130	4029946.7070			
			416,415.3750	4,029,843.4570	417187.6250	4029971.9180			
			416,400.7190	4,029,849.4766	417582.2500	4030268.0078			
			416,387.3130	4,029,856.1563	417521.0310	4029772.5176			
416,372.5940	4,029,860.3105	417701.5630	4029667.0430						
416,368.5310	4,029,870.0703	417771.4380	4029656.0293						
416,375.7810	4,029,880.6270	417852.7810	4029647.5566						
416,384.4690	4,029,895.7617	418130.3750	4029643.4648						
416,385.5310	4,029,910.9023	418383.2810	4029647.0859						
416,395.3130	4,029,918.6621	419083.7810	4029748.1953						
416,406.0630	4,029,922.9727	419086.1880	4029746.9258						
416,419.9060	4,029,929.8086	419093.6560	4029564.0527						
416,435.1560	4,029,936.6543	417887.0630	4029198.4668						
416,449.2500	4,029,947.3340	417896.1560	4029182.4668						
416,459.1250	4,029,961.2246	417881.5000	4029187.7246						
416,462.9690	4,029,976.8418	418000.2190	4028968.8594						
416,471.5630	4,029,988.3965	417985.8130	4028531.7539						
		417825.0940	4028556.4668						
		417545.0000	4028513.0254						

## EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates
D11 continued	2.32	SDCA	417,068.6250	4,027,867.9766	D16	0.70	SDCA	416987.0630	4023427.0801
			417,152.6880	4,027,307.1758				416718.5630	4023625.5098
			417,077.1880	4,026,864.2910				416734.5310	4023647.0078
			417,117.7810	4,026,581.1016				416700.3440	4023672.5195
			417,277.7500	4,026,460.9707				416689.5630	4023734.1953
			416,924.2190	4,025,991.8965				416678.1560	4023741.8613
D12	0.02	SDCA	419,887.8440	4,027,285.2500	416644.1560	4023925.0195	417010.6880	4024645.2734	
			419,726.0310	4,027,404.7344	417000.8130	4024984.0566			
			419,965.0000	4,027,728.2520	417004.5630	4024995.9414			
			419,949.5310	4,027,659.1582	416997.8130	4025001.7578			
			419,887.8440	4,027,285.2500	416224.2500	4025007.0430			
					416932.7810	4025971.6777			
D13	0.02	SDCA	419,810.5000	4,026,842.2539	417170.5000	4026294.0039	417483.0940	4026061.2461	
			419,648.7190	4,026,961.7383	417363.6250	4025899.4863			
			419,772.4690	4,027,130.8359	417848.8440	4025541.0000			
			419,887.8440	4,027,285.2500	418087.8130	4025864.5176			
			419,880.3750	4,027,234.3164	418249.6250	4025744.9961			
			419,832.8130	4,026,984.5820	417981.1560	4025483.1621			
D14	2.46	SDCA	412,117.6560	4,023,538.0977	417862.3130	4025432.8262	417742.6560	4025357.7832	
			411,983.4060	4,023,714.6152	417000.8130	4025299.8848			
			411,915.1560	4,023,883.7793	417711.4060	4025042.9023			
			411,828.0940	4,024,594.2207	417596.9060	4024857.0391			
			411,988.0310	4,025,141.2695	417427.9690	4024735.2051			
			412,161.8440	4,025,254.5859	417308.1560	4024673.9160			
D17	0.01	SDCA	412,387.4060	4,025,234.3184	417192.2500	4024288.4082	418531.3750	4025787.7188	
			412,577.3130	4,025,175.8184	417038.6560	4023907.3789			
			412,752.9380	4,025,413.6777	418650.8440	4025949.5527			
			412,942.5940	4,025,667.2090	418812.6560	4025829.9941			
			413,298.0630	4,025,913.1816	418812.6560	4025829.9941			
			413,700.7190	4,025,878.1113	418272.7810	4025817.3457			
D18	0.01	SDCA	413,843.4060	4,025,859.0313	418531.3750	4025787.7188	418250.0940	4025745.5586	
			413,892.3750	4,025,869.0625	418531.2190	4025787.8750			
			414,103.4380	4,026,021.7207	418422.7500	4025775.2305			
			414,294.0310	4,026,188.3672	418250.0940	4025745.5586			
			414,574.5630	4,026,473.5742					
			414,628.3130	4,026,552.7695					
D19	1.88	SDCA	414,946.8130	4,027,212.3789	410989.2810	4022251.9551	418531.3750	4025787.7188	
			415,303.7810	4,027,171.2480	411145.7810	4022140.5918			
			415,463.6880	4,026,711.0117	410728.5630	4021605.7773			
			415,639.0630	4,026,577.9492	410525.7190	4021575.8516			
			415,777.6250	4,026,784.4590	410434.2500	4021553.4805			
			415,787.8440	4,026,793.4668	410330.1560	4021538.0020			
D15	0.08	SDCA	415,793.6560	4,026,794.4512	410249.0940	4021523.9121	410249.0940	4021523.9121	
			416,290.3440	4,026,429.5527	410165.6880	4021513.8320			
			416,545.3750	4,026,241.2695	410012.7810	4021489.0801			
			416,908.5000	4,025,969.6309	409988.7810	4021485.5020			
			416,207.2500	4,025,017.7598	409958.9380	4021487.3027			
			415,765.2810	4,024,422.9277	409834.5940	4021472.0918			
D16	0.08	SDCA	415,712.3440	4,024,368.7461	409710.8750	4021458.8867	409710.8750	4021458.8867	
			414,755.6880	4,025,075.7559	409588.2190	4021468.2129			
			414,875.1560	4,025,237.5156	409472.9060	4021506.2676			
			414,715.5000	4,025,356.9941	409364.2190	4021564.2617			
			414,832.8440	4,025,518.7598	409273.0310	4021648.9043			
			414,509.4060	4,025,757.7637	409231.3750	4021698.0781			
D17	0.08	SDCA	414,628.8750	4,025,919.4863	409192.6560	4021749.2871	409142.4380	4021863.0625	
			414,432.8750	4,026,064.2539	409121.8750	4021936.3730			
			414,383.9380	4,025,997.9883	409108.8130	4021989.7910			
			414,274.7500	4,025,678.2109	409094.0000	4022070.1055			
			414,249.7810	4,025,496.0098	409085.6880	4022117.5977			
			414,266.4690	4,025,323.2305	409078.5310	4022146.7773			
D18	0.08	SDCA	414,210.4380	4,025,245.9863	409061.1250	4022247.9473	409061.1250	4022247.9473	
			413,519.9380	4,024,988.5723	409045.9690	4022310.3633			
			413,307.2500	4,025,145.7637	409033.1250	4022381.5703			
			413,144.4690	4,024,931.4102	409029.3750	4022398.8301			
			412,117.6560	4,023,538.0977	409009.4380	4022518.7207			
					409000.8440	4022749.8164			
D19	0.08	SDCA	418,812.6560	4,025,829.9941	408748.8130	4022752.2285	408748.8130	4022752.2285	
			419,051.1560	4,026,152.9863	408748.6880	4022994.9199			
			419,213.4060	4,026,034.2168	408752.0000	4023250.6855			
			419,810.5000	4,026,842.2539	409002.0630	4023249.9121			
			419,655.1250	4,026,404.8789	408999.6250	4023000.2637			
			419,499.9380	4,025,999.3496	410005.0940	4022997.9844			
D20	0.08	SDCA	419,182.9690	4,025,925.2813	410001.1880	4023280.3379	410001.1880	4023280.3379	
			418,812.6560	4,025,829.9941	410254.3750	4023245.9746			

**EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions**

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates
D19 continued	1.88	SDCA	410,472.1880	4,023,123.1172	S1	0.71	Study	410001.6560	4042464.2656
			410,718.0630	4,023,206.8965				409290.7190	4042500.2383
			410,862.1250	4,023,378.8164				408861.2190	4042688.4688
			410,821.5940	4,023,731.0039				408813.8750	4042910.9609
			410,665.3750	4,023,862.7910				408859.4380	4043071.8984
			410,401.5000	4,024,041.8867				408972.0940	4043285.6914
			410,411.4380	4,024,308.5215				409337.5310	4043461.0000
			410,520.6560	4,024,349.3066				410500.6560	4043924.3945
			411,162.2810	4,024,681.8047				410962.4690	4044000.3555
			411,124.9690	4,024,778.6250				411096.8440	4043852.2109
			411,222.3440	4,024,873.7930				411108.0630	4043672.6836
			411,392.4060	4,024,792.1602				410984.4380	4043481.0273
			411,607.8130	4,024,539.2461				410592.0940	4043294.9219
			411,737.1560	4,023,825.0313				410496.6250	4043013.0352
			411,867.2500	4,023,463.2520				410003.5310	4043008.3594
			411,784.7500	4,023,306.3613				410001.6560	4042464.2656
			411,582.4060	4,023,006.9551					
			411,126.7810	4,022,795.5957					
			410,994.2500	4,022,416.6367					
			410,989.2810	4,022,251.9551					
D20	0.21	SDCA	414,982.2190	4,021,997.8164	S2	0.27	Study	415072.8130	4041278.8984
			415,176.7190	4,022,263.2852				414928.6560	4041572.7422
			415,103.2190	4,022,320.4727				414740.2500	4042529.6992
			415,581.2500	4,022,965.4922				415304.2190	4042966.9609
			415,817.9380	4,022,790.5078				415642.3130	4042393.3203
			416,056.9060	4,023,113.9902				415234.1250	4041986.6914
			416,207.6250	4,023,003.7656				415072.8130	4041278.8984
			415,998.3750	4,023,002.3203					
			416,002.5310	4,022,602.1270					
			415,526.5000	4,022,002.0215					
D21	0.39	SDCA	409,784.0630	4,021,446.5840	S3	0.72	Study	421548.9690	4029833.7383
			409,836.5940	4,021,452.1992				421571.8750	4030077.3184
			409,959.4380	4,021,467.4043				421631.0310	4031208.7773
			409,986.8440	4,021,465.6152				421439.0940	4031498.2363
			410,014.9380	4,021,469.1094				421216.1560	4031761.8594
			410,109.0000	4,021,484.2637				421260.3750	4031837.4414
			410,027.5940	4,021,036.2754				421371.5310	4031985.9238
			409,998.0310	4,020,801.4766				421398.8440	4032023.9863
			409,487.5940	4,020,143.3262				421454.5000	4032099.1406
			409,409.3130	4,020,065.3262				421509.5310	4032174.3066
			409,373.6560	4,020,006.3652				421645.9690	4032358.6465
			409,360.9380	4,020,010.4766				421725.3130	4032466.9844
			409,276.4690	4,020,023.0879				421769.8440	4032526.2539
			409,280.3750	4,020,086.8984				421827.1560	4032498.3555
			409,223.5310	4,020,182.5996				421952.1880	4032442.4199
			409,166.6250	4,020,986.3672				421854.9690	4031871.4102
			409,146.5630	4,021,804.0762				422105.2500	4031749.0176
			409,176.1250	4,021,738.1621				422299.6560	4031762.5020
			409,218.6880	4,021,681.9980				422592.2190	4031994.7988
			409,255.5940	4,021,639.3984				422701.7500	4032367.5195
			409,351.8750	4,021,549.4316				422732.5630	4032243.8984
			409,464.4690	4,021,488.9551				422746.8130	4032159.0254
			409,583.4380	4,021,449.5684				422779.7500	4032064.7734
			409,710.2810	4,021,438.8574				422779.7190	4031946.8984
			409,784.0630	4,021,446.5840				422793.9060	4031814.8984
								422817.5310	4031682.9316
								422840.9690	4031565.0645
								422869.3130	4031447.2109
								422836.2810	4031338.7852
								422713.7500	4031206.8086
		422529.9380	4030985.2422						
		422250.5940	4030779.7578						
		422000.0310	4030499.9922						
		422006.2810	4030500.0156						
		421836.9380	4030271.0234						
		421548.9690	4029833.7383						
D22	0.03	SDCA	414,001.2500	4,020,257.5078	S4	0.15	Study	417410.5630	4023845.5176
			414,001.4690	4,020,502.5137				417398.8440	4023845.8750
			414,426.0000	4,020,500.8262				417387.4380	4023846.9883
			414,464.0310	4,020,432.0313				417377.4060	4023848.7207
			414,293.7190	4,020,338.7207				417367.8440	4023851.0527
			414,135.9690	4,020,279.6660				417358.9380	4023853.9434
			414,001.2500	4,020,257.5078				417350.9380	4023857.4238
								417343.0940	4023861.6250
								417335.2810	4023866.7793
								417327.4690	4023872.8066
D23	0.29	SDCA	409,535.8130	4,018,994.6445				4023879.7500	
			409,534.9380	4,019,112.7676				4023888.9688	
			409,493.8750	4,019,250.0898				4023899.1680	
			409,428.5630	4,019,253.1973				4023910.1230	
			409,374.7500	4,019,259.9512				4023921.5137	
			409,200.4380	4,019,355.6914				4023930.3848	
			409,208.0310	4,019,472.8008				4023939.6543	
			409,435.7810	4,019,902.2852				4023949.9414	
			409,445.4060	4,019,983.3887				4023961.3281	
			409,576.6880	4,020,126.1250				4023975.5664	
			410,016.9060	4,020,278.1445				4023992.3125	
			410,025.1560	4,019,002.0527					
			409,535.8130	4,018,994.6445					

**EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions**

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)				
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates			
S4 continued	0.15	Study	417,257.5630	4,024,036.4043	S4 continued	0.15	Study	417723.6250	4024112.4082			
			417,255.7810	4,024,053.0898				417716.8440	4024108.7773			
			417,254.3440	4,024,071.4844				417710.6880	4024104.8281			
			417,253.3440	4,024,112.0410				417693.1880	4024092.0859			
			417,253.6880	4,024,135.3887				417683.1250	4024084.1797			
			417,256.4690	4,024,211.2207				417674.4380	4024076.5137			
			417,258.9380	4,024,248.6602				417667.2810	4024069.1191			
			417,260.8130	4,024,266.7930				417661.4690	4024061.8086			
			417,266.0630	4,024,299.1426				417657.0630	4024054.5488			
			417,269.5630	4,024,313.8516				417654.5000	4024048.2773			
			417,274.6560	4,024,330.5859				417652.5000	4024040.8516			
			417,281.5940	4,024,349.5684				417647.9060	4024009.5918			
			417,289.7810	4,024,368.9414				417646.3750	4024002.8047			
			417,298.0630	4,024,386.4863				417644.5940	4023996.9746			
			417,306.2810	4,024,401.4785				417640.7500	4023988.9395			
			417,314.9690	4,024,415.0508				417636.0310	4023980.8086			
			417,324.0630	4,024,427.2441				417630.3750	4023972.9629			
			417,333.2500	4,024,437.8730				417623.6560	4023965.2930			
			417,341.8130	4,024,446.3809				417617.2810	4023958.7949			
			417,362.2810	4,024,463.6328				417609.9690	4023952.3184			
			417,374.6880	4,024,472.7871				417601.7810	4023945.7832			
			417,391.6880	4,024,484.4727				417592.6250	4023939.0781			
			417,422.5940	4,024,504.8984				417575.3440	4023927.6641			
			417,438.9380	4,024,515.1504				417540.5940	4023906.3262			
			417,454.8440	4,024,524.5742				417526.8440	4023897.4316			
			417,469.5000	4,024,532.6895				417515.0940	4023889.3320			
			417,483.8130	4,024,540.1250				417487.6880	4023868.7949			
			417,497.9690	4,024,546.9180				417472.0940	4023858.9844			
			417,525.0310	4,024,558.3184				417463.6560	4023854.8926			
			417,537.3130	4,024,562.7500				417455.1880	4023851.9063			
			417,550.9690	4,024,567.0371				417444.7810	4023849.1504			
			417,565.6880	4,024,571.1504				417433.6250	4023847.1348			
			417,595.7190	4,024,578.3379				417422.1560	4023845.9258			
			417,644.3750	4,024,588.4512				417410.5630	4023845.5176			
			417,671.1560	4,024,593.2676								
			417,699.5630	4,024,597.4395								
			417,729.9690	4,024,601.0371				C1	0.21	Channel	411145.9380	4022140.5117
			417,763.4060	4,024,604.2285							410989.3130	4022252.0020
			417,801.4380	4,024,607.2109							410994.2500	4022416.6367
			417,876.5000	4,024,612.3184							411126.7810	4022795.5957
			417,885.9690	4,024,613.4160							411582.4060	4023006.9551
			417,906.1880	4,024,617.6074							411784.7500	4023306.3613
			417,954.9060	4,024,630.4629							411867.2500	4023463.2520
			417,966.3750	4,024,632.8535							411737.1560	4023825.0313
			417,976.4690	4,024,634.2813							411915.1560	4023883.7793
			417,984.4060	4,024,634.8398							411983.4060	4023714.6152
			417,991.7190	4,024,634.7266							412117.6560	4023538.0977
417,998.0940	4,024,633.9082				411792.0630	4023094.1152						
418,004.0310	4,024,632.4531				411782.4060	4023076.2949						
418,009.1560	4,024,630.2891				411748.7190	4022994.3965						
418,013.8130	4,024,627.4102				411643.6250	4022726.7266						
418,017.8750	4,024,623.8594				411641.6880	4022435.3887						
418,021.4380	4,024,619.5566				411419.2190	4022347.2383						
418,027.1560	4,024,609.7598				411284.5000	4022318.9453						
418,032.4060	4,024,597.6895				411145.9380	4022140.5117						
418,034.6560	4,024,589.4512											
418,035.8750	4,024,580.7773	C2	0.30	Channel	409201.5000	4019370.5664						
418,035.6560	4,024,570.7617				409173.3130	4019532.8418						
418,034.0630	4,024,559.9766				409115.7190	4019657.4395						
418,031.0630	4,024,548.3418				409058.5940	4019813.5703						
418,026.3750	4,024,535.4473				409055.4380	4019859.0117						
418,020.4690	4,024,521.3984				409098.6560	4019944.7520						
418,000.5310	4,024,478.6465				409192.5940	4020079.2344						
417,984.5630	4,024,435.9668				409223.5310	4020182.5996						
417,970.9060	4,024,402.7227				409280.3750	4020086.8984						
417,957.8130	4,024,373.8125				409276.4690	4020023.0879						
417,943.3130	4,024,343.8242				409352.7190	4020011.6758						
417,931.2500	4,024,320.3027				409373.6560	4020006.3652						
417,918.0940	4,024,295.7734				409409.3130	4020065.3262						
417,880.1250	4,024,228.6719				409487.8750	4020143.3594						
417,859.5000	4,024,190.0117				409998.1880	4020801.4746						
417,854.1250	4,024,181.0176				410027.7500	4021036.2715						
417,848.9380	4,024,173.2773				410109.2810	4021484.2578						
417,843.6250	4,024,166.4160				410174.2810	4021494.7188						
417,838.3130	4,024,160.3535				410242.0940	4021502.6836						
417,832.0940	4,024,154.4258				410335.4060	4021518.5000						
417,825.1250	4,024,149.1992				410438.7190	4021533.8438						
417,816.9690	4,024,144.4160				410529.8750	4021556.1816						
417,807.5630	4,024,140.0762				410712.0940	4021583.1074						
417,799.1250	4,024,136.8242				410602.7500	4021411.3418						
417,789.4690	4,024,133.5957				410686.8440	4021328.9805						
417,744.3750	4,024,120.6641				410488.7190	4020946.7344						
417,733.3130	4,024,116.6641				410264.6250	4020620.0820						
					410015.6880	4020454.4902						

**EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions**

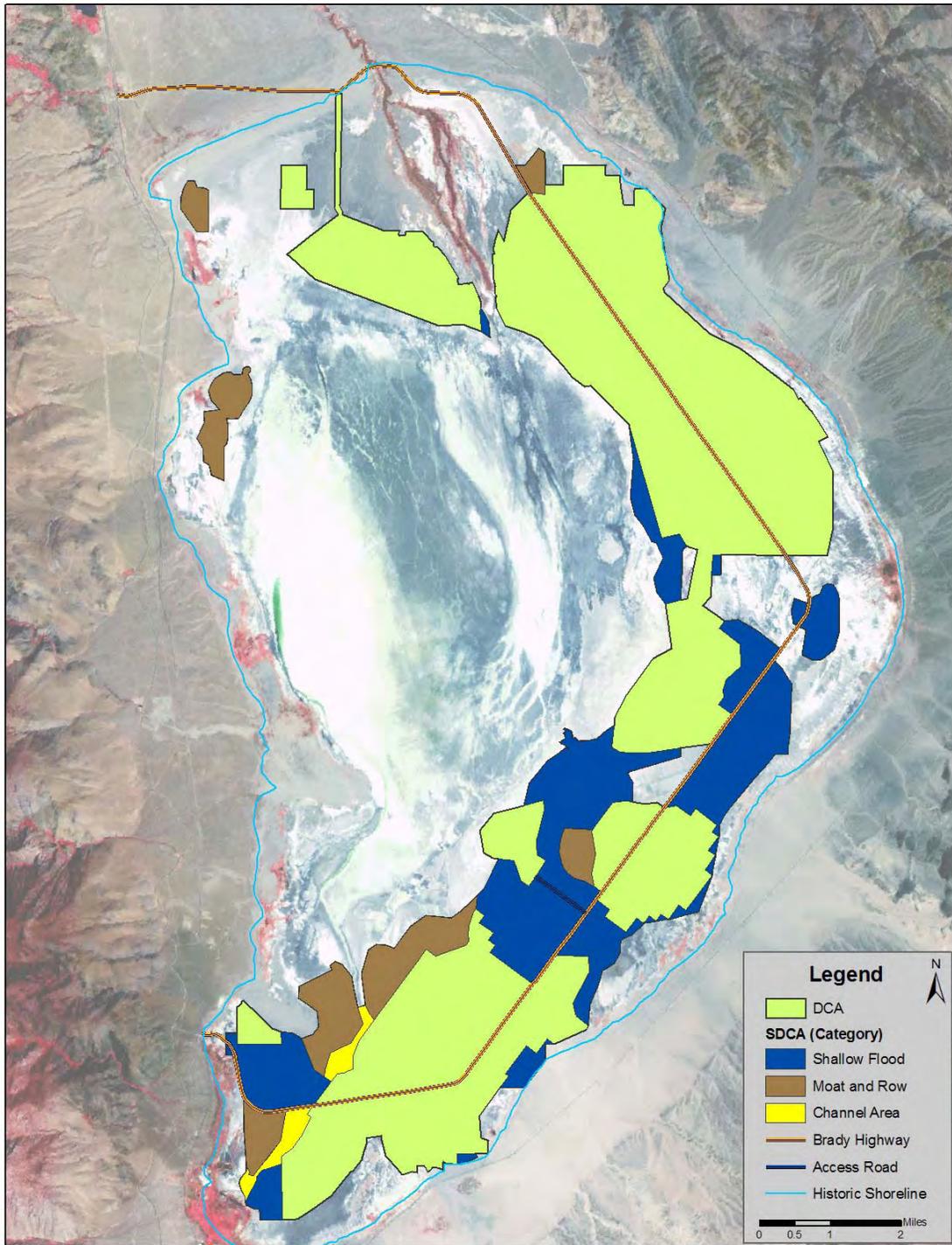
Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates
C2 continued	0.30	Channel	410,016.9060	4,020,278.1445
			409,576.6880	4,020,126.1250
			409,445.4060	4,019,983.3887
			409,435.7810	4,019,902.2852
			409,208.0310	4,019,472.8008
			409,201.5000	4,019,370.5664

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates

Total SDCA            12.77  
 Total Study            1.85  
 Total Channel           0.50

### EXHIBIT 3 -- DUST CONTROL MEASURE MAP

*Shown are dust control measures assigned to areas within the SDCA.*



## EXHIBIT 4 -- DUST CONTROL MEASURE DESCRIPTIONS

Brief descriptions of dust control measures for use on Owens Lake are given below. More detailed descriptions of the three BACM approved dust control methods (shallow flooding, managed vegetation and gravel) are provided in the 2003 SIP. Modifications to these measures as provided in the Settlement Agreement (Agreement) are noted. All references are to sections of the Agreement; section numbers of the Agreement are contained in square brackets.

### Shallow Flooding

The “shallow flooding” (SF) dust control measure involves wetting emissive lake bed surfaces to reduce dust emissions. Performance specifications and a detailed description of the SF measure are provided in the 2003 SIP for achieving 99 percent PM<sub>10</sub> control efficiency. Otherwise, water shall be applied in amounts sufficient to achieve the required wetness cover as specified in Sections 3 through 5, 25, 26, and 27, or as modified under the provisions of Sections 5, 14, 15, 18, and 29. Satellite imagery, aerial photography or other methods approved by the APCO under the provisions of Section 29 are used to measure wetness cover for compliance.

### Managed Vegetation

The “managed vegetation” (MV) dust control measure involves establishing a plant cover on emissive lake bed surfaces to protect them from the wind, thereby reducing dust emissions. Performance specifications and a detailed description of the MV control measure are provided in the 2003 SIP for achieving 99 percent PM<sub>10</sub> control efficiency. Vegetative cover on the MV site present on the lake bed on January 1, 2007 shall be as specified in Section 6. The performance specification of MV may be modified under the provisions of Section 29. Point-frame measurements satellite imagery or other methods approved by the APCO under the provisions of Section 29 are used to measure plant cover for compliance.

### Gravel Cover

The “gravel cover” (GC) dust control measure involves placing a layer of gravel on emissive lake bed surfaces to protect them from the wind, thereby reducing dust emissions. Performance specifications are described in the 2003 SIP.

### Moat and Row

The general form of the “moat and row” (MR) measure is an array (see Figure E4-1) of earthen berms (rows) about 5 feet high with sloping sides, flanked on either side by ditches (moats) about 4 feet deep (see Figure E4-2). Moats serve to capture moving soil particles, and rows physically shelter the downwind lake bed from the wind. The individual MR elements are constructed in a serpentine layout across the lake bed surface, generally parallel to one another, and spaced at variable intervals, so as to minimize the fetch between rows along the predominant wind directions. The serpentine layout of the MR array is intended to control emissions under the full range of principal wind directions (see Figure E4-1). Initial pre-test

modeling indicates that MR elements' spacing will generally vary from 250 to 1000 feet, depending on the surface soil type and the PM<sub>10</sub> control effectiveness required on the MR area.

The PM<sub>10</sub> control effectiveness of MR may be enhanced by combining it with other dust control methods such as vegetation, water, gravel, sand fences, or the addition of other features that enhance sand capture and sheltering or directly protect the lake bed surface from wind erosion. The effectiveness of the array can also be increased by adding moats and rows to the array, which reduces the distance between rows.

The final form of MR will largely be determined from the results of testing on the lake bed as provided in Sections 7 and 8. Final design is subject to test results, required PM<sub>10</sub> control effectiveness, environmental documentation and permitting, engineering, and monitoring considerations.

In areas where MR is used as a control measure, the City shall implement the measure in a manner consistent with the Agreement, particularly Sections 7 and 8, or as modified by actions pursuant to Sections 18 through 24.

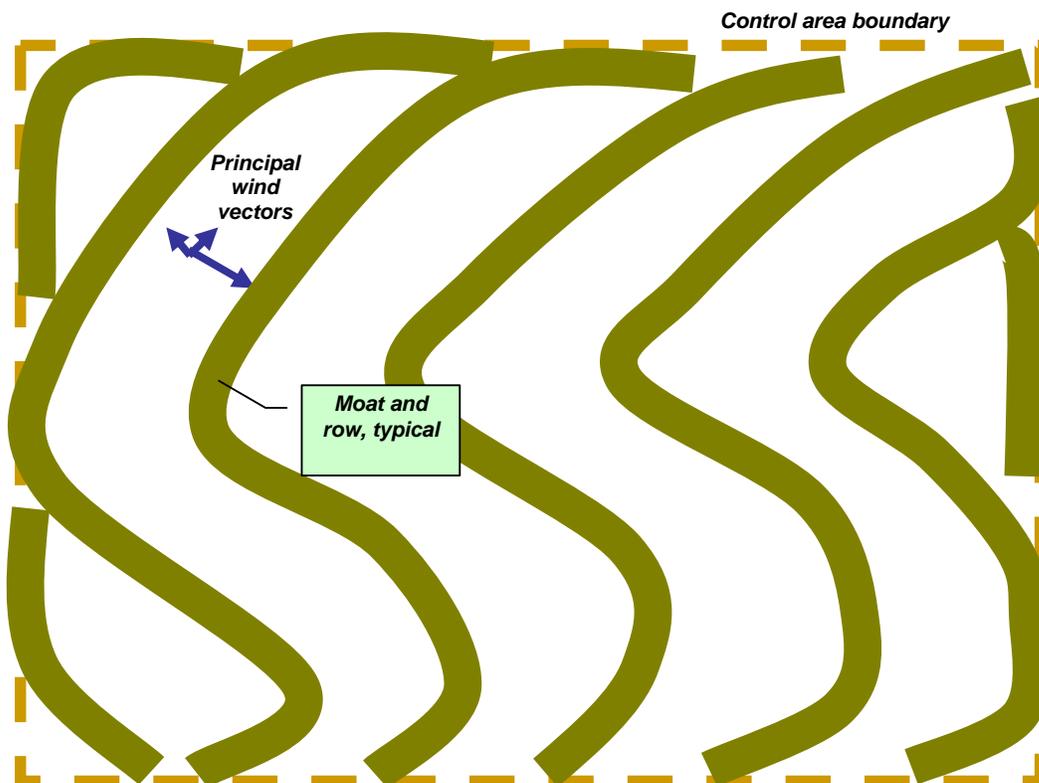


Figure E4-1. Moat and Row Array Plan View (schematic).

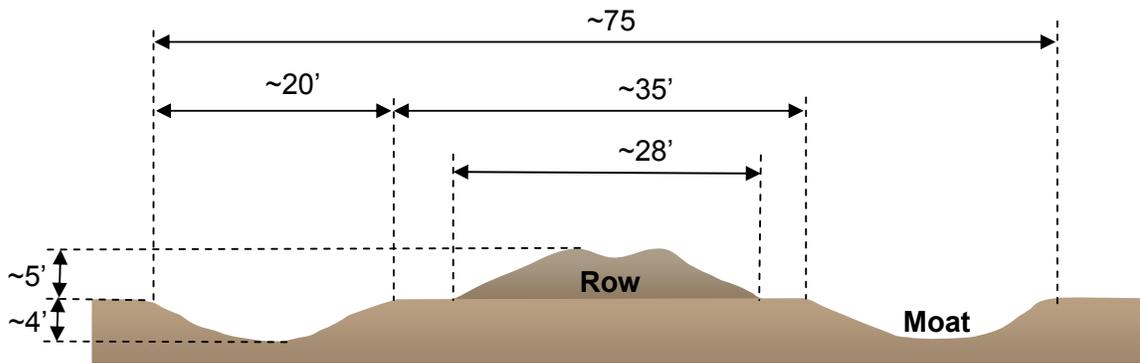
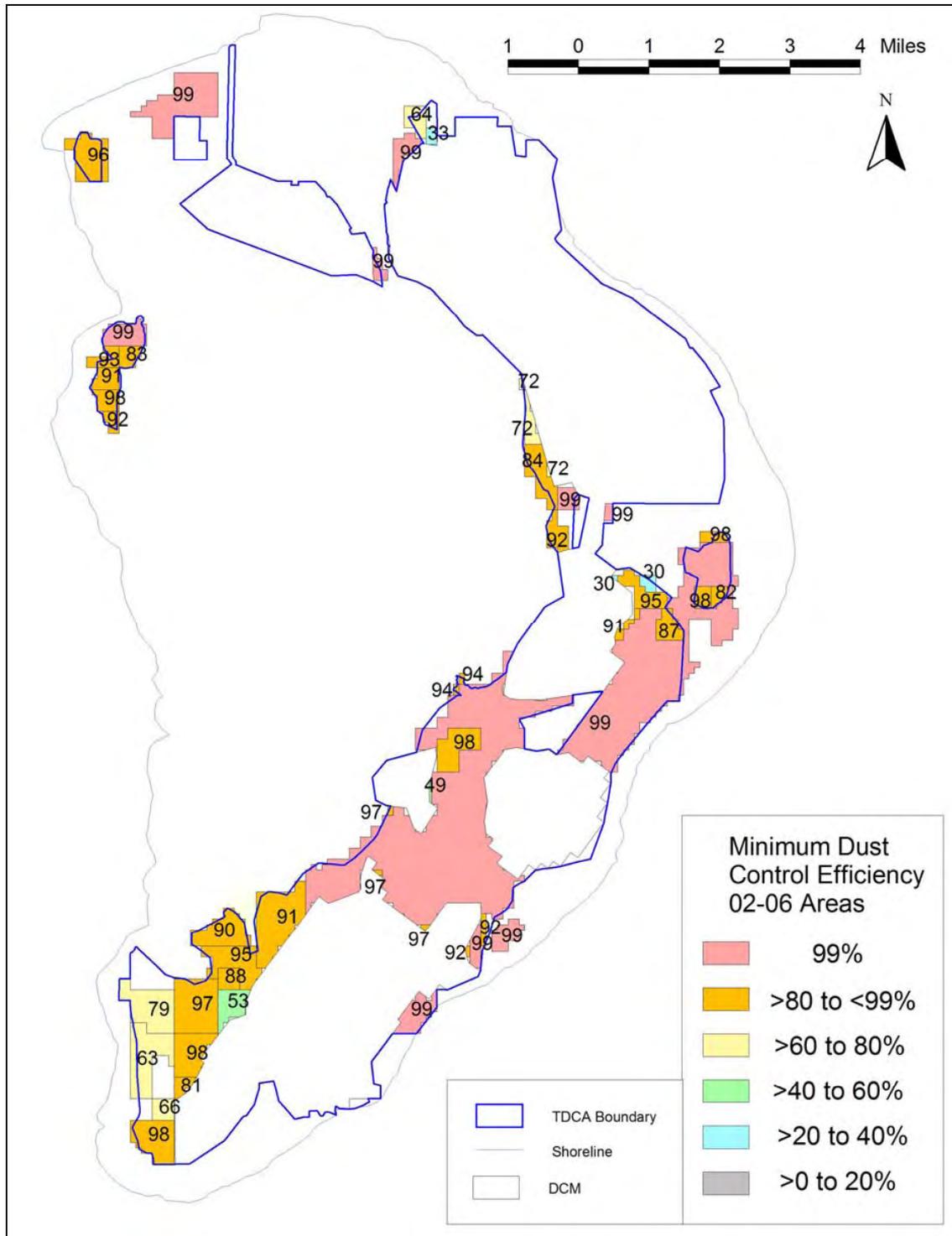


Figure E4-2. Profile of Moat and Row with Approximate Dimensions (schematic).

### EXHIBIT 5 -- TDCA MINIMUM DUST CONTROL EFFICIENCY MAP

*Shown are MDCEs calculated according to Sections 3 and 4 of the agreement.*



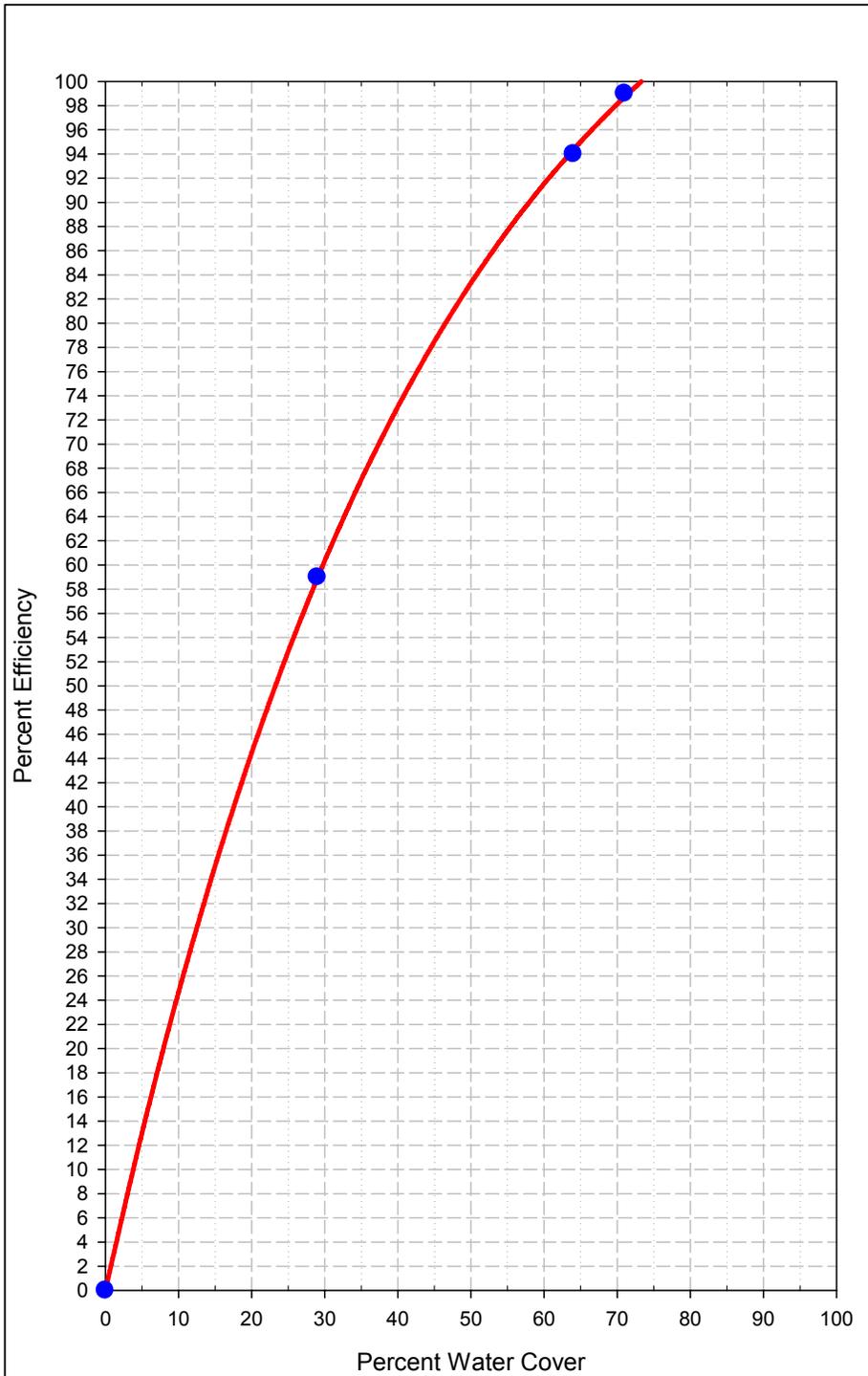
## EXHIBIT 6 -- MDCE SELECTION PROCESS

This exhibit summarizes the purpose of the MDCE Selection Process Spreadsheet. A copy of the Process Spreadsheet, which contains a description of the spreadsheet structure and operation, may be downloaded from the District's website at <http://www.gbuapcd.org/>.

The District developed the Dust ID Model as a tool for identifying dust control areas on the lake bed. The Dust ID Model computes the amount of dust being generated from each source area on the lake bed, but the results cannot be used without additional processing to identify the acceptable combinations of dust control required on each source area (that is, each area's minimum dust control efficiency or "MDCE") to achieve the federal 24-hour  $PM_{10}$  standard along the shoreline. There are many possible combinations of MDCEs that could produce the acceptable result of achieving the standard at the shoreline. For example, 50 percent control on hypothetical Area 1 and 99 percent control on Area 2 may produce the same modeled shoreline concentration as 99 percent control on Area 1 and 50 percent control on Area 2. However, the first combination might be more practical and less costly than the second, and for that reason it is important to have a process that can quickly and efficiently identify acceptable combinations. In all cases, the outcome of this process is some combination of area-by-area dust control efficiencies that produces a modeled attainment of the federal  $PM_{10}$  standard everywhere along the shoreline.

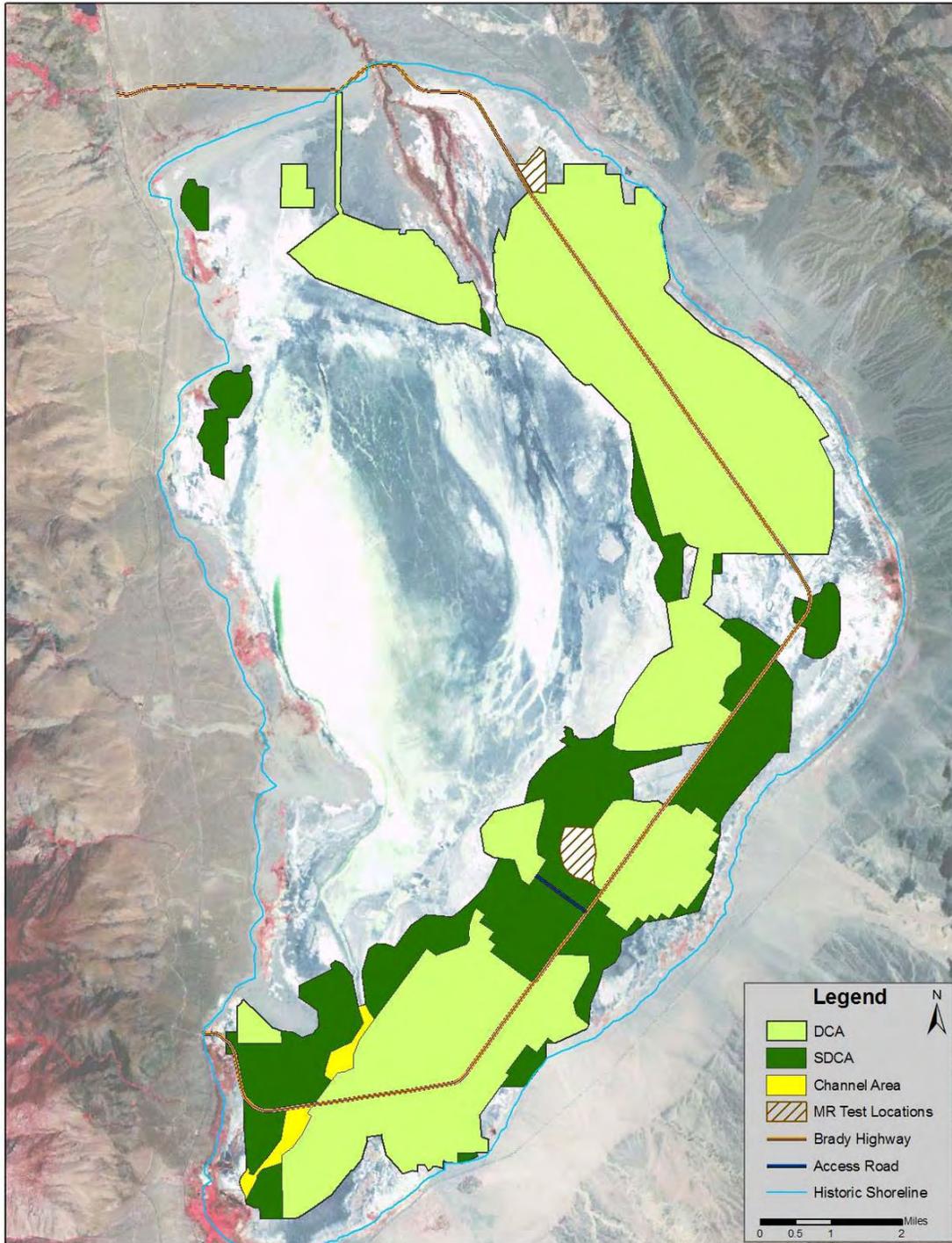
The process for selecting the acceptable combinations of dust control levels has been, heretofore, a manual process. The MDCE Selection Process Spreadsheet (Process Spreadsheet) was developed to more quickly and efficiently identify combinations of dust controls required to produce compliance with the federal 24-hour  $PM_{10}$  standard along the shoreline. The worksheet is set up so that MDCE calculations are automatic, yet it still allows manual adjustments to be made.

### EXHIBIT 7 -- SHALLOW FLOOD CONTROL EFFICIENCY CURVE



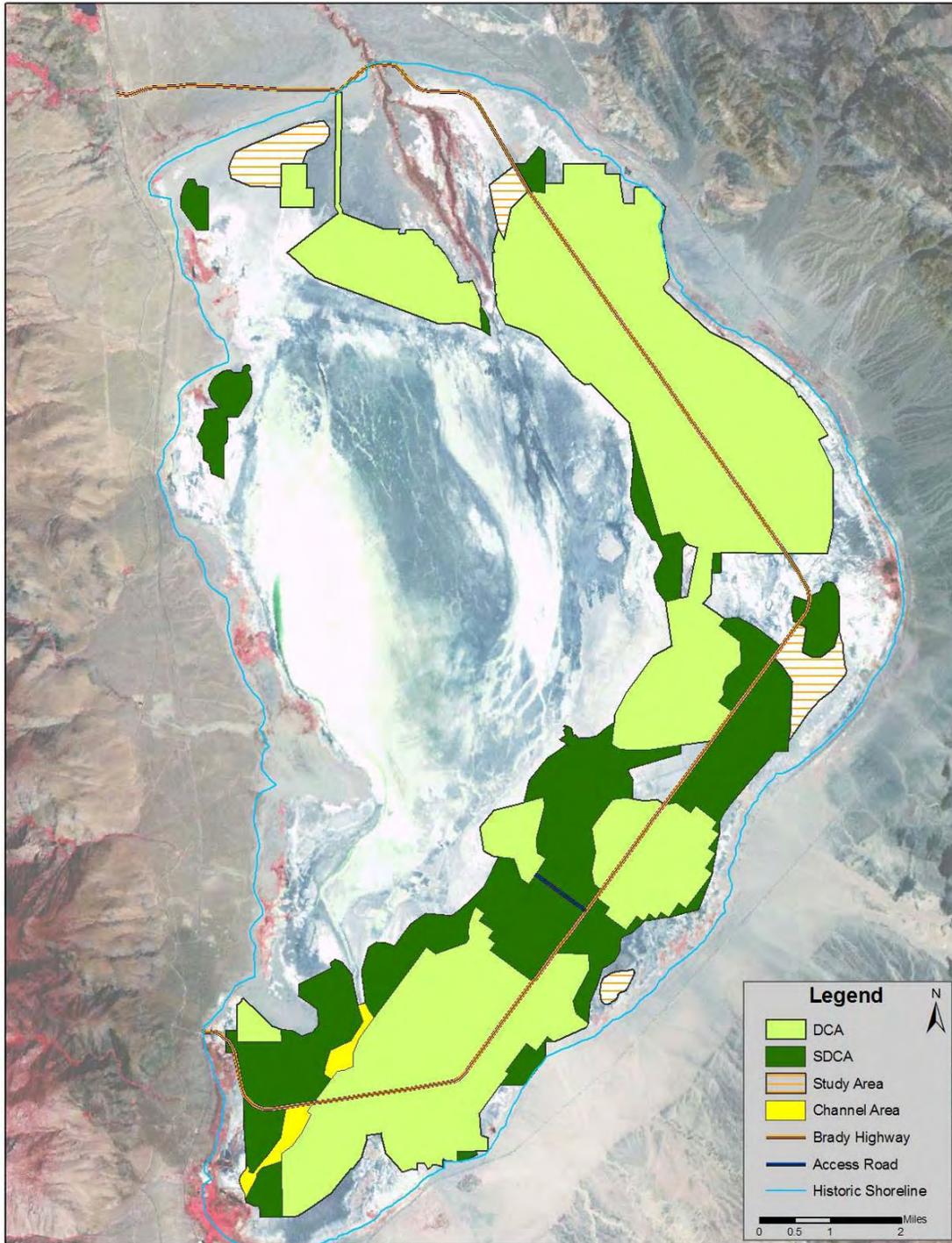
# EXHIBIT 8 -- MOAT AND ROW DEMONSTRATION PROJECT LOCATION MAP

*Two proposed moat and row demonstration project locations*



### EXHIBIT 9 -- STUDY AREA MAP

*Four proposed study area locations*



## EXHIBIT 10 -- SCHEDULE OF CONTINGENCY MEASURES

<i>Issue</i>	<i>Resolution</i>	<i>Duration</i>	<i>Units</i>
<b>Moat and Row</b>			
Eroded row	Install armoring to prevent further erosion	2	mo/mile
	Install sand fences to prevent further erosion	1	mo/mile
	Reconstruct row in place or adjacent	2	mo/mile
Filled moat	Re-excavate new moat outboard of filled moat, expand existing row onto filled moat	2	mo/mile
Filled sand fence	Clean out or flank with new sand fences	2	mo/mile
Collapsed sand fence	Repair or flank with new sand fences	1	mo/mile
Spacing too large	Pull in intervening sand fence	1	mo/mile
	Add intervening moat and row	3	mo/mile
	Enhance with vegetation and/or wetness	12 to 36	months
	Soil roughening	1 to 3	months/sq mi
	Conversion to reduced BACM/BACM	See Exhibit 11	
<b>Managed Vegetation</b>			
Emissions from bare areas	Enhance/restore vegetation	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Emissions from vegetated areas	Determine and establish necessary cover	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
<b>Gravel Patches</b>			
Infilling pore spaces	Supplement gravel depth	4	months/sq mi
	Stabilize by other means (e.g., vegetation, wetness, sand fences)	6 to 36	months
<b>Shallow Flood</b>			
Emissions from dry areas (insufficient uniformity of wetting )	Wet dry areas. May require land leveling and/or additional laterals.	12	months
Generally too dry	Increase water application rate relative to ET	1	month
<b>Other features</b>			
Gravel source	Open new or re-open existing quarry	4	months
Emissions from roads, berms, etc.	Increase watering frequency	1	month
	Stabilize by other means (e.g., gravel, stabilizing agents)	1 to 4	months/sq mi

## EXHIBIT 11 -- MOAT AND ROW TRANSITION SCHEDULE

Activity	Duration (years )
Shallow flood transition from moat & row	1.9
Managed vegetation transition from moat & row	5.9
Gravel cover transition from moat & row	1.8
<i>Mutually agreeable exceptions:</i>	<i>Increase over and above durations listed above (years)</i>
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0

## EXHIBIT 12 -- DCM OPERATION SCHEDULE

Activity	Duration (years )
New area shallow flood DCM <sup>a</sup>	2.9
New area managed vegetation DCM <sup>a</sup>	6.1
New area gravel cover DCM <sup>a</sup>	2.2
<i>Mutually agreeable exceptions:</i>	<i>Increase over and above durations listed above (years)</i>
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0
4. Expanded CEQA triggered	1.4
<sup>a</sup> Assumes that total new area <2 square miles per year	

**EXHIBIT 13. DEFINITIONS**

- A. “Background PM<sub>10</sub> concentration” shall mean the concentration of PM<sub>10</sub> caused by sources other than from wind blown dust emanating from the Owens Lake bed. For the purpose of modeling air quality impacts, the background concentration is assumed to be 20 µg/m<sup>3</sup> (micrograms per cubic meter) during every hour at all receptor locations. The monitored and modeled PM<sub>10</sub> emissions from the Keeler Dunes, which are located off the lake bed are treated as a separate dust source area and are not included in the background concentration.
- B. “Best Available Control Measures” or “BACM” shall have the same definition as in the federal Clean Air Act. Approved BACM in the 2003 SIP was associated with PM<sub>10</sub> emission reductions of at least 99 percent and includes managed vegetation, shallow flood, and gravel cover.
- C. “Contingency measures” shall mean dust control measures or modifications to the dust control measures that can be implemented to mitigate dust source areas that cause or contribute to an exceedance of the federal standard at the historic shoreline in the event that a previously approved control strategy was found to be insufficient.
- D. “Control Area” shall mean an area on the lake bed for which dust control is required.
- E. “Control efficiency” shall mean the relative reduction or percent reduction in PM<sub>10</sub> emissions resulting from the implementation of a control measure compared to the uncontrolled emissions.
- F. “Control measures” shall mean measures effective in reducing the PM<sub>10</sub> emissions from the lakebed surface over which they are implemented.
- G. “Dust control measure” or “DCM” shall mean measures designed to suppress sand motion and reduce dust emissions from the Owens Lake bed.
- H. “Dust ID Model” shall mean a computer-based air quality modeling approach developed as part of the 2003 SIP to identify emissive areas on the Owens Lake bed and to estimate the resulting PM<sub>10</sub> concentrations at the shoreline. See also “Dust ID Program.”
- I. “Dust ID Program” shall mean a long-term monitoring and modeling program that is used to identify dust source areas at Owens Lake that cause or contribute to exceedances and violations of the federal PM<sub>10</sub> standard. The current protocol for conducting the Dust ID Program is

included in the 2003 SIP (Exhibit 2 – Attachment 4). See also “Dust ID Model.”

- J. “Emission rate” shall mean the rate (expressed as mass per unit area per unit time) at which an air constituent (PM<sub>10</sub>, for example) is transported away from the surface of the lake bed.
- K. “Exceedance of the federal standard” or “exceedance” shall mean any single-day PM<sub>10</sub> concentration that is monitored or modeled to be above 150 µg/m<sup>3</sup> (24-hour average from midnight to midnight) at any location at or above the historic shoreline.
- L. “Historic shoreline” or “shoreline” shall mean the elevation contour line of 3,600 feet above mean sea level at Owens Lake, California.
- M. “Lake bed” or “Owens Lake bed” or “playa” shall mean the exposed surface within and below the historic shoreline.
- N. “Managed Vegetation” is a Dust Control Measure consisting of lakebed surfaces planted with protective vegetation.
- O. “May not lawfully be included in the SIP” shall mean that inclusion of the provision in question in the revisions to the 2003 SIP has been determined by binding judicial order to be unlawful.
- P. “MCDE-BACM” shall mean Dust Control Measures that achieve Minimum Dust Control Efficiency and are found to be appropriate for the area of application.
- Q. “Minimum Dust Control Efficiency” or “MDCE” shall mean the lowest dust control efficiency, as determined by the Dust ID model, in the Supplemental Dust Control Area necessary to meet the federal standard at the historic shoreline.
- R. “Moat and Row” shall mean a Dust Control Measure consisting of arrays of sand breaks that arrest sand motion.
- S. “PM<sub>10</sub>” or “particulate matter” shall mean atmospheric particulate matter less than 10 micrometers in nominal aerodynamic diameter.
- T. “PM<sub>10</sub> monitor” shall mean an instrument used to detect the concentrations of PM<sub>10</sub> in the air.
- U. “Sand flux monitor” shall mean a device used to measure the amount and/or rate of moving or saltating sand and sand-sized particles caused by wind erosion.

- V. “Shallow Flood” is a Dust Control Measure consisting of lakebed areas wetted to a specified proportion of surface coverage.
- W. “2003 SIP” or “2003 Owens Valley PM<sub>10</sub> State Implementation Plan” shall mean the Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State Implementation Plan 2003 Revision – Adopted November 13, 2003.
- X. “Supplemental Control Requirements” or “SCR” shall mean Dust Control Measures required by the District on areas outside of the DCA that cause or contribute to an exceedance of the federal PM<sub>10</sub> standard at the historic shoreline of Owens Lake.

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## **Board Order 080128-01 Attachment B**

### **2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure**

#### **BACKGROUND**

The State Implementation Plan (SIP) adopted by the Great Basin Unified Air Pollution Control District (District) in 2003 required the City of Los Angeles (City) to install and operate PM<sub>10</sub> controls on a total of 29.8 square miles of the dried Owens Lake bed by the end of 2006. The 2003 SIP also contained a provision and procedures for an annual review of air quality monitoring data by the District's Air Pollution Control Officer (APCO) in order to determine if controls were needed on additional areas beyond the 29.8 square miles in order for the Owens Valley Planning Area to attain or maintain the federal 24-hour PM<sub>10</sub> National Ambient Air Quality Standard (NAAQS). If additional controls were needed, the 2003 SIP provided for the APCO to require the City to implement the necessary controls. This annual review and possible requirement for additional controls is known as the Supplemental Control Requirements (SCR) determination. The 2003 SIP required that SCR determinations use data collected starting July 1, 2002.

In December 2005, after analyzing data collected from July 2002 through June 2004, the District's APCO made the first SCR determination under the provisions of the 2003 SIP. The City objected to the APCO's analysis and submitted an alternative analysis of the data. After reviewing the City's analysis, the APCO revised the SCR determination in April 2006. The City also objected to the revised determination and filed a lawsuit against the District in May 2006. In June 2006 the City and the District entered into settlement negotiations in an attempt to resolve their disputes.

In December 2006 a final Settlement Agreement was approved by the District and the City. This agreement is Attachment A to Board Order 080128-01. Among other issues, the Settlement Agreement provides for modifications to be made to the 2003 SIP's SCR determination procedure. These modifications are incorporated into this revised 2008 SCR determination procedure.

#### **CONDITIONS**

The 2008 Owens Lake Dust Source Identification Program Protocol (Protocol) (Attachment C) contains the procedures to collect, screen, analyze and model the data used by the District's APCO to determine if exceedances of the 24-hour PM<sub>10</sub> NAAQS have occurred and additional Supplemental Controls are necessary on the Owens Lake bed. The following actions may be taken by the APCO and will not be considered a change to the Protocol:

- Add, remove or move PM<sub>10</sub> monitors and meteorological stations
- Replace TEOMs with any other USEPA-approved Reference or Equivalent Method monitors that collect hourly concentration data
- Replace Sensits with any other sand flux monitor (SFM) that collects hourly data
- Replace Cox Sand Catchers with any other SFM

- Add, remove or move SFMs as long as the maximum grid cell size for modeling remains at one square kilometer
- Calculate “from-the-lake” wind directions for new PM<sub>10</sub> monitor sites
- Determine default K-factors for new source areas

The Protocol and these Supplemental Control Requirements (SCR) specify many assumptions and decision trees to be followed that may need to be changed in the future. The following changes to the Protocol and the SCR may be made by written agreement of the APCO and the General Manager of the City of Los Angeles (City) Department of Water and Power:

- The background value of 20 µg/m<sup>3</sup> may be changed to another value or a procedure may be established to calculate the background from upwind/downwind lake bed monitors
- The default K-factors may be updated
- The default seasonal cut points may be updated
- The CalPUFF modeling system may be changed to another USEPA guideline model
- The procedure for determining the sand flux from a Dust Control Measure (DCM) area may be updated
- The K-factor screening criteria may be updated
- From-the-lake wind directions in Attachment B, Table 1 may be changed to avoid including off-lake sources
- Non-reference or non-equivalent method special purpose PM<sub>10</sub> monitors may be added
- Procedures for determining source area boundaries may be updated
- Methods for directly measuring source area emission rates may be implemented

## **DEFINITIONS**

A ***shoreline or near-shore PM<sub>10</sub> monitor*** is a fixed or portable USEPA-approved Federal Reference Method or Equivalent Method PM<sub>10</sub> Monitor located approximately on the 3600-foot elevation (historic shoreline) contour, or within the Owens Valley Non-Attainment Area above the 3600-foot elevation. The existing shoreline or near-shore PM<sub>10</sub> monitors are at Keeler, Flat Rock, Shell Cut, Dirty Socks, Olancha, Bill Stanley and Lone Pine (see Attachment B, Map 1).

A ***special purpose PM<sub>10</sub> monitor*** is a fixed or portable USEPA-approved Federal Reference Method or Equivalent Method PM<sub>10</sub> monitor installed upwind of or near potential dust source areas on the lake bed below the 3600-foot elevation. These lake bed PM<sub>10</sub> monitors will be used to monitor new dust sources areas to generate new K-factors and to evaluate model predictions at the PM<sub>10</sub> sites. They shall not be used to monitor compliance with the NAAQS and the data will not be submitted to USEPA’s Aerometric Information and Retrieval System (AIRS).

An ***exceedance*** is a midnight to midnight Pacific Standard Time 24-hour average PM<sub>10</sub> concentration greater than 150 µg/m<sup>3</sup> measured by a shoreline or near-shore PM<sub>10</sub> monitor.

***From-the-lake wind directions*** are determined by extending two straight lines from the PM<sub>10</sub> monitor site to the points on the 3600-foot contour of the Owens Lake bed that maximize the angle in the direction of the lake bed between the two straight lines. From-the-lake and non-lake wind directions for the existing PM<sub>10</sub> monitor sites are shown in Attachment B, Table 1.

**Physical evidence** of a source area boundary consists of Global Positioning System (GPS) data, visual observations, photographic observations, video observations, or any other method described for this purpose in the Dust ID Protocol.

**BACM** are Best Available Control Measures/Most Stringent Measures (MSM) defined as the dust controls determined to be BACM/MSM for Owens Lake in Paragraphs 15, 16 and 17 of Board Order 080128-01. If, in the future, the District changes or deletes existing BACM or adds new BACM, then the dust controls are those as revised by the latest District action.

**Implements BACM control measures** means BACM are constructed and meeting the performance standards outlined Paragraphs 15, 16 and 17 of Board Order 080128-01.

**Extreme violators** are areas currently required to implement BACM, but BACM are found to be insufficient to adequately control emissions.

**Environmental analysis document complete** means that a project level environmental document has been certified covering the location and the BACM/MSM selected for implementation by the City.

#### **GENERAL SCR DETERMINATION PROCEDURE**

1. If the City is in compliance with Paragraphs 1 and 3 of Board Order 08128-01 regarding the amount, timing and operation of existing and future dust controls, the APCO will not issue additional written SCR determinations until after May 1, 2010 and will not use data collected prior to April 1, 2010 for new determinations, except for Study Areas as provided in Paragraph 2, below. This will allow the City time to complete construction and implementation of the additional PM<sub>10</sub> controls within the 2008 Total Dust Control Area.
2. After May 1, 2010, the APCO will recommence written SCR determinations using the latest SCR procedure. Recommended determinations will use data collected only after April 1, 2010, except in those areas delineated as Study Areas. SCR determinations for Study Areas shall use data collected after July 1, 2006. The APCO shall make SCR determinations at least once in every calendar year. SCR determinations shall make reasonable efforts to account for impacts caused by Dust Control Measure construction activities.
3. If, pursuant to Paragraph 2, herein, the APCO determines that a monitored or modeled exceedance of the federal 24-hour PM<sub>10</sub> NAAQS caused by emissions from the lake bed has occurred at or above the historic shoreline:
  - A. The APCO, based on all available information, including, visual observation, physical evidence, monitoring and modeling, and in consultation with the City, will identify the need for additional controls, monitoring, or both.
    - (i) If the APCO identifies the need for additional controls and/or increased MDCE on existing controls, the APCO shall issue a written SCR determination to the City.

- (ii) If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an alternative analysis of the data used by the APCO to make the determination.
  - (iii) If the City submits an alternative analysis, the APCO shall consider the City's analysis and has full and sole discretion to withdraw, modify or confirm the SCR determination. If the APCO takes action to withdraw or modify the SCR determination, he shall do so within 60 days of the City's submittal of the alternative analysis.
  - (iv) If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's action, the City may initiate the Dispute Resolution Process pursuant to Paragraph 32 of the 2006 Settlement Agreement between the District and the City (Attachment A to Board Order 080128-01). The APCO may modify the SCR determination based on the outcome of the Dispute Resolution Process.
  - (v) In the event the Parties are unable to resolve disagreements over the APCO's SCR determinations through the Dispute Resolution Process, the City may appeal the APCO's SCR determinations to the California Air Resources Board (CARB) under the provisions of Health and Safety Code Section 42316. The CARB will act within 90 days on the City's appeal.
  - (vi) The implementation of additional control measures under the SCR determination process will be considered contingency measures under Section 172(c)(9) of the federal Clean Air Act and will be implemented automatically upon final action of the SCR determination.
- B. The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Paragraph 6 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.
- C. If the City proposes in their Remedial Action Plan to decrease the control efficiency in any previously controlled dust source area, the City must demonstrate that the proposed strategy will control dust sources to the extent that there are no modeled exceedances at the shoreline based on:
- (i) new dust event(s) that caused or contributed to a modeled or monitored exceedance,
  - (ii) dust events that took place from July 2002 through June 2006 based on the results of the MDCE Selection Process Spreadsheet as set forth in the 2006 Settlement Agreement, and
  - (iii) that previously determined control efficiency levels are maintained in (a) all areas that are required to have 99% control efficiency or higher in the 2003 SIP Dust Control Area and (b) new dust source areas that are not included in the MDCE Selection Process Spreadsheet.

D. The District may, as appropriate, also issue Notices of Violation.

4. In the event:

- A. The APCO has made a written determination pursuant to Paragraph 3 that an exceedance of the federal standard, occurring after April 1, 2010, resulted from a Control Area or portion of a Control Area treated with the Moat & Row PM<sub>10</sub> control measure; and
- B. That Control Area or portion of a Control Area causing the exceedance was remediated by the City as provided in Paragraph 6 below; and
- C. That Control Area or a portion of that Control Area is subsequently the sole cause of an exceedance of the federal standard at or above the historic shoreline, (i.e., an exceedance occurred after the City's initial attempt to remediate that area under Paragraph 6);

then the City shall convert that Control Area, or that portion of that Control Area, from Moat & Row to MDCE-BACM or BACM as described in Paragraphs 15, 16 and 17 of Board Order 080128-01, to address the exceedance described in Paragraph 4.C., for all or the portion of that Control Area that caused the subsequent exceedance, under the time deadlines provided for in Paragraph 9.

- 5. If the APCO determines that Moat & Row constitutes BACM or MDCE-BACM as provided for in Attachment D of Board Order 080128-01, "2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area," then upon issuance of such written determination, the provisions of Paragraph 4 that require the City to convert to BACM or MDCE-BACM may be satisfied by applying the BACM or MDCE-BACM approved under this Paragraph 5.
- 6. A Remedial Action Plan prepared by the City pursuant to Paragraph 3.B will contain a description of:
  - A. Any and all needed changes, repairs or enhancements to DCMs, including one or some combination of the following:
    - (i) Maintenance of facilities (*e.g.*, berms, moats and rows);
    - (ii) Changes to Shallow Flood or Managed Vegetation facilities or operations (*e.g.*, increase in wetness cover extent, improved wetness cover distribution, enhancement of vegetation);
    - (iii) Augmentation (*e.g.*, more moats and rows) or enhancement (*e.g.*, surface-protecting elements) of Moat & Row areas;
    - (iv) Transition of Moat & Row areas to BACM, or MDCE-BACM.

- B. Any and all needed expansion of DCMs, and specific plans for expanding the measures.
  - C. A schedule for the work to be performed to implement the changes, clearly indicating the point at which facilities will be operational and effective at design levels.
7. The Schedule of Contingency Measures incorporated as part of this Procedure as Attachment B, Exhibit 1 sets forth a non-exclusive list of items that shall be included by the City in its Remedial Action Plans, described in Paragraph 6, and the timing required for their implementation.
  8. Before any full-scale Moat & Row areas are operational, the City shall submit to the District a conceptual design and schedule for possible implementation of BACM or MDCE-BACM to each Moat & Row area consistent with Paragraph 4. These designs and schedules are the potential contingency measures to be implemented by the City where a transition from Moat & Row to another DCM is needed, or where such transition is required pursuant to Paragraph 4.
  9. Areas to be transitioned from Moat & Row to BACM or MDCE-BACM will be operational within the times set forth in the Moat & Row Transition Schedule incorporated as Attachment B, Exhibit 2. DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule incorporated as Attachment B, Exhibit 3. In all cases, the time allowed for implementation of control measures shall not include any time between the City's appeal to the California Air Resources Board under the provisions of Health and Safety Code Section 42316 and resolution of such an appeal.

### **DETAILED SCR DETERMINATION PROCEDURE**

Exceedances of the federal 24-hour PM<sub>10</sub> National Ambient Air Quality Standard of 150 µg/m<sup>3</sup> at or above the historic shoreline of Owens Lake (elevation 3600 feet above mean sea level) can either be measured directly via a PM<sub>10</sub> monitor or they can be modeled using the procedures set forth in the latest Owens Lake Dust Source Identification Program Protocol. Set forth below are the two procedures to be used by the APCO in making SCR determinations: the first uses directly monitored exceedances and the second uses modeled exceedances.

#### **A. MONITORED EXCEEDANCES**

##### **A.1 – Do lake bed source areas cause or contribute to a monitored 24-hour average PM<sub>10</sub> concentration greater than 150 µg/m<sup>3</sup> at an historic shoreline PM<sub>10</sub> monitor or at a near-shore PM<sub>10</sub> monitor?**

Any event that causes a monitored 24-hour average PM<sub>10</sub> concentration greater than 150 µg/m<sup>3</sup> at a shoreline or near-shore PM<sub>10</sub> monitor will be evaluated to determine if lake bed dust source areas caused or contributed to the exceedance. The following steps will be used to screen hourly PM<sub>10</sub> concentrations to determine if a lake bed source area caused or contributed to a monitored exceedance:

- 1) For hourly average from-the-lake wind directions, use the recorded hourly PM<sub>10</sub> concentration.
- 2) For hourly average non-lake wind directions or missing data, replace the recorded hourly PM<sub>10</sub> concentration with the background concentration of 20 µg/m<sup>3</sup>.

- 3) Average the adjusted hourly concentrations from steps 1 and 2 for the 24-hour period from midnight to midnight, Pacific Standard Time.

If the 24-hour average of the adjusted hourly PM<sub>10</sub> concentrations exceeds 150 µg/m<sup>3</sup> at the monitor site, go to A.2. If not, go to B.1.

A.2 – Is there physical evidence of lake bed emissions and/or air quality modeling sufficient to define boundaries for the area to be controlled?

Source Delineation.

If possible, the boundary of a dust source area will be delineated by a GPS survey. Under certain circumstances, the surveyed boundary of the dust source area will not result in a closed polygon. If the GPS survey yields a partial boundary and not a closed polygon, then the polygon area may be closed, if the length of the closure is equal to or less than one-half kilometer or is less than 20 percent of the surveyed source area perimeter, whichever is smaller. The ends of the partial surveyed area boundary will be completed with a straight line, unless survey notes or visual observations indicate that a different shaped boundary should be used. If the surveyed source area boundary has a complex shape, then the partial boundary to be closed will use the best available field and visual data to connect the two ends and form the polygon. Boundaries of existing controlled areas or other previously located boundaries will be used in place of a GPS survey boundary, if the survey notes or visual observations indicate the erosion area extends to that boundary.

If the GPS boundary described above is not available, the area will be defined by any one or a combination of GPS surveying, visual observations, and video observations or any other method described in the Dust ID Protocol (Attachment C).

If neither the GPS boundary nor other physical evidence, as described above, is available, the default area size will be one square kilometer centered on the sand flux monitor (SFM), or one grid cell if the SFMs are in a closer array.

If there is physical evidence, as described above, to define the boundaries for the area to be controlled, and no K-factor for that area or no sand catch data above one gram for the sampling period from a sand flux sampler located within a 30 degree upwind cone centered on the wind direction of the defined source, then modeling cannot be performed. Go to A.3.

Modeling.

If sand flux data is available for the exceedance identified in A.1, the District will model the event. Modeling will be performed following the latest Dust ID Modeling Protocol using the source area determined above.

The order of priority for applying K-factors in the model will be:

- 1) When available, the District will use event specific storm-average K-factors to model dust events at the PM<sub>10</sub> monitor if there are three or more hours of screened hourly K-factors for a 48-hour period. If not,

- 2) The District will use the most recent temporal and spatial 75-percentile hourly K-factors to model events, if there are nine or more screened hourly K-factors for a period and they are determined by the methods described in the most current Dust ID Protocol. If not,
- 3) The District will use the default K-factors in Attachment B, Table 2 to model events, based on the month of the event being investigated and the K-factor area.

Only those on-lake and off-lake dust sources with sand flux data will be included in the model. All data collected by the District pursuant to this Section shall be shared with the City within 30 days of final data review.

The modeling results will be used to prioritize multiple upwind source areas for control, or to determine the fraction of a single upwind source area that needs to be controlled.

Go to A.3

If neither physical evidence nor model results are available, go to A.5.

#### A.3 – District directs City to implement dust controls.

Source areas in A.2 that cause or contribute to an exceedance may be new source areas, or may be emissions from areas with existing dust controls. The APCO will determine, in writing, that conditions specified in Section A.1 were met for a specified area determined by A.2. For emissions from areas with existing dust controls, the City will have the choice of increasing the controls in the existing dust control areas or controlling other contributing sources that will result in lowering the monitored impact below the  $150 \mu\text{g}/\text{m}^3$  exceedance threshold, if such areas exist. If the APCO identifies the need for additional controls, the APCO shall issue a written SCR determination to the City.

If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an alternative analysis of the data used by the APCO to make the determination. If the City submits an alternative analysis, the APCO shall consider the City's analysis and may withdraw, modify or confirm the SCR determination. If the APCO takes action to withdraw or modify the SCR determination, he shall do so within 60 days of the City's submittal of the alternative analysis.

If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's final action, the City may initiate the Dispute Resolution Process pursuant to Paragraph 32 of the 2006 Settlement Agreement between the District and the City (Attachment A to Board Order 080128-01). The APCO may modify the SCR determination based on the Dispute Resolution Process.

In the event the Parties are unable to resolve disagreements over the APCO's SCR determinations through the Dispute Resolution Process, the City may appeal the APCO's SCR determinations to the California Air Resources Board (CARB) under the provisions of Health and Safety Code Section 42316 (Section 42316). The CARB will act within 90 days on the City's appeal.

The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Paragraph 6 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

Go to A.4.

#### A.4 – City implements dust controls.

DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule incorporated as Attachment B, Exhibit 3. The City is solely responsible for all environmental impact analyses required by the California Environmental Quality Act and for all required permits and leases.

#### A.5– District collects additional physical evidence and installs sand flux monitors in suspected areas.

If there is insufficient physical evidence and no sand flux monitor data to determine the emissive area on the lake bed that caused the monitored or modeled exceedance, the District will install Sensits and Cox Sand Catchers (CSC) sand flux monitors in the suspected area in a sampling array with a maximum spacing of one kilometer. The District will also continue to collect other physical evidence.

### **B. MODELED EXCEEDANCES**

#### B.1 – Does the Dust ID model predict a 24-hour shoreline concentration greater than 150 $\mu\text{g}/\text{m}^3$ , including background?

##### Dispersion Modeling Analysis.

At least once a year, the District will examine the Dust ID information and dispersion model to determine if there have been any modeled shoreline exceedances since the period included in the last model run. Modeling will be performed following the 2008 Owens Lake Dust Source Identification Program (Dust ID) Protocol (Attachment C).

##### K-factors.

New K-factors may be generated from  $\text{PM}_{10}$  concentrations measured at any shoreline or near-shore  $\text{PM}_{10}$  monitor using the methods described in the Dust ID Protocol. The order of priority for applying K-factors in the model will be:

- 1) The current temporal and spatial 75th percentile hourly K-factors. The District will use the current modeling period temporal and spatial 75th percentile hourly K-factors to model events, if there are nine or more hourly K-factors for an agreed upon seasonal period and area determined by the methods described in the most current Dust ID Protocol.
- 2) If there is no agreement on seasonal cut-points, the default cut points, as shown in Attachment B, Table 2, will be used with number 1, above.
- 3) If there is no agreement on area, the default areas, as shown in Attachment B, Map 1, will be used with number 1, above.

- 4) If there are fewer than nine hourly K-factors for any area and period, go to 5), below.
- 5) Default K-factors from Attachment B, Table 2. The District will use the K-factors in Attachment B, Table 2 to model events, based on the month of the event being investigated and the K-factor area. If the new dust source area is not within a K-factor area shown in Attachment B, Table 2, the APCO shall determine the default K-factor for the new source area based on the default K-factors of areas with similar soil characteristics.

Source Area Size, Location and Sand Flux.

The boundary of a dust source area will be delineated by a GPS survey. Under certain circumstances, the surveyed boundary of the dust source area will not result in a closed polygon. If the GPS survey yields a partial boundary and not a closed polygon, then the polygon area may be closed, if the length of the closure is equal to or less than one-half kilometer or is less than 20 percent of the surveyed source area perimeter, whichever is smaller. The ends of the partial surveyed area boundary will be completed with a straight line, unless survey notes or visual observations indicate that a different shaped boundary should be used. If the surveyed source area boundary has a complex shape, then the partial boundary to be closed will use the best available field and visual data to connect the two ends and form the polygon. Boundaries of existing controlled areas or other previously located boundaries will be used in place of a GPS survey boundary, if the survey notes or visual observations indicate the erosion area extends to that boundary.

If the GPS boundary described above is not available, the area will be defined by any one or a combination of GPS surveying, visual observations, and video observations or any other method described in the Dust ID Protocol.

The details of how to delineate source area boundaries are contained in the Dust ID Protocol.

If neither the GPS boundary nor the other physical evidence as described above is available, the default area size will be one square kilometer centered on the SFM, or one grid cell if the SFM are in a closer array.

All data collected by the District pursuant to this Section shall be shared with the City within 30 days of final data review. If the modeling shows that lake bed source areas have caused or contributed to any modeled shoreline PM<sub>10</sub> impact greater than 150 µg/m<sup>3</sup> for a 24-hour average, go to B.7. If not, go to B.2.

B.2 – Is the modeled concentration less than 100 µg/m<sup>3</sup>?

This refers to the modeled concentration calculated in B.1 and includes the background PM<sub>10</sub> level of 20 µg/m<sup>3</sup>. If yes, go to B.6. If no, go to B.3.

B.3 – District directs the City to commence environmental impact analysis, design and permitting.

The APCO will direct the City in writing to choose the BACM it wishes to implement in the area identified in B.1.

The City will develop a scope of work for the identified potential source areas, including: (1) a summary of the sites pertinent conditions, features, and location, (2) appropriate control alternatives and approach, including a conceptual layout of dust control and integration into the TDCA (roads, water supply, drainage, and power), (3) standard and site-specific permitting considerations, (4) anticipated environmental documentation considerations and approach, and (5) an approximate timetable for implementation beginning at an undefined start date that might coincide with a future SCR determination. City shall complete these steps within 180 days of the date of the written direction from the APCO. Go to B.4.

B.4 – District deploys reference and/or non-reference method Special Purpose PM<sub>10</sub> monitor(s) to confirm model (if not already deployed).

The District will deploy reference and/or non-reference method Special Purpose PM<sub>10</sub> monitor(s) on the lake bed upwind and downwind of the identified emissive area, if there are no existing monitors at locations that can be used in Section B.5 to refine the model predictions. Monitors will be sited between 250 and 5000 meters outside of any GPS'd or observed source area boundaries. These PM<sub>10</sub> monitoring sites may be removed after the model confirmation procedure described in B.5. Shoreline and near-shore PM<sub>10</sub> monitors that are sited to confirm the model may be used for NAAQS compliance, if an exceedance is monitored. Go to B.5.

B.5 – Is the refined model prediction greater than 150 µg/m<sup>3</sup>?

For each event measured under Section B.4 that results in a 24-hour monitored concentration of greater than 100 µg/m<sup>3</sup>, the event-specific K-factor (defined in the Dust ID Protocol) will be used to model the concentration at the shoreline receptors. If the event-specific K-factor was derived for the same year and season as the original event modeled in B.1, the Section B.1 event will be remodeled using the new K-factor. If either that remodeled concentration for the Section B.1 event, or the new modeled concentration for the on-lake monitored event, is greater than 150 µg/m<sup>3</sup> at a shoreline receptor, go to B.7. If not, go to B.6.

The District will make a determination if any currently modeled event within the same season and K-factor area using the appropriate K-factors as determined by this procedure causes a shoreline receptor to exceed 150 µg/m<sup>3</sup>. If yes, go to B.7.

B.6 – No action required.

No action is required of the City at this time. Data collected during this period can be used in conjunction with data collected at a later time to define emissive areas on the lake bed according to this protocol and to develop K-factors for emissive areas.

B.7 – District directs the City to implement dust controls.

Source areas in B.1 and B.5 that cause or contribute to an exceedance may be new source areas or existing source areas with less than the required level of control (MDCE not high enough to prevent exceedances).

The APCO will determine, in writing, that conditions specified in Sections B.1 or B.5 were met for the specified area. Within 30 days of that determination by the APCO, the City will be notified of that determination in writing. If possible, the City will have the choice of increasing

the control efficiencies on existing dust control areas and/or controlling other contributing sources that will result in lowering the modeled impact below the 150 µg/m<sup>3</sup> exceedance threshold. If the APCO identifies the need for additional controls, the APCO shall issue a written SCR determination to the City.

If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an alternative analysis of the data used by the APCO to make the determination. If the City submits an alternative analysis, the APCO shall consider the City's analysis and may withdraw, modify or confirm the SCR determination. If the APCO takes action to withdraw or modify the SCR determination, he shall do so within 60 days of the City's submittal of the alternative analysis.

If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's final action, the City may initiate the Dispute Resolution Process pursuant to Paragraph 32 of the 2006 Settlement Agreement between the District and the City (Attachment A to Board Order 080128-01). The APCO may modify the SCR determination based on the Dispute Resolution Process.

In the event the Parties are unable to resolve disagreements over the APCO's SCR determinations through the Dispute Resolution Process, the City may appeal the APCO's SCR determinations to the California Air Resources Board (CARB) under the provisions of Health and Safety Code Section 42316 (Section 42316). The CARB will act within 90 days on the City's appeal.

The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Paragraph 6, above, to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

Go to B.8.

#### B.8 – City implements BACM.

DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule incorporated as Attachment B, Exhibit 3. The City is solely responsible for all environmental impact analyses required by the California Environmental Quality Act and for all required permits and leases.

For source areas that arrive at B.7 from B.5, all time periods in the above referenced implementation schedule in B.8 shall apply but be reduced by the time period elapsed since the date of the written direction from the APCO described in Section B.3, or one year, whichever is less.

Attachment B Enclosures

Map 1: Owens Lake Dust ID Monitoring Map

Table 1: From-the-lake and Non-lake Wind Directions for PM<sub>10</sub> Monitor Sites

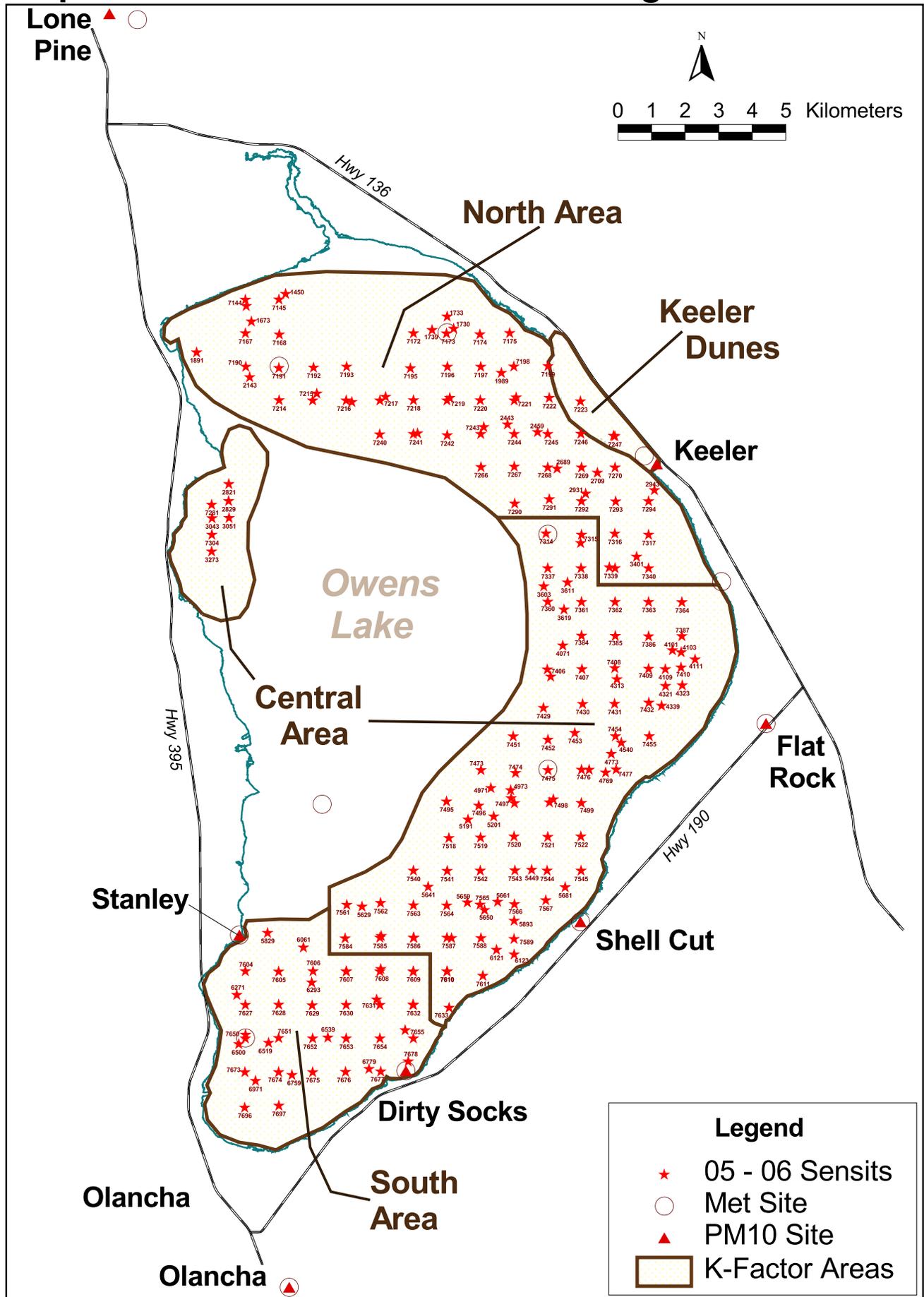
Table 2: Default Spatial and Temporal K-factors for the Dust ID Model

Exhibit 1: Schedule of Contingency Measures

Exhibit 2: Moat & Row Transition Schedule

Exhibit 3: DCM Operation Schedule

# Map 1 - Owens Lake Dust ID monitoring network



## Attachment B - Table 1

From-the-Lake and Non-Lake Wind Directions for PM<sub>10</sub> Monitor Sites

PM <sub>10</sub>	From-the-Lake	Non-lake	
Monitor Site	Wind Dir. (Deg.)	Wind Dir. (Deg.)	Met Tower
Lone Pine	126≤WD≤176	WD<126 or WD>176	Lone Pine
Keeler	147≤WD≤290	WD<147 or WD>290	Keeler
Flat Rock	224≤WD≤345	WD<224 or WD>345	Flat Rock
Shell Cut	WD≥227 or WD≤33	33<WD<227	Shell Cut
Dirty Socks	WD≥234 or WD≤50	50<WD<234	Dirty Socks
Olancha	WD≥333 or WD≤39	39<WD<333	Olancha
Bill Stanley	WD≥349 or WD≤230	WD<349 or WD>230	Bill Stanley
New Sites	TBD	TBD	TBD

TBD – From-the-lake and non-lake wind directions will be determined for new sites by the APCO when sites are selected.

## Attachment B - Table 2

## Default Spatial and Temporal K-factors for the Dust ID Model

<u>AREA</u>	<u>K-factor</u>	
	<u>Jan.– Apr. &amp; Dec.</u>	<u>May–Nov. (These are the default cutpoints.)</u>
Keeler Dunes	7.4 x 10 <sup>-5</sup>	6.0 x 10 <sup>-5</sup>
North Area	3.9 x 10 <sup>-5</sup>	1.5 x 10 <sup>-5</sup>
Central Area	12.0 x 10 <sup>-5</sup>	6.9 x 10 <sup>-5</sup>
South Area	4.0 x 10 <sup>-5</sup>	1.9 x 10 <sup>-5</sup>

## Attachment B - Exhibit 1: Schedule of Contingency Measures

From 2006 Settlement Agreement

**EXHIBIT 10 -- SCHEDULE OF CONTINGENCY MEASURES**

<b>Issue</b>	<b>Resolution</b>	<b>Duration</b>	<b>Units</b>
<b>Moat and Row</b>			
Eroded row	Install armoring to prevent further erosion	2	mo/mile
	Install sand fences to prevent further erosion	1	mo/mile
	Reconstruct row in place or adjacent	2	mo/mile
Filled moat	Re-excavate new moat outboard of filled moat, expand existing row onto filled moat	2	mo/mile
Filled sand fence	Clean out or flank with new sand fences	2	mo/mile
Collapsed sand fence	Repair or flank with new sand fences	1	mo/mile
Spacing too large	Pull in intervening sand fence	1	mo/mile
	Add intervening moat and row	3	mo/mile
	Enhance with vegetation and/or wetness	12 to 36	months
	Soil roughening	1 to 3	months/sq mi
	Conversion to reduced BACM/BACM	See Exhibit 11	
<b>Managed Vegetation</b>			
Emissions from bare areas	Enhance/restore vegetation	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Emissions from vegetated areas	Determine and establish necessary cover	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
<b>Gravel Patches</b>			
Infilling pore spaces	Supplement gravel depth	4	months/sq mi
	Stabilize by other means (e.g., vegetation, wetness, sand fences)	6 to 36	months
<b>Shallow Flood</b>			
Emissions from dry areas (insufficient uniformity of wetting )	Wet dry areas. May require land leveling and/or additional laterals.	12	months
Generally too dry	Increase water application rate relative to ET	1	month
<b>Other features</b>			
Gravel source	Open new or re-open existing quarry	4	months
Emissions from roads, berms, etc.	Increase watering frequency	1	month
	Stabilize by other means (e.g., gravel, stabilizing agents)	1 to 4	months/sq mi

## Attachment B - Exhibit 2

From 2006 Settlement Agreement

**EXHIBIT 11 -- MOAT AND ROW TRANSITION SCHEDULE**

<b>Activity</b>	<b>Duration (years )</b>
Shallow flood transition from moat & row	1.9
Managed vegetation transition from moat & row	5.9
Gravel cover transition from moat & row	1.8
<i>Mutually agreeable exceptions:</i>	<i>Increase over and above durations listed above (years)</i>
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0

## Attachment B - Exhibit 3

From 2006 Settlement Agreement

**EXHIBIT 12 -- DCM OPERATION SCHEDULE**

<b>Activity</b>	<b>Duration (years )</b>
New area shallow flood DCM <sup>a</sup>	2.9
New area managed vegetation DCM <sup>a</sup>	6.1
New area gravel cover DCM <sup>a</sup>	2.2
<i>Mutually agreeable exceptions:</i>	<i>Increase over and above durations listed above (years)</i>
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0
4. Expanded CEQA triggered	1.4
<sup>a</sup> Assumes that total new area <2 square miles per year	

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# **Board Order 080128-01 Attachment C**

## **2008 Owens Lake Dust Source Identification Program Protocol**



### **Great Basin Unified Air Pollution Control District**

157 Short Street, Bishop, California 93514  
Telephone (760) 872-8211

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# 2008 Owens Lake Dust Source Identification Program Protocol

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### Glossary of Terms and Symbols

AIRS	US Environmental Protection Agency's Aerometric Information and Retrieval System
ATV	All-Terrain Vehicle
APCO	Air Pollution Control Officer
BACM	Best Available Control Measure
BACT	Best Available Control Technology
CAAA	Clean Air Act Amendments of 1990
CALMET	A meteorological preprocessor program for CALPUFF.
CALPUFF	An air pollution model
CARB	California Air Resources Board
CSC	Cox Sand Catcher, a passive sand flux measurement device.
DCA	Dust Control Area
DCM	Dust Control Measure
Dust ID Program	Owens Lake Dust Source Identification Program
EIR	Environmental Impact Report
Event-specific $K_f$	Weighted-average of hourly K-factors for a dust event, weighted by the hourly $PM_{10}$ concentration
Exceedance	Modeled or monitored $PM_{10} > 150 \mu g/m^3$ at the shoreline
FTEE	Full-time equivalent employee
GBUAPCD	Great Basin Unified Air Pollution Control District
GIS	Geographic Information System
GPS	Global Positioning System
KE	Kinetic energy
K-factor	Proportionality constant for sand flux and $PM_{10}$ emissions, $K_f$
LADWP	City of Los Angeles Department of Water and Power (also City)
$m^3$	cubic meter
met	meteorological
mg	milligram
MSM	Most Stringent Measure
NAAQS	National Ambient Air Quality Standards
NEAP	Natural Events Action Plan
OVPA	Owens Valley $PM_{10}$ Planning Area
PC	Particle count
$PM_{10}$	Particulate matter less than 10 microns aerodynamic diameter
QA	Quality Assurance
RASS	Radio Acoustic Sounding System
RSIP	Great Basin APCD 2003 Owens Valley $PM_{10}$ Planning Area Revised State Implementation Plan

## Chapter 8 - Enabling Legislation to Implement Control Strategy

Sensit	An electronic sand motion detector.
Settlement Agreement	2006 Settlement Agreement between LADWP and GBUAPCD
Storm-average $K_f$	Arithmetic average of hourly K-factors for a dust event
SCR	Supplemental Control Requirements of the 2003 SIP
SFM	Sand flux monitor
TEOM	Tapered-Element Oscillating Microbalance, measures PM <sub>10</sub> .
USEPA	United States Environmental Protection Agency
USGS	US Geological Survey
WD	Wind direction
2003 SIP	Great Basin APCD 2003 Owens Valley PM <sub>10</sub> Planning Area Revised State Implementation Plan
µg	microgram

# 2008 Owens Lake Dust Source Identification Program Protocol

## 1. Program Overview

### 1.1 Introduction

The objective of the Owens Lake Dust Source Identification (Dust ID) Program is to identify dust source areas at Owens Lake that can cause or contribute to violations of the National Ambient Air Quality Standards (NAAQS) for PM<sub>10</sub>. The Dust ID Program is a long-term monitoring program that is intended to identify dust source areas for control under the provisions of the Supplemental Control Requirements (SCR) in the 2003 revised Owens Valley PM<sub>10</sub> State Implementation Plan (RSIP) and the 2006 Owens Lake Settlement Agreement (Settlement Agreement). The text of the Settlement Agreement and SCR provisions is included in the appendices to this document.

The RSIP and Settlement Agreement require the City of Los Angeles Department of Water & Power (City) to control all sources of wind blown dust from the lake bed of Owens Lake that cause or contribute to an exceedance of the PM<sub>10</sub> NAAQS at the historic shoreline (3,600-foot contour line). Based on dust events that occurred between January 2000 and July 2006, 43 square miles of the lake bed were found to cause or contribute to NAAQS violations. Dust controls are required to be implemented on 29.8 square miles of the lake bed by December 31, 2006, and an additional 13.2 square miles by April 1, 2010.

Provided that these control measures are implemented in accordance with the RSIP and Settlement Agreement, the District will suspend making determinations to control additional dust source areas from December 4, 2006 until May 1, 2010. During this period, all monitoring, modeling and observations will continue as described in this Dust ID Program Protocol. Data and information collected during this period will be used to determine any control requirements for Study Areas as described in the Settlement Agreement, and to advise the City on any monitored dust emissions from the lake bed and surrounding areas. If any new lake bed dust source areas are identified from data collected after April 1, 2010, they will be subject to dust control requirements as provided for in the Settlement Agreement and any future revisions to the Owens Valley PM<sub>10</sub> State Implementation Plan. SCR determinations shall make reasonable efforts to account for impacts caused by Dust Control Measure (DCM) construction activities.

### 1.2 Locating Dust Source Areas

A network of sand flux samplers, PM<sub>10</sub> monitors, meteorological towers and remote camera sites will be used to monitor and locate dust source areas at Owens Lake. Figure 1.1 shows a map of the Dust ID network at Owens Lake. As configured in 2003, the Dust ID network included: sand flux monitors at 136 lake bed sites at 1-km spacing, 7 PM<sub>10</sub> monitors, 13 met towers, 8 observation sites, and 10 time-lapse cameras at 7 sites. At the discretion of the Air Pollution Control Officer, additional sand flux, PM<sub>10</sub> and met sites will be added as necessary to collect

information that can be used to monitor and model the impact from new areas that may become emissive on the lake bed.

The automated monitoring network will be augmented with information from observers who will map dust source locations from off-lake sites when dust events take place during normal work hours. These maps will be used to help document source areas that may be outside the sand flux network or that may be within the network, but missed by the samplers. Field personnel will inspect active source areas and map the source area boundaries using a GPS (Global Positioning System) as conditions allow. Data collected from the sand flux network, visual mapping and GPS surveys will be included in a Geographic Information System (GIS) database for mapping and analysis. Maps generated using these different methods will be compared qualitatively to help delineate source area boundaries.

### **1.3 Monitored Exceedances**

Analysis of hourly  $PM_{10}$  concentrations at shoreline and off-lake monitoring sites may show that lake bed source areas cause or contribute to  $PM_{10}$  exceedances. Monitoring of  $PM_{10}$  concentrations will be done using US EPA-approved monitors. Currently, hourly  $PM_{10}$  readings are obtained using TEOM (Tapered-Element Oscillating Microbalance)  $PM_{10}$  monitors manufactured by R&P, Inc. If a  $PM_{10}$  exceedance is monitored,  $PM_{10}$  concentrations will be paired with the local wind direction for each hour of that event to determine if lake bed source areas caused or contributed to the exceedance.

Twenty-four hour average  $PM_{10}$  monitor concentrations will be adjusted for winds coming from the direction of the lake to the monitor (from-the-lake) and from directions not from the lake to the monitor (non-lake).  $PM_{10}$  concentrations during any hour with winds from a non-lake wind direction will be assumed to have an average background concentration of  $20 \mu\text{g}/\text{m}^3$  and from-the-lake wind directions will be given their hourly value. If the adjusted 24-hour average is greater than  $150 \mu\text{g}/\text{m}^3$ , then an exceedance will have been monitored from a lake bed source or sources.

If a lake bed source area causes or contributes to an exceedance, hourly  $PM_{10}$  concentrations and wind directions will be reviewed to see if a new source area (or areas) is associated with that exceedance. If sand flux data are available that show erosion activity in the direction of a new source area, this event will also be modeled as described in the air quality modeling protocol. If the  $PM_{10}$  monitor data indicate that a new source area caused or contributed to an exceedance, DCMs may be required under the provisions of the Settlement Agreement or current SIP.

### **1.4 Modeled Exceedances**

Air quality modeling will be performed with the CALPUFF modeling system or other United States Environmental Protection Agency (USEPA) approved modeling method. At least once a year, the Dust ID information will be examined and the model will be run to determine if there were any modeled shoreline exceedances since the period covered by the last model run.  $PM_{10}$  emissions for the model will be based on hourly sand flux measured at lake bed sites and spatial and temporal factors derived using the empirical relationship between sand motion on the lake

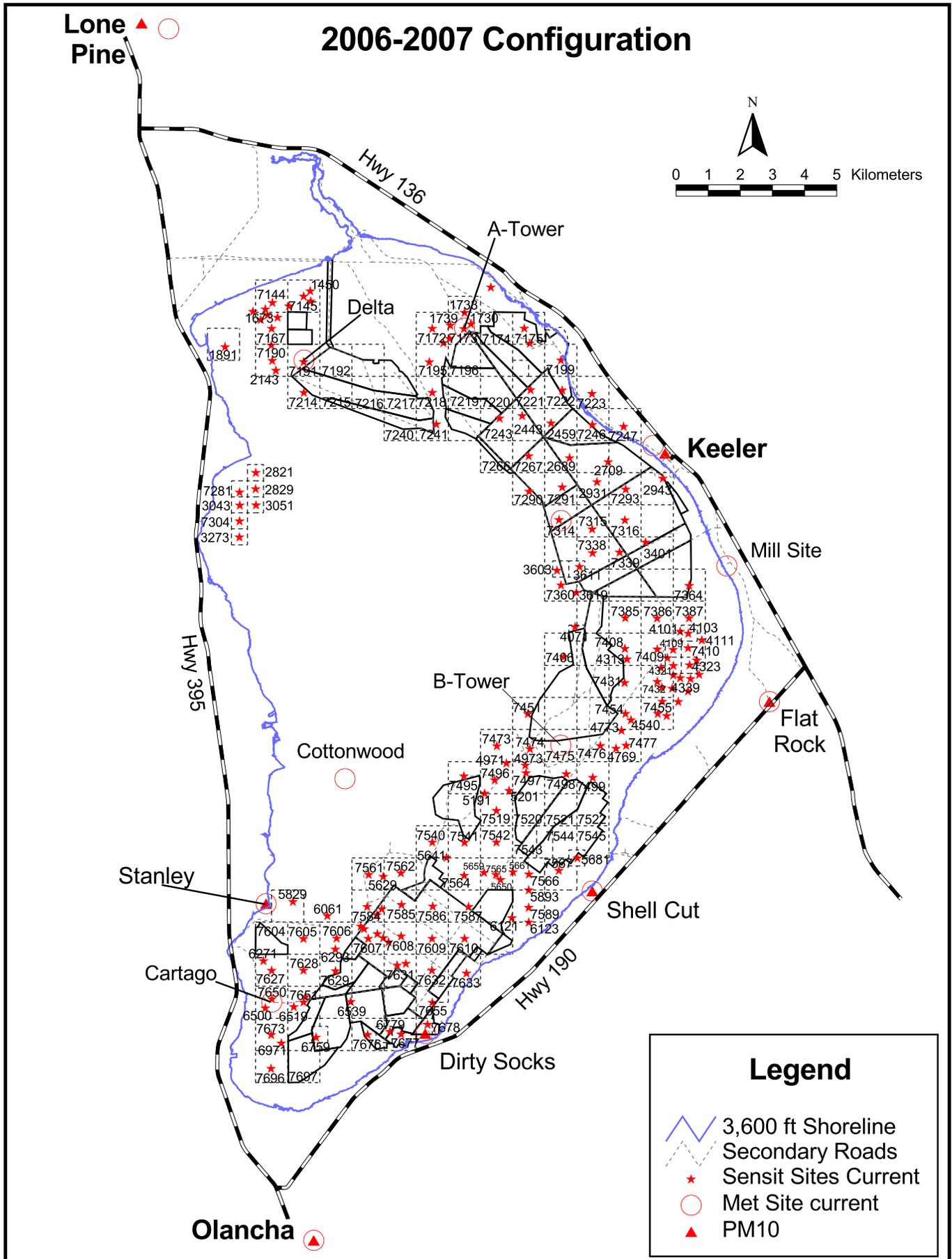


Figure 1.1 - Owens Lake Dust ID monitoring network

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bed and measured  $PM_{10}$  values. CALPUFF will be run using the following equation to estimate emissions and to model  $PM_{10}$  impacts at the shoreline:

Equation 1.1

$$PM_{10} = K_f \times q$$

where,

- $q$  = Sand flux measured at 15 cm above the surface [ $g/cm^2/hr$ ]  
 $K_f$  = K-factor, empirically-derived ratio of the  $PM_{10}$  emission flux to the sand flux at 15 cm.

The ratio of  $PM_{10}$  to sand flux ( $K_f$ ) is referred to as the K-factor. The initial Dust ID program results showed that K-factors could be derived empirically by comparing model predictions to monitored  $PM_{10}$  concentrations. Initial studies also showed that average K-factors can vary spatially and seasonally at Owens Lake. Default K-factors will be used with Equation 1.1 to estimate hourly  $PM_{10}$  emissions unless new K-factors are generated from future dust events following the modeling procedures in this program protocol. If the CALPUFF model results indicate that a new lake bed source area caused or contributed to an exceedance at a shoreline location, dust controls may be required under the provisions of the 2006 Settlement Agreement or the current SIP.

### 1.5 Sand Flux Measurements

Sand flux is measured using a combination of Cox Sand Catchers (CSC) and Sensits. CSCs are sand collection devices that provide a mass collection amount for a certain time period (about 1 to 3 months), and Sensits are electronic sand motion detectors used to time-resolve the collected mass to estimate hourly sand flux rates. The sand flux rate is applied to the area represented by the sand flux sampling site, which may vary in size and shape depending on the source area delineated by field observations.

### 1.6 Dust ID Program Protocol Content

Section 2 of the Dust ID Program Protocol describes the methods and instrumentation that will be used to monitor sand flux with Sensits and CSCs on the lake bed. Section 3 provides a brief description of the  $PM_{10}$  and meteorological monitoring network that will be used to monitor  $PM_{10}$  exceedances, develop K-factors and to call public health advisories. Section 4 describes methods that will be used by visual observers and field personnel to map lake bed dust source areas and delineate boundaries using GPS. Section 5 explains the procedures for developing K-factors using air quality modeling and monitoring data. Section 6 provides the protocol for dispersion modeling.

## **2. Protocol for Measuring Sand Flux Rates and Operation of the Sensit and Cox Sand Catcher Network**

### **2.1 Objective**

Sand flux measurements will be used as a surrogate to estimate PM<sub>10</sub> emissions coming off the lake bed. The objective of the sand flux measurements is to provide an hourly emissions estimate for all active source areas on the lake bed.

### **2.2 Methods and Instrumentation**

Sand flux will be measured with Sensits and Cox Sand Catchers (CSCs). Collocated Sensits and CSCs are used to measure hourly sand flux rates at different locations on the lake bed. The 2006-2007 Sensit/CSC network locations are shown in Figure 1.1. The instruments are placed with their sensors or inlets positioned 15 cm above the surface. Sensits are electronic sensors that measure the kinetic energy or the particle counts of sand-sized particles as they saltate, or bounce, across the surface. Sensits are used to time-resolve the CSC mass to provide hourly sand flux rates.

Figure 2.1 shows a Sensit suspended above the ground on the right, and a CSC in the ground to the left. The photo was taken at a site that was used to test the accuracy of Sensits and CSCs before the Dust ID Program began. The battery powered Sensits are augmented with a solar charging system. A datalogger records 5-minute Sensit data during active saltation periods. Data collection is triggered by particle count activity and continues until particle counts are zero for an hourly period. Each datalogger has a radio transmitter that sends Sensit data to the District's Keeler field office once a day to provide updates on erosion activity at each site. These daily updates are used to alert field personnel to active source areas for possible Global Positioning System (GPS) mapping and inspection. Daily transmission of the data may be temporarily suspended if the solar battery power is low due to extended days of cloud cover.

CSCs are passive collection instruments that capture windblown, sand-sized particles. These instruments were designed and built by the District as a reliable instrument that could withstand the harsh conditions at Owens Lake. CSCs have no moving parts and can collect sand for a month or more at Owens Lake without overloading the collectors. Field personnel visit CSC sites to measure the mass of the collected sand catch. A diagram of the CSC is shown in Figure 2.2. Not shown in the diagram is an internal sampling tube that can be seen in the photo in Figure 2.3. The internal sampling tube is removed from the PVC casing to measure the sand catch sample. The lengths of the sampling tubes and casings are adjusted during construction to accommodate the amount of sand flux in each area and to avoid overloading the CSC. The CSC length ranges from about one to three feet. Because the PVC casing is buried in the ground, an adjustment sleeve is used to keep the inlet height at 15 cm to compensate for surface erosion and deposition. Field techs use a standardized measuring device to check or adjust the sampling inlets to 15 cm after collecting each sample.

Figure 2.4 shows an example of the linear relationship between the CSC collected sand mass and the kinetic energy measured with a co-located Sensit. Sensits measure saltation in terms of

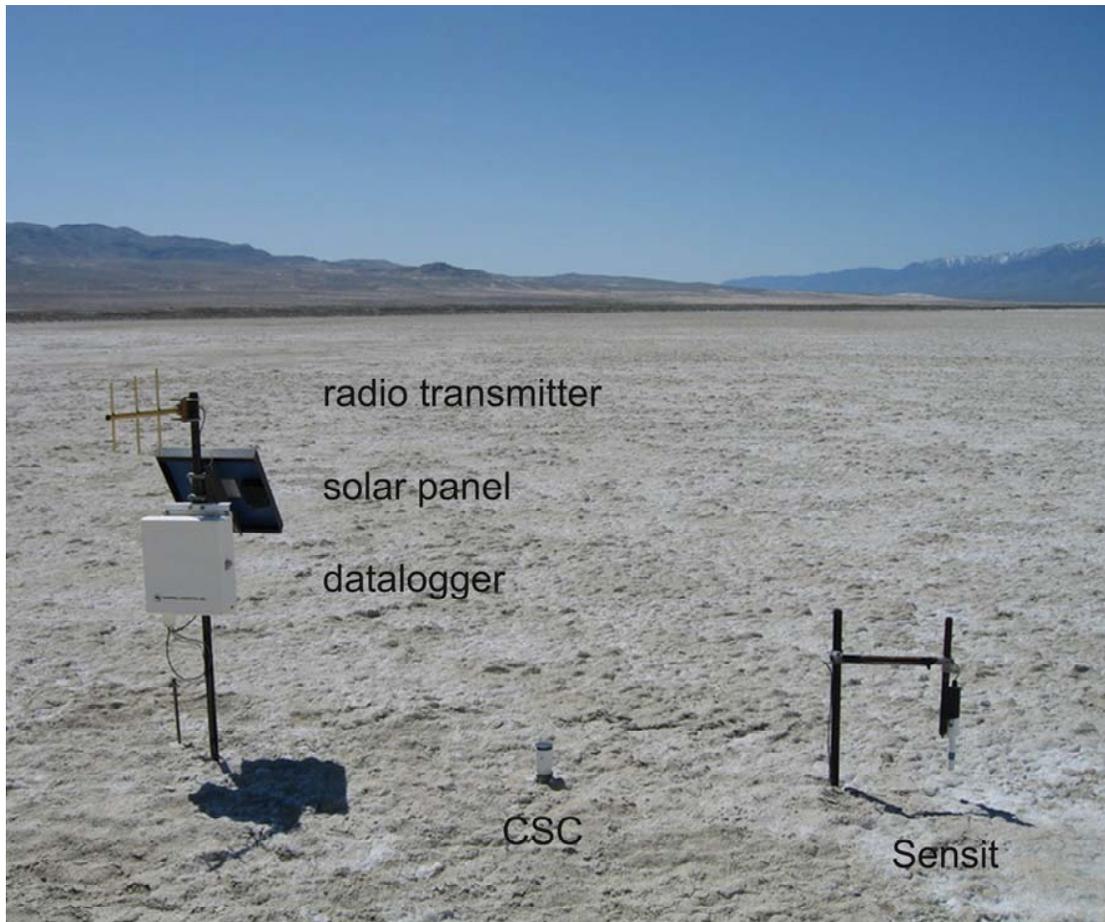


Figure 2.1 - Dust ID sand flux monitor sites measure wind erosion activity using CSCs to collect sand-sized particles and Sensits that electronically detect moving particles. Sensit data are recorded on dataloggers and transmitted by radio from each site to the District's office in Keeler.

Figure 2.2 - Diagram of the Cox Sand Catcher (CSC) used to measure sand flux at Owens Lake.

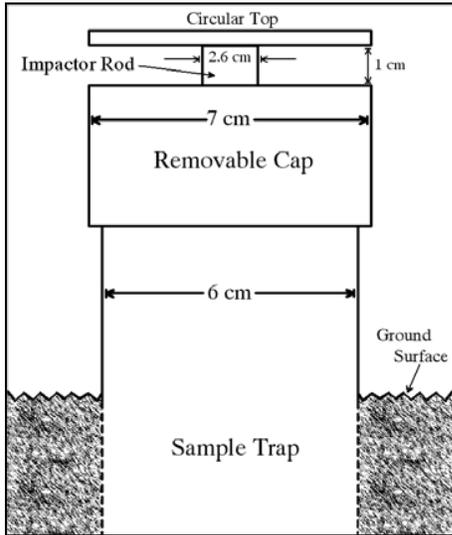


Figure 2.3 - Example of a Cox Sand Catcher (CSC) with the inner sampling collection tube removed.

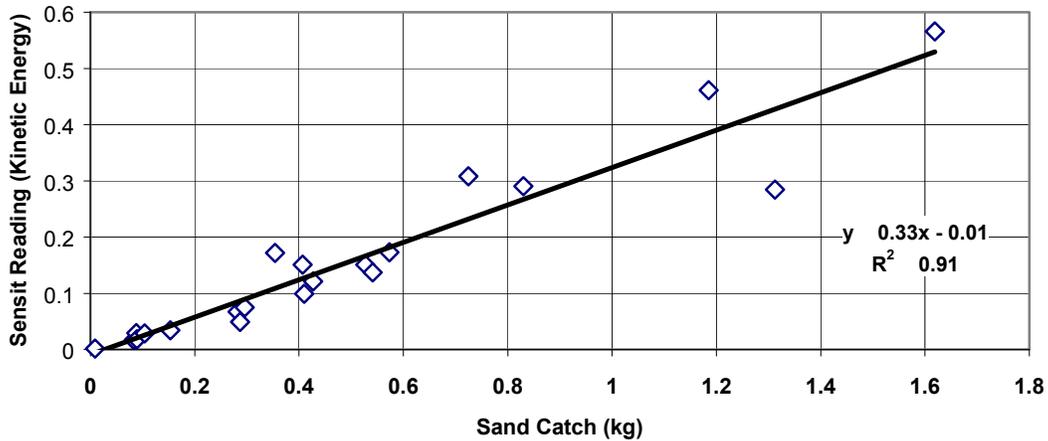


Figure 2.4 - Example of the linearity between CSC mass and a Sensit reading using kinetic energy reading (Sensit No. 7291).

kinetic energy (KE) and particle count (PC). The District uses the output (KE or PC) that provides the best precision and accuracy for the range of saltation activity expected at each site.

Because the electronic Sensit response to the saltation flux can vary, Sensits were used in combination with CSCs to determine hourly sand flux rates. This combination takes advantage of the good precision and accuracy of the CSC sand catch data, and the ability of Sensits to time-resolve the sand flux for each hour of the CSC sampling period. In this way, the sum of the hourly sand catches always matches the CSC sand catch for each sampling period, and it minimizes the error in the hourly sand flux.

Changes to the sand flux monitoring network are made as necessary to improve the characterization of dust source areas on the lake bed. Sand flux sampler sites are added to the network to monitor new source areas or to improve the sand flux estimates for known dust source areas. Although the sand flux network was originally designed in a fixed grid pattern with 1 km site spacing, the current practice is to place the samplers at sites that represent smaller source areas. Some sites may be less than 250 m apart, and their locations may be off the regular grid pattern to better represent sand flux activity in the dust source area. In addition, many of the original sampling sites that are now in flooded portions of the shallow flood DCM were removed, since PM<sub>10</sub> emissions from the flooded sites can be assumed to be zero in the Dust ID model.

### 2.3 Operating Procedures

Sand captured in the CSCs will be weighed in the Keeler lab to the nearest tenth of a gram. A field technician will visit each site every one to three months to collect the sample tubes. The following procedures will be used when collecting the CSC samples and downloading Sensit data:

- 1) Park field vehicle 10 meters or more east of the site and walk the remaining distance to the sampling site. Field personnel will access all Sensit and CSC sites from an easterly approach to minimize upwind surface impacts near the sampling sites.
- 2) Measure and record the inlet height above the surface to the middle of the inlet.
- 3) Remove the sample collection tube from the CSC.
- 4) Verify collection tube number corresponds to site number on the field form.
- 5) Weigh and record the gross weight of the collection tube and sample to the nearest 1 gram using a field scale.
- 6) If any soil material is visible in the tube, seal the collection tube and place it in the tube rack for transport to the lab. If no soil material is visible, note this on the collection form and reuse the collection tube for the next sampling period.
- 7) Place a clean collection tube in the CSC and record the collection tube number.
- 8) Replace the CSC inlet and adjust the height to 15 cm ( $\pm 1$  cm).
- 9) Download Sensit data from the datalogger to a storage module.
- 10) Measure and record the Sensit sensor height above the surface to the center of the sensor using the Height Adjustment Tool, and adjust if necessary to 15 cm. See Figure 2.5.
- 11) Inspect the sensor and radio transmitter wiring and clean or repair, if needed.

- 12) A field operational response test on the Sensit will be completed during each visit and the Sensit will be replaced, if it fails the test.
- 13) CSC samples will be removed from the sample collection tubes and weighed on a calibrated bench-top scale in the Keeler lab to the nearest 0.1 gram.
- 14) Wet samples will be removed from the collection tubes and oven dried before weighing in the lab.

## 2.4 Data Collection

A field form will be used to document the information for the CSC and Sensit (see example in Figure 2.6). The form will have the site number, date and time of measurement (Pacific Standard Time), "as is" CSC inlet and Sensit sensor height ( $\pm 1$  cm), tube tare weight prior to sand catch ( $\pm 0.001$  kg), total sand catch weight ( $\pm 0.001$  kg), and post-catch tube weight ( $\pm 0.001$  kg), Sensit response test (particle counts or kinetic energy), operator's initials, and a comments section where the condition of the sampler and any other relevant factors, such as surface condition will be documented. The Data Processing Department will calculate the net sand catch weight from the CSC during data analysis. CSC lab weights, measured to the nearest 0.1 g will be recorded on the Lab Form shown in Figure 2.7. After completion of the forms, the field technician will make a copy of the completed forms and file the copies at the Keeler office. The original forms will be sent to Data Processing in the Bishop office. Data Processing will enter the data into an electronic file. The original hard copy forms will be filed in the Bishop office.

Each day, dataloggers for all Sensit sites will be downloaded by radio transmission to the Keeler Field office. Data from the storage modules will be downloaded to the computer at the Keeler office by the field technician at the end of a collection period. The radio transmitted Sensit data will be used as the data of record. Storage module data will be collected at least quarterly and will serve as a back-up file.

Technicians will keep a log of all the repairs, maintenance, or replacement of Sensits or CSCs, radio transmitters, and datalogger equipment. This log will be kept in a field notebook and the field forms sent to Data Processing as they are completed. It is the technician's or operator's responsibility to review the data and notify the Air Monitoring Specialist and Data Processing who will decide whether any data should be edited or deleted and why.

## 2.5 Chain of Custody

Each field form will be initialed and dated by the field technician during each site visit. The form will be signed and dated by the person receiving the data when delivered to the Bishop office. If no person is available to sign the form in the Bishop office, the delivery person will sign and date the form and place it in the Data Processor's box.

## 2.6 Quality Assurance

All field and lab scales will be checked at least every two months using Class F weights. Field scales will also be checked with a 100-gram weight at each sample site before weighing the sand catch and the weight recorded on the field form. The bench-top scale in the Keeler office will be



Figure 2.5 - A Height Adjustment Tool is used to measure the height of Sensits and CSCs and to adjust the sensor and inlet height to 15 cm above the soil surface.





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checked with the Class F weights before each set of sand catches are weighed. The test weights will be recorded on the scale log sheet in the laboratory. Both scales will be calibrated and certified at least once every year. Ten percent of the CSC sand catch samples will be stored for at least one year from the date of collection before discarding.

## 2.7 Calculating Hourly Sand Flux

For modeling purposes discussed in Section 6, hourly sand flux is calculated for each Sensit/CSC site using the sand catch to Sensit reading ratio for each collection period and apportioning the sand catch to the hourly Sensit reading. The hourly sand flux is divided by 1.2 cm<sup>2</sup>, which is the equivalent inlet opening size of the CSC for flux calculation purposes.

For Sensits using kinetic energy,

### Equation 2.1

$$q_{n,t} = (S_{n,t} - S_{n,bg}) \times \frac{CSC_{n,p}}{\sum_{t=1}^N (S_{n,t} - S_{n,bg})} \times \frac{1}{1.2} \quad [\text{g/cm}^2/\text{hr}]$$

Where,

- $q_{n,t}$  = hourly sand flux at site n, for hour t [g/cm<sup>2</sup>/hr]
- $CSC_{n,p}$  = CSC mass for site n, for collection period p [g]
- $S_{n,t}$  = Sensit total KE reading for site n, for hour t [non-dimensional]
- $S_{n,bg}$  = Sensit KE background reading for site n, [non-dimensional]
- N = Total number of hours in CSC collection period p.

For Sensits using particle count,

### Equation 2.2

$$q_{n,t} = S'_{n,t} \times \frac{CSC_{n,p}}{\sum_{t=1}^N S'_{n,t}} \times \frac{1}{1.2} \quad [\text{g/cm}^2/\text{hr}]$$

Where,

- $S'_{n,t}$  = Sensit total PC reading for site n, for hour t [non-dimensional]

## 2.8 Sensit Calibration and Data Analysis

### 2.8.1 Sensit Calibration Check

Data Processing will track Sensits by their serial number. After each sample collection period, Sensit and CSC data will be added to data from other sample collections. Data Processing will determine the average sand catch to Sensit ratio for each Sensit. Sensit readings will be collected

for particle counts and kinetic energy for each Sensit. Due to differences in individual Sensit responses, some Sensits have a more consistent sand flux to Sensit reading ratio using particle count rather than kinetic energy. This normally depends on the manufacturer's electronic design. At high sand flux sites, kinetic energy provides a more linear response for most Sensits. If KE is used, a background KE is subtracted from the reading if it is not zero. A background KE is determined from the KE reading when the PC reading is zero.

The ratio of the Sensit response to the collected mass will be compared for each collection period to previous ratios for the same instrument to ensure that the Sensit is responding consistently. As seen in Figure 2.4 this ratio can vary, especially at low collection masses, so large deviations in the ratio should only be used as an indicator for a possible problem. Sensits will be replaced if they show no readings with significant sand associated CSC collection, have significant readings during calm wind periods, have an erratic response as compared to previous collection periods, or if they fail the field operational response test.

### 2.8.2 Replacing Missing Sand Catch Data

Sand catch data can be lost if the CSC collector tube is full, or damaged, or if the sample is spilled during weighing. The lost sand catch data will be estimated using Sensit data. A cumulative sand catch to Sensit ratio is calculated by adding all of the valid sand catches and all of the corresponding Sensit data for that particular Sensit/CSC pair, and then dividing them to obtain the total ratio. The cumulative ratio is applied to the Sensit data to estimate the hourly sand flux. If there was a Sensit change, only data generated after the Sensit change is used to calculate the cumulative sand catch to Sensit ratio.

CSC collection tubes will be weighed and reset at the same time as any Sensit change at a site in order to maintain the time correlation between the two devices.

### 2.8.3 Replacing Missing Sensit Data

Sensit data can be lost when the datalogger or Sensit fails. In such cases, the sand catch data will be time resolved using a neighboring site. The historical hourly sand flux data are compared to determine which neighboring site behaves most similarly to the site with the lost data. The correlation coefficients between the data sets will be used to determine which site behaves most similarly. If no adjacent sites were active during the period of lost Sensit data, then the nearest active sites will be used for comparison.

## 3. Protocol for Measuring Ambient $PM_{10}$ and Meteorological Conditions

### 3.1 Objective

Ambient  $PM_{10}$  monitors will be placed at locations generally around the shoreline of Owens Lake and in local communities to monitor the ambient air for exceedances of the  $PM_{10}$  NAAQS and to develop K-factors for modeling  $PM_{10}$  emissions from lake bed sources.  $PM_{10}$  monitors may be placed on the lake bed for short-term special-purpose monitoring studies.

### **3.2 Methods and Instrumentation for PM<sub>10</sub> and Meteorological Data**

PM<sub>10</sub> monitoring will be performed using USEPA-approved reference or equivalent method monitors. The current monitoring network shown in Figure 1.1 includes seven PM<sub>10</sub> monitor sites – Keeler, Lone Pine, Olancho, Dirty Socks, Shell Cut, Bill Stanley and Flat Rock. Each PM<sub>10</sub> site is equipped with a Tapered Element Oscillating Microbalance (TEOM) PM<sub>10</sub> monitor. TEOM monitors are capable of measuring hourly PM<sub>10</sub> concentrations. The Dust ID Program will rely on the TEOM to determine if an exceedance is caused by a lake bed source, since the data can be correlated with hourly wind directions to determine dust source directions. TEOM data will also be used to generate K-factors to model the PM<sub>10</sub> emissions from lake bed sources.

Ten-meter meteorological towers will be located near each PM<sub>10</sub> monitor site and at other locations around the lakeshore and on the lake bed. The current met sites are shown in Figure 1.1. The met data are used to create wind fields with the CALMET model that are used with CALPUFF to model air quality impacts. All met towers include instrumentation to measure wind speed and wind direction. Two lake bed met sites (A & B Towers) measure wind speed at different heights (0.5, 1, 2, 5 and 10 m) to determine surface roughness and vertical wind speed profiles. Some met sites also measure temperature, relative humidity, barometric pressure, and/or precipitation.

### **3.3 Operating Procedures, Instrument Calibration and Quality Assurance**

PM<sub>10</sub> monitoring will be performed in accordance with USEPA monitoring guidelines found in 40 CFR, Part 58 and meteorological monitoring will be performed in accordance with USEPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volumes I, II, and IV.

### **3.4 Data Handling and Data Access via Modem**

TEOM PM<sub>10</sub> data will be delivered to Data Processing on a routine monthly schedule. After the data pass the proper data review and QA checks they will be submitted to the USEPA's AIRS database. PM<sub>10</sub> data from special-purpose monitors that may be located on the lake bed will not be submitted to the AIRS database.

All the PM<sub>10</sub> sites and some met sites are equipped with modem links that allow for access to the hourly concentrations. These data are useful for alerting field personnel to possible new sources of PM<sub>10</sub>, and for alerting the public in case of high concentrations. For hourly concentrations above 400 µg/m<sup>3</sup> the District will issue public health advisories when the communities of Keeler, Lone Pine or Olancho are affected. The public can view real-time wind speed, direction and PM<sub>10</sub> data from the Dust ID monitoring network on the District's website at [www.gbupcd.org/data](http://www.gbupcd.org/data).

## 4. Protocol for Observing and Mapping Source Areas and Dust Plume Paths

### 4.1 Objective

The objective for source area mapping is to use the best available information from visual observations, GPS mapping, and sand flux measurements to delineate the boundaries of dust source areas for as many events as possible. This information will be used to help delineate the control area boundaries for new sources.

### 4.2 Methods and Instrumentation

The Dust ID Program includes four methods to help locate dust source areas and to delineate the source area boundaries. The methods are: 1) visual mapping by trained observers, 2) time-lapse cameras, 3) surface inspections with GPS mapping, and 4) sand flux activity (as measured with Sensits and CSCs).

#### 4.2.1 Mapping Dust Source Areas from Off-Lake Observation Sites

One or more trained observers will complete observations from viewpoints to best observe the active dust source areas. For instance, two observers may be at viewpoints on the east side of the dust plume in the Inyo and Coso Mountains and a third may be on the west side in the Sierra. The observers will create hourly maps of the visible boundaries of any dust source areas, their plume direction and note if the visible plume crosses the shoreline. To the extent practicable, all lake bed and off-lake dust sources will be included in the observations. Figure 4.1 shows an example of sand flux measurements and the cumulative information that can be collected by observers mapping the dust plumes from different locations.

#### 4.2.2 Video Cameras

Remote time-lapse video cameras will record dust events during daylight hours. This information will be reviewed to help identify source areas that may have been missed by observers, or to help confirm source area activity detected by PM<sub>10</sub> monitors or the sand flux network. Remote time-lapse video can also be used to help verify modeled impacts that were not monitored by the PM<sub>10</sub> network, to check compliance of dust control areas, and to identify off-lake sources not measured by any of the other methods.

#### 4.2.3 Mapping Using GPS

##### 4.2.3.1 “Trigger” Levels for Initiating Field Inspections and GPS Surveys

Dust observations, Sensit activity, elevated PM<sub>10</sub> concentrations and video will be used as “trigger data” to determine the time and location for a Dust Source Area Survey (survey). Sensit and PM<sub>10</sub> data will be automatically collected via radio transmission every workday. A technician will summarize and review the data each workday. The summary will list all Sensit activity greater than background output levels, and hourly TEOM PM<sub>10</sub> concentrations over

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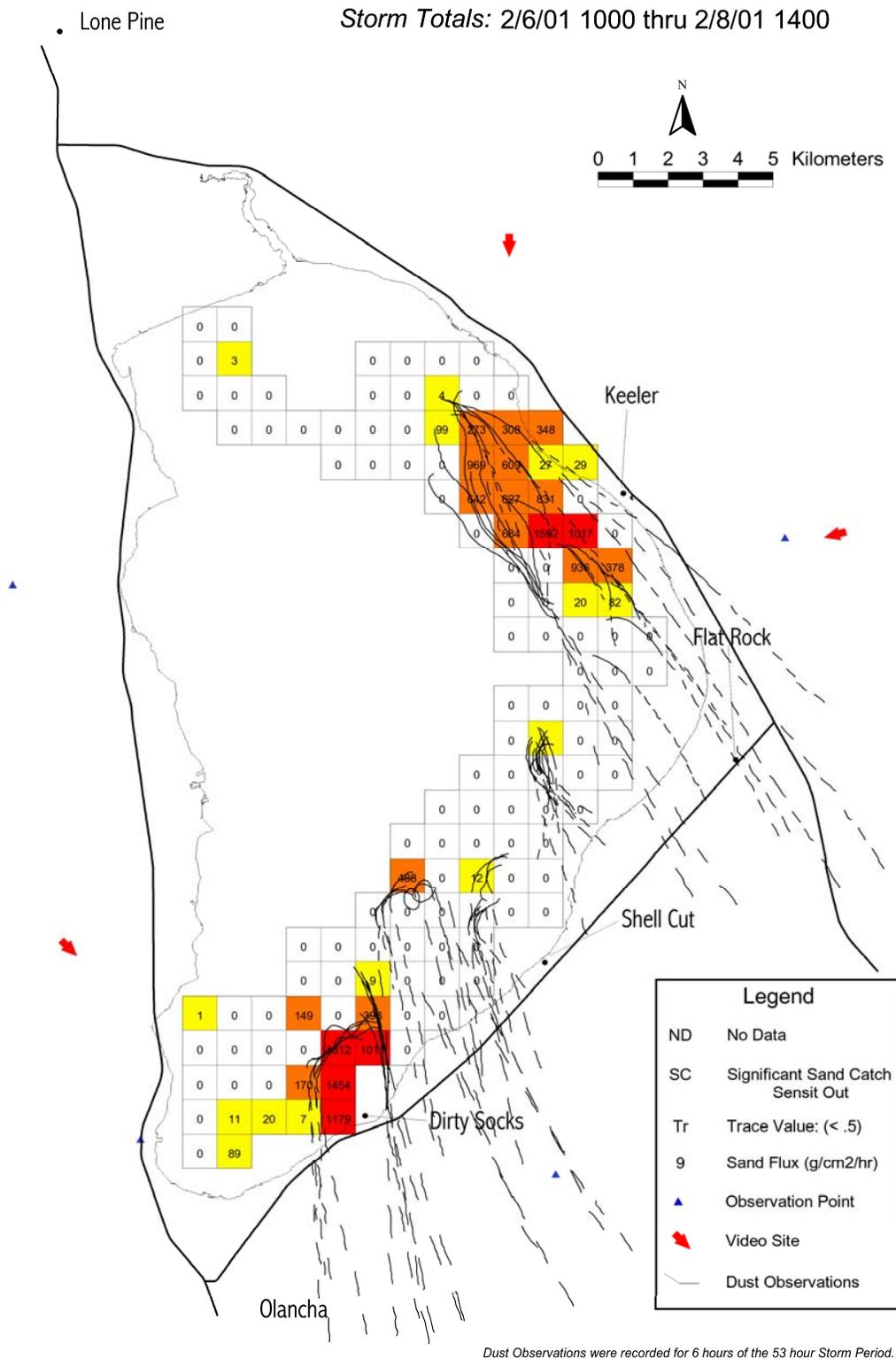


Figure 4.1 - Example of dust plume maps drawn by observers during daylight hours and total sand flux for a dust event on February 6-8, 2001.

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50  $\mu\text{g}/\text{m}^3$  with corresponding wind speed and direction data. If dust observations are available from a recent dust storm, they will be used to confirm the location of the dust source(s) that correspond with the Sensit activity and elevated  $\text{PM}_{10}$  concentration. Video will be used to identify a source or sources that were not identified by observations, Sensit data or  $\text{PM}_{10}$  information. Wind speed and wind direction data will be used to help determine if a lake bed dust source could have caused elevated  $\text{PM}_{10}$  concentrations. All of the trigger information will be used to identify any lake bed dust source area to initiate a dust source survey and/or surface inspection. The survey should be completed the same day if weather conditions are favorable. For larger areas, surveying may continue for several days or until precipitation obscures the boundaries of the source area.

In addition to the above process, general field inspections will be completed after dust storms to verify lake bed emission activity and the need for a survey. A survey will be completed if the trigger data and /or field inspections indicate emissive conditions in an area that has not been previously surveyed during the current dust period (Section 4.3) or in an area that has been previously surveyed but has increased in size since its last survey. The priorities for completing a survey are:

- 1) new lake bed source areas outside the instrumented Sensit network;
- 2) new lake bed source areas that have not been surveyed within the instrumented Sensit network; and
- 3) lake bed source areas that have previously been surveyed.

#### 4.2.3.2 GPS Mapping Procedures

After a dust source is identified by dust observation, Sensit data, sand catch data, video,  $\text{PM}_{10}$  concentration or inspection of the lake bed surface, District staff will map the exterior boundary of as many of the source areas identified as possible during daylight hours, as weather conditions allow. The mapping will begin as soon as possible after a dust storm and continue until all the identified areas are mapped or precipitation occurs. The boundary of the emissive area(s) will be mapped using a Global Positioning System (GPS). Surveyors conducting the mapping will ride an ATV or walk around the outer boundary of the wind-damaged surface surveying a line with the GPS. A wind-damaged surface is defined as a soil surface with wind erosion evidence and/or aeolian deposition that has not been modified to an unrecognizable point by precipitation since the last identified dust storm.

GPS line data should be collected at an interval of one record every 10 seconds or less. Data should be collected in NAD83 UTM Zone 11 coordinates. Only GPS units capable of continuously recording line data will be used. Data should be processed and corrected using base station data (either from a commercial correction service or using data from the District's Keeler base station) to ensure positional accuracy.

Before beginning a survey, the edge of the source area is determined by a visual review of the surface conditions within a representative one square meter area along the edge of the source area. An undamaged surface is evident if there is no visible evidence of a disturbed lake bed surface due to wind damage. As an aid to calibrate the level of disturbed surface, a surveyor will

begin each survey by estimating the percentage of surface that is undamaged by the wind. The surveyor visually determines where a surface with 70 to 80 percent of undisturbed surface is located. The surveyor completes the survey by following a line of travel that closely represents the initial one-meter calibration. The following defined list, Boundary Conditions and Survey Procedures (see below), can be used to determine how to map the source boundary under differing surface boundary conditions.

#### Boundary Conditions and Survey Procedures:

- Distinct Boundary:** A visibly sharp transition, 25 feet or less in width, between a wind-damaged lake bed surface and an undamaged lake bed surface. The surveyor should travel directly along this distinct outside edge, if possible, and may deviate 25 feet to the inside or outside on occasion. Small (25-foot wide or less) channels, boundary indentations, roads, mounds, and other obstacles may be directly crossed if the continuation of the main source boundary is clearly visible on the opposite side.
- Diffuse Boundary:** A visibly distinct transition, 25 to 100 feet in width, between a wind-damaged lake bed surface and an undamaged lake bed surface. Every effort should be made to travel along the outermost edge of the visible distinction.
- Indistinct Boundary:** A boundary that is not obvious to the surveyor where the edge of the source is located. Mapping would be stopped at this point until a Distinct or Diffuse Boundary can be located.

Generally the surveyor will maintain a constant course of travel following the Distinct Boundary of the wind-damaged area. As the boundary becomes less distinct, it is recommended to move the course of travel further into or outside the source to maintain recognition of surface damage. It is acceptable to travel within approximately 50 feet of the outer or inner edge of the larger more noticeable active area if the boundary is Diffuse. When encountering an Indistinct Boundary condition, the surveyor should note if the boundary can be found or if the boundary cannot be mapped during the existing survey and why. If the boundary cannot be mapped, the survey shall end at that point leaving an unclosed source area polygon.

It is possible for the surveyor to find himself or herself greater than 50 feet within or outside of the source area boundary. When this happens, the surveyor should turn perpendicular to the direction they were traveling and travel in the direction where the distinct edge should be located. For example, if the surveyor were inside the source area, they would turn in the direction where erosion evidence was not observed earlier along their path. If the surveyor were outside the source area, they would turn toward the side where they previously observed the source. Boundary loss may occur because of an Indistinct Boundary or unfavorable lighting conditions. The time and coordinates should always be noted when it is necessary to relocate the boundary during a survey.

Another alternative for relocating a source area edge is to pause the GPS unit from recording data until the boundary is located and then resume with data collection. This allows the surveyor to travel in any direction until the edge is relocated or end the survey if an edge cannot be located. The line produced between the point where the GPS unit was paused and then restarted would be deleted and considered un-surveyed during post processing.

The presence of Indistinct Boundaries or conditions that cause the ending of a survey must be annotated on the GPS data or explained in the field notes, including point coordinates. Examples would include dust storm, precipitation, lightning, mud, and channel with flowing water, pond, and time constraint or equipment malfunction.

#### 4.2.4 Using Sand Flux Monitors to Map Source Area Boundaries

Dust source area boundaries can be delineated or refined using default cell boundaries represented by active sand flux monitors. The area represented by the active SFM site may be shaped to exclude known non-emissive areas, such as; DCM areas, wetlands, or areas with different soil texture where there is evidence that it is non-emissive.

### 4.3 Composite Dust Source Map Development

Data Processing will compile the cumulative mapping information from the visual observers and field inspections using the GPS into a GIS database for two periods each year, December through June and July through November. A new composite map will be developed for each period containing only those data collected during that period. Hand drawn observation maps will be scanned and translated into the GIS database. Observation maps will be compared with source area locations from other methods through the GIS generated layers. Overlays of the maps generated from sand flux monitors, video cameras, visual observers and GPS'd source areas will be compared qualitatively, considering the information may have been collected at different times.

## 5. Protocol for Determining K-factors and PM<sub>10</sub> Emission Rates from Sand Flux Data

### 5.1 Objective

The objective of this portion of the Dust ID Program is to estimate the PM<sub>10</sub> emission flux for each cell or source area using the relationship  $PM_{10} \text{ emission flux} = \text{sand flux} \times K\text{-factor}$ . PM<sub>10</sub> emissions for each area will be used with the CALPUFF modeling system or other USEPA approved model to determine if the PM<sub>10</sub> emissions will cause or contribute to a NAAQS violation at the shoreline.

### 5.2 Method for Determining PM<sub>10</sub> Emissions and New K-factors

#### 5.2.1 PM<sub>10</sub> Emission Flux = Sand Flux x K-factor

PM<sub>10</sub> emissions will be estimated using the sand flux for each area represented by a Sensit and CSC and an appropriate K-factor for the area and period. The sand flux values will come from

the Sensit and CSC data as discussed in Section 2. New K-factors for each area and period will be developed as discussed in this section, and default K-factors will be used to model dust events unless newer K-factors are determined.

### 5.2.2 Default Temporal and Spatial Storm-average K-factors

PM<sub>10</sub> emissions may be estimated from default K-factors that were developed from previous dust events that occurred in the same area and the same range of calendar months in previous years.

The areas for K-factor groupings are shown in Figure 1.1: North Area, Central Area, Keeler dunes, and the South Area. Any new source area within the depicted boundaries will be associated with that area for the spatial grouping of new K-factor values. If a new source area and K-factor is developed for an area outside these boundaries, the area and default K-factor will be associated with the K-factor for an existing area with the most similar surface soil texture. The determination of the most similar existing area will be made by the Air Pollution Control Officer.

### 5.2.3 Method to Determine Sand Flux from Areas with Implemented Dust Control Measures (DCM)

Sand flux will be measured at sites within the shallow flood and managed vegetation DCM areas. Sensits and CSCs will be sited on dry areas within the shallow flood DCM to represent dry areas near the site. DCM areas covered with standing water will be assumed to have zero sand flux. For the Managed Vegetation DCM, sand flux sites will be placed in spatially representative areas and in areas within the DCM where wind blown dust may have been previously observed.

### 5.2.4 New K-factors Seasonal Cut-points

The APCO will review the K-factor data and propose seasonal cut-points to the LADWP. LADWP will respond to the proposed cut-points within 30 days. If no agreement can be reached within 60 days, the default periods will be used.

The two default periods to be used are: the winter/spring period that includes the months of December, January, February, March and April, and the summer/fall period that includes May through November. These same calendar months will be used to generate new temporal K-factors for each area and to generate new 75-percentile hourly K-factor values for modeling PM<sub>10</sub> emissions.

### 5.2.5 Using CALPUFF Modeling System to Generate New K-factors

New hourly K-factors can be inferred from the CALPUFF model by using hourly sand flux as a surrogate for PM<sub>10</sub> emissions. Modeled PM<sub>10</sub> predictions can then be compared to monitored concentrations at PM<sub>10</sub> monitor sites to determine the K-factor that would correctly predict the monitored concentration for each hour. More information on the modeling procedures is included in Section 6.

A K-factor of  $5 \times 10^{-5}$  will be used initially to run the CALPUFF model and to generate concentration values that are close to the monitored concentrations. Hourly K-factor values will then be adjusted in a post-processing step to determine the K-factor value that would make the modeled concentration match the monitored concentration at the PM<sub>10</sub> monitor site. The initial K-factor will then be adjusted using Equation 5.2.

Equation 5.2

$$K_f = K_i \left( \frac{C_{obs.} - C_{bac.}}{C_{mod.}} \right)$$

Where,

$K_i$  = Initial K-factor ( $5 \times 10^{-5}$ )

$C_{obs.}$  = Observed hourly PM<sub>10</sub> concentration. [ $\mu\text{g}/\text{m}^3$ ]

$C_{bac.}$  = Background PM<sub>10</sub> concentration

$C_{mod.}$  = Model-predicted hourly PM<sub>10</sub> concentration. [ $\mu\text{g}/\text{m}^3$ ]

#### 5.2.6 Screening Hourly K-factors

K-factors will be calculated for every hour that has active sand flux in cells upwind from a PM<sub>10</sub> monitor. These hourly K-factors will be screened to remove hours that did not have strong source-receptor relationships between the active source area (target area) and the downwind PM<sub>10</sub> monitor. For example, the screening criteria will exclude hours when a PM<sub>10</sub> monitor site is located on the edge of a dust plume. Because the edge of a dust plume has a very high concentration gradient, a few degrees error in the plume direction could greatly affect the calculated K-factor.

The following criteria will be used to screen the hourly K-factors:

##### Initial K-factor Screen

- 1) Wind speed is greater than 5 m/s at 10 m height at any network site.
- 2) Hourly modeled and monitored PM<sub>10</sub> concentrations were both greater than  $150 \mu\text{g}/\text{m}^3$  at the same monitor-receptor site.
- 3) Hourly wind direction as listed in Table 5.1 for each monitor site.
- 4) The mean sand flux for all sites with non-zero sand flux is greater than  $0.5 \text{ g}/\text{cm}^2/\text{hr}$ .

##### Final K-factor Screen

- 5) At least one sand flux site located within the target area and within a 30-degree upwind cone has sand flux greater than  $2 \text{ g}/\text{cm}^2/\text{hr}$ .

- 6) All sources are within a distance of 15 km of the receptor.
- 7) More than 65 percent of the PM<sub>10</sub> contribution at a monitor site came from the target source area (North Area, South Area, Central Area or Keeler dunes).
- 8) Eliminate hours when sand flux data are missing from one or more cells that are located within a 30-degree upwind cone and within 10 km of the shoreline monitor. For Olancha and Lone Pine, which are both located 5 to 10 km from the lake bed, the distance limitation is changed to 10 km upwind of the shoreline.

**Table 5.1 Wind Directions for the Initial K-factor Screen**

<b>PM<sub>10</sub> Monitor Site</b>	<b>From-the-Lake Wind Dir. (Deg.)</b>	<b>Met Tower</b>
Lone Pine	110 $\leq$ WD $\leq$ 190	Lone Pine
Keeler	130 $\leq$ WD $\leq$ 330	Keeler
Flat Rock	210 $\leq$ WD $\leq$ 360	Flat Rock
Shell Cut	WD $\geq$ 210 or WD $\leq$ 50	Shell Cut
Dirty Socks	WD $\geq$ 220 or WD $\leq$ 65	Dirty Socks
Olancha	WD $\geq$ 320 or WD $\leq$ 55	Olancha
Bill Stanley	50 $\leq$ WD $\leq$ 190	Bill Stanley
New Sites	TBD	TBD

The from-the-lake wind directions for the initial K-factor screening criterion 3) are shown in Table 5.1. From-the-lake wind directions for any new PM<sub>10</sub> sites will be determined by the APCO as needed for the initial K-factor screen. Note that 'From-the-Lake' wind directions for assessing the lake bed impacts at PM<sub>10</sub> monitor sites (see 2008 SIP) are different from these K-factor screening wind directions.

Hourly K-factors that pass through the screening criteria will be used to develop new event-specific spatial K-factors, and new 75-percentile hourly average temporal and spatial K-factors, if enough K-factors are available.

### 5.3 Temporal and Spatial Event-specific K-factors

#### 5.3.1 Event-Specific K-factors

Screened hourly K-factors will be used to generate event-specific K-factors for the active source areas. The event-specific K-factor will be calculated as the arithmetic average using all the hours when the hourly K-factor passes the screening criteria for the target area.

### 5.3.2 Temporal & Spatial 75-Percentile K-factors

The statistical 75-percentile value will be determined from the distribution of the hourly K-factors that pass the screening criteria for that area and period, whenever there are nine or more hourly K-factors. The 75<sup>th</sup> percentile will be calculated using the Microsoft Excel PERCENTILE function. The Microsoft Excel PERCENTILE function works by sorting values from lowest to highest, then assigns the 0<sup>th</sup> percentile is the lowest value, the 100<sup>th</sup> percentile is the largest value, and the values in between as  $(k-1)/(n-1)$  where  $n$  is the number of data values in the list and  $k$  is index of the  $k^{\text{th}}$  lowest value in the list. Thus, each value is placed  $1/(n-1)$  apart. If a requested percentile does not lie on a  $1/(n-1)$  step, then the PERCENTILE function linearly interpolates between the neighboring values.

### 5.3.3 Default K-factors

Table 5.2 shows the default K-factors for each of the K-factor areas and periods. These K-factors are derived for the temporal and spatial 75-percentile values from the screened hourly K-factors for the 30-month Dust ID period used for the RSIP. Each of the two temporal periods combines hourly K-factors from the same calendar periods for 2 or 3 years.

**Table 5.2 - Default Spatial and Temporal K-factors for the Dust ID Model**

AREA	K-factor Jan.– Apr. & Dec.	K-factor May-Nov.
Keeler Dunes	$7.4 \times 10^{-5}$	$6.0 \times 10^{-5}$
North Area	$3.9 \times 10^{-5}$	$1.5 \times 10^{-5}$
Central Area	$12. \times 10^{-5}$	$6.9 \times 10^{-5}$
South Area	$4.0 \times 10^{-5}$	$1.9 \times 10^{-5}$

## 6. Protocol For Dispersion Modeling

This section of the *Protocol* discusses the dispersion model methods planned for the simulation of wind blown dust at Owens Lake using data from the Dust ID Program. The modeling procedures follow the methods used in the RSIP, with refinements based on experience and modifications to support the provisions of the SCR. The modeling techniques will be used both diagnostically to infer emission rates for source areas and prognostically to predict  $PM_{10}$  concentrations at the historic shoreline. Following an overview of the modeling approach, the remainder of this section discusses construction of the meteorological data set, dispersion model options, background concentrations and source area characterization.

### 6.1 Overview of Modeling Procedures and Rationale for Model Selection

The CALPUFF modeling system was used in the RSIP and has been selected for continuing studies in the Dust ID Program. CALPUFF is the USEPA recommended modeling approach for long-range transport studies and USEPA has proposed CALPUFF as a *Guideline Model* to be

included in the *Guideline on Air Quality Models* (40 CFR Part 51, Appendix W). Recently the modeling system is also being applied to near-field dispersion problems where the three-dimensional qualities of the wind field are important and for stagnation episodes when pollutants remain within the modeling domain over periods of several hours or more. Dust events on Owen Lake are sometimes influenced by complex wind patterns, with plumes from the North Sand Sheet traveling in different directions than plumes from the South Sand Sheet.

The proposed model domain shown in Figure 6.1 includes a 34 km-by-48 km area centered on Owens Lake. The meteorological and computational grid will use a one-kilometer horizontal mesh size with ten vertical levels extending from the surface to four kilometers aloft. The extent of the model domain was selected to include the “data rich” Dust ID Program study area, terrain features that act to channel winds, and receptor areas of interest. This same model domain and mesh size were used in the simulations supporting the RSIP.

## 6.2 Meteorological Data Set Construction

Three-dimensional wind fields for CALPUFF will be constructed from surface and upper air observations using the CALMET meteorological preprocessor program and the procedures employed in the RSIP. CALMET combines surface observations, upper air observations, terrain elevations, and land use data into the format required by CALPUFF. Winds are adjusted objectively using combinations of both surface and upper air observations according to options specified by the user. In addition to specifying the three-dimensional wind field, CALMET also estimates the boundary layer parameters used to characterize diffusion and deposition by the CALPUFF dispersion model.

## 6.3 CALPUFF Options and Application

**Surface Observations.** The necessary surface meteorological data will come from the District’s network of ten-meter towers shown in Figure 1.1. The District may also install additional stations to better characterize winds near suspect source areas not currently near an existing site. Very few periods of missing data are typically contained in the District’s database. Periods of missing data will be flagged and CALMET will construct the wind fields using the data from the remaining stations. In addition to the District’s network, surface data from other field programs at Owens Lake will be used when available.

**Cloud Cover Data.** The current version of CALMET also requires cloud cover and ceiling height observations. Cloud cover is a variable used by CALMET to estimate the surface energy fluxes and, along with ceiling height, is used to calculate the Pasquill stability class. Hourly cloud cover and ceiling height observations are being collected from the surrounding surface airways observations at China Lake and Bishop Airport. During dust event conditions, the sensitivity of the CALPUFF modeling system to these variables is reduced, as the stability class becomes neutral under moderate to high winds. Algorithms within the modeling system that depend on the surface energy fluxes are dominated by the momentum flux and tend to be insensitive to cloud cover under high winds. For these reasons, the absence of local cloud cover and ceiling height measurements are not expected to significantly affect the results of the modeling study.

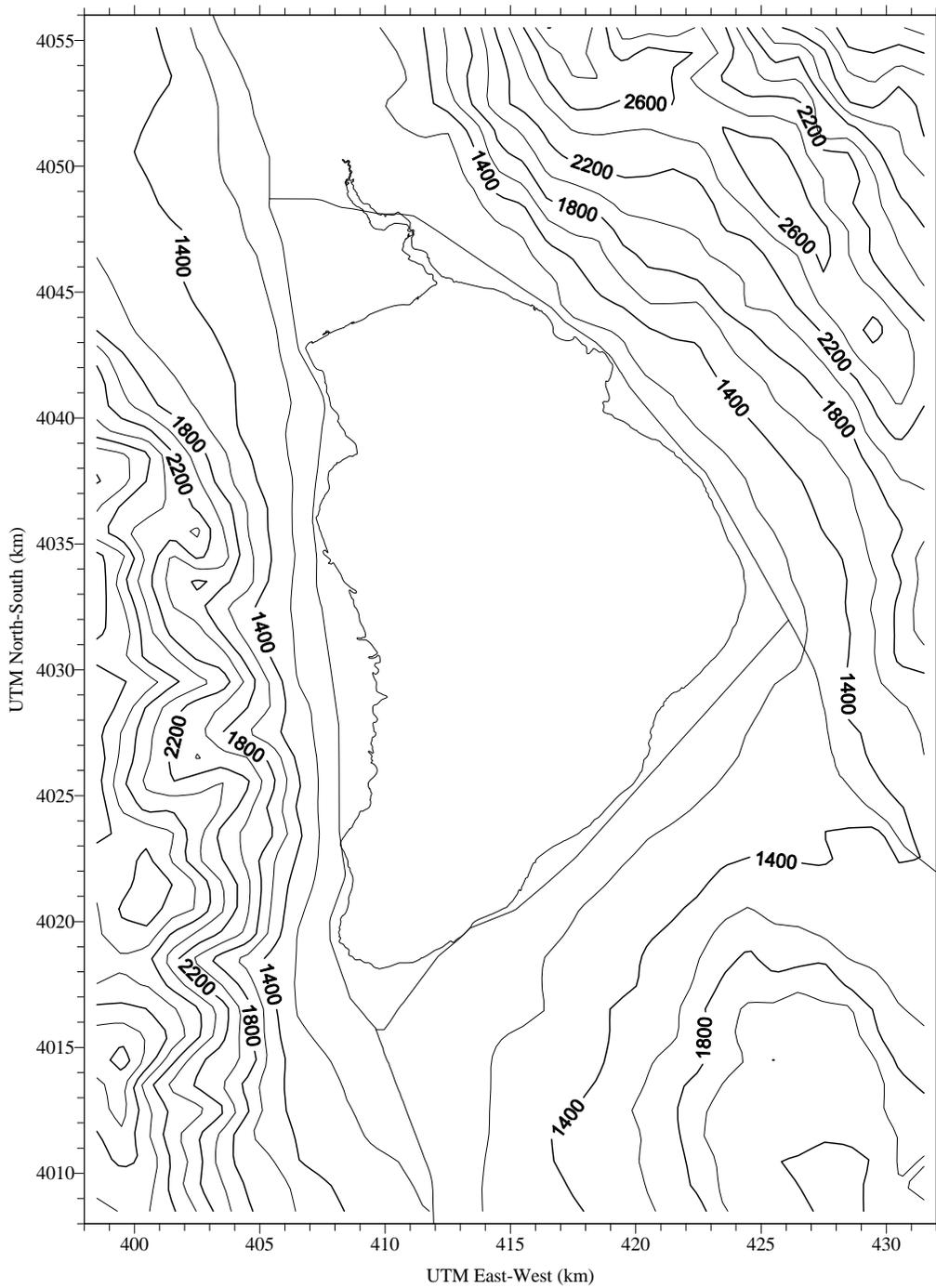


Figure 6.1 - Model Domain, elevation contours and UTM coordinates for the Dust ID Model

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**Surface Characteristics and Terrain.** The CALPUFF modeling system requires land use and terrain data. These data are used by CALMET to adjust the wind field and affect the calculations performed by the CALPUFF dispersion model. CALPUFF considers spatial changes in land use, including the surface roughness, and the input data are specified on a horizontal grid. The terrain data influence the constructed wind fields and plume trajectories in regions of sparse observations. Land use and terrain data have been obtained from the U.S. Geological Survey (USGS) data sets on the Internet. The resolution of these land use and terrain data sets are 200 m and about 30 m, respectively. The District has prepared these data sets using the pre-processing software provided with the CALPUFF modeling system. The resulting grids have been plotted and checked against data from the District's GIS database where the modeling domain overlaps the District's data. The 1-km mesh size terrain used by CALMET and CALPUFF is shown in Figure 6.1.

**Upper air data.** Upper air data will be collected from a number of different sources for construction of the wind fields and estimation of mixing heights with CALMET. In the RSIP, both local and regional data were collected as follows:

- A 915 MHz Radar Wind Profiler and Radio Acoustic Sounding System (RASS) were used to collect upper level wind and temperature measurements. The Wind Profiler was initially located at Dirty Socks then moved to the Mill Site during the 4<sup>th</sup> quarter of 2001. The District discontinued measurements with the Wind Profiler on June 30, 2003. The Wind Profiler with RASS samples wind and temperature from 100 m, up to 5000 m with a vertical resolution as low as 60 m depending on the clutter environment, atmospheric scattering conditions, and pulse length. Experience at Owens Lake indicates wind data recovery is sometimes poor above 1000 m due to the dry environment and the RASS data are limited to the lower levels during windy conditions.
- Regional twice-daily upper air soundings from Desert Rock Airport (Mercury, Nevada) and China Lake Naval Air Station.

During high wind events, observations from the Wind Profiler at both the Mill Site and Dirty Socks indicate very little wind speed or wind direction shear with height. Previous CALPUFF simulations suggest concentrations predicted at PM<sub>10</sub> monitoring sites and at the historical shoreline are not usually influenced by upper level winds because the sources are ground based. The highest impacts occur close to the source areas, and there is very little wind shear during high winds.

Following removal of the Wind Profiler, soundings from China Lake and Desert Rock will be used to construct the data set. The China Lake and Desert Rock sounding will primarily be used for upper level temperature lapse rates. Winds aloft will be based on extrapolation of the surface wind measurements. The default algorithms employed by CALMET based on Similarity Theory often adjust the winds in the wrong direction and predict too much increase in wind speed with height even for very small surface roughness lengths. As an alternative, wind speeds aloft will be adjusted using the empirical results suggested by the previous Wind Profiler measurements. No wind direction turning with height will be assumed except near the Wind Profiler site where the actual data will be used until this program is discontinued.

**CALMET options.** The options employed for the application of CALMET to construct the wind fields were provided in the “Modeling Protocol” (MFG, 2001). The majority of the selected model options are based on the defaults incorporated in the code by the model author. Notable model options include:

- Ten vertical levels varying geometrically from the surface to 4000 m. The geometric spacing provides better resolution near the surface and the upper limit is high enough to be above the boundary layer height.
- Vertical extrapolation of surface winds aloft using the results of the Wind Profiler studies.
- Less than default smoothing of wind fields. LADWP contractors Air Sciences and Environ suggested less smoothing of the wind fields by CALMET after review of the *Owens Valley PM<sub>10</sub> Attainment Demonstration Modeling Protocol*.

Wind fields constructed with CALMET will be randomly checked by plotting the resultant fields and the surface observations on a base map. The CALDESK™ software package will also be used to view the CALMET wind fields.

The application of CALPUFF involves the selection of options controlling dispersion. Although the simulations are primarily driven by the meteorological data, emission fluxes, and source characterization, the dispersion options also affect predicted PM<sub>10</sub> concentrations. The model options used in the RSIP will continue to be used for the Dust ID Program. In this study, the following options will be used for the simulations:

- Dispersion according to the conventional Pasquill-Gifford dispersion curves. Sensitivity tests were also performed by applying CALPUFF with dispersion routines based on Similarity Theory and estimated surface energy fluxes. These tests did not indicate improved performance over the Pasquill-Gifford based simulations.
- Near-field puffs modeled as Gaussian puffs, not elongated “slugs.” CALPUFF contains a computation intensive “slug” algorithm for improved representation of plumes when wind directions vary rapidly in time. This option was tested, but did not significantly influence the CALPUFF predictions.
- Consideration of dry deposition and depletion of mass from the plume. The particle size data used will be based on measurements taken within dust plumes on Owens Lake as discussed below.

Dry deposition and subsequent depletion of mass from the dust plumes depend on the particle size distribution. Several field studies have collected particle size distributions within dust plumes at Owens Lake. Based on results from Niemeyer, *et al.* (1999), the CALPUFF simulations will assume a lognormal distribution with a geometric mean diameter of 3.5 μm and a geometric standard deviation of 2.2.

## 6.4 Background PM<sub>10</sub> Concentrations

The dispersion model simulations include only wind blown emissions from the source areas with sand flux activity measurements. During high wind events other local and regional sources of fugitive dust can contribute to the PM<sub>10</sub> concentrations observed at the monitoring locations. In the RSIP a constant background concentration of 20 µg/m<sup>3</sup> was added to all predictions to account for background sources. The constant background was calculated from the average of the lowest observed PM<sub>10</sub> concentrations for each dust event when 24-hour PM<sub>10</sub> concentrations at any of the sites were above 150 µg/m<sup>3</sup>. To avoid including impacts from lake bed dust source areas in the background estimate, the procedures used a simple wind direction filter to exclude hours when the lake bed may have directly influenced observed PM<sub>10</sub> concentrations. Such hours were removed and daily average background concentrations were recalculated based on the remaining data.

Additional PM<sub>10</sub> monitors are proposed for installation at Owens Lake. These monitors can be used to measure hourly PM<sub>10</sub> concentrations upwind from lake bed source areas. Some of these monitors may be representative of regional PM<sub>10</sub> concentrations and others may be influenced by local sources that may indicate a higher PM<sub>10</sub> concentration than the regional background level. A method to calculate background concentrations based on upwind monitor concentrations for each modeled-event approved by both the APCO and the General Manager of the LADWP may be developed in the future. Meanwhile, a default background of 20 µg/m<sup>3</sup> will be added to the model prediction for each receptor location.

## 6.5 Area Source Characterization

CALPUFF simulations at Owens Lake are sensitive to source configuration. Emissions will be varied hourly according to the methods described in Section 6.6 and dust sources represented as rectangular area sources. CALPUFF contains an area source algorithm that provides numerically precise calculations within and near the area source location. The area source configuration used for the Dust ID model run for the period from July 2002 through June 2003 is shown in Figure 6.2. The paired Sensit and CSC measurements were assumed to be representative of the horizontal sand flux for irregularly shaped source areas near the sand flux site. Field observers determined the size and shape of the source areas based on GPS mapping after the storms, observation maps made during the storms, and physical surface characteristics. All source areas were represented by sand flux measured at a single site that was applied to a series of 250 m x 250 m cells that were configured to conform to the general shape of the source area represented by the sand flux site.

The following general rules are used to characterize and map source areas on the lake bed:

- Actual source boundaries will be used when available to delineate emission sources in the simulations. Actual source boundaries will be determined using a weight-of-evidence approach considering visual observations, GPS mapping, and surface erosive characteristics. Erosive characteristics that might be considered when defining a source boundary include properties of the soil, surface crusting, wetlands, and the proximity of the brine pool and existing DCMs.

- Source boundaries will also be defined based on the DCM locations. For example, sand flux measurements outside the DCM will be assumed to apply up to the boundary of the DCM. Sand flux measurements inside the DCM will be assumed to apply to the area inside the DCM.
- All source areas will be represented by a series of 250 m x 250 m cells that generally conform to the shape of the source area and share the same hourly sand flux rates as the sand flux site representing that source area. Cells small than 250 m x 250 m may be used near the shoreline to better represent source areas where predicted concentrations are expected to be particularly sensitive to the source area configuration. (Figure 6.2)

## **6.6 Estimation of PM<sub>10</sub> Emissions**

Hourly PM<sub>10</sub> emissions for each source area will be estimated using Dust ID sand flux data and K-factors following the procedures described in Section 5. See also SCR Section 1.2 and 2.1 regarding the order of priority for using K-factors for modeling.

## **6.7 Simulation of Shoreline Concentrations**

Under the provisions of the SCR in the RSIP, CALPUFF simulations will be used to assess whether lake bed source areas cause or contribute to an exceedance of the PM<sub>10</sub> NAAQS in areas without PM<sub>10</sub> monitoring sites. Predictions will be obtained using the RSIP receptor network that contains more than 460 receptor locations placed at the historic shoreline (approximately at the 3600' elevation) of Owens Lake (see Figure 6.2). The receptor spacing along the historic shoreline ranges from 100 to 200 m. Note in several locations along the shoreline, receptors are very close to or even within potential source areas (see Figure 6.3).

## **7. Owens Lake Safety & Training Program**

### **7.1 Objective**

All field personnel that work at Owens Lake are required to complete special training courses to deal with the unique hazards and environmental precautions that must be considered when working on the lake bed. Training includes: first aid and CPR training, proper ATV use, respiratory protection and dust safety, lake bed access reporting, and snowy plover protection.

### **7.2 Safety Requirements**

Safety is the first priority while working at Owens Lake. Training requirements are required for every worker at the lake for their own safety. Dust storms can start within minutes exposing workers to dust and sand. Lightning storms often occur in the summer. Winters have sub-freezing temperatures and summers have temperatures well above 100 degrees. Access is usually restricted to ATV's and can change often throughout each year. The objective of all the training requirements is to put safety as the highest priority at all times.

## Chapter 8 - Enabling Legislation to Implement Control Strategy

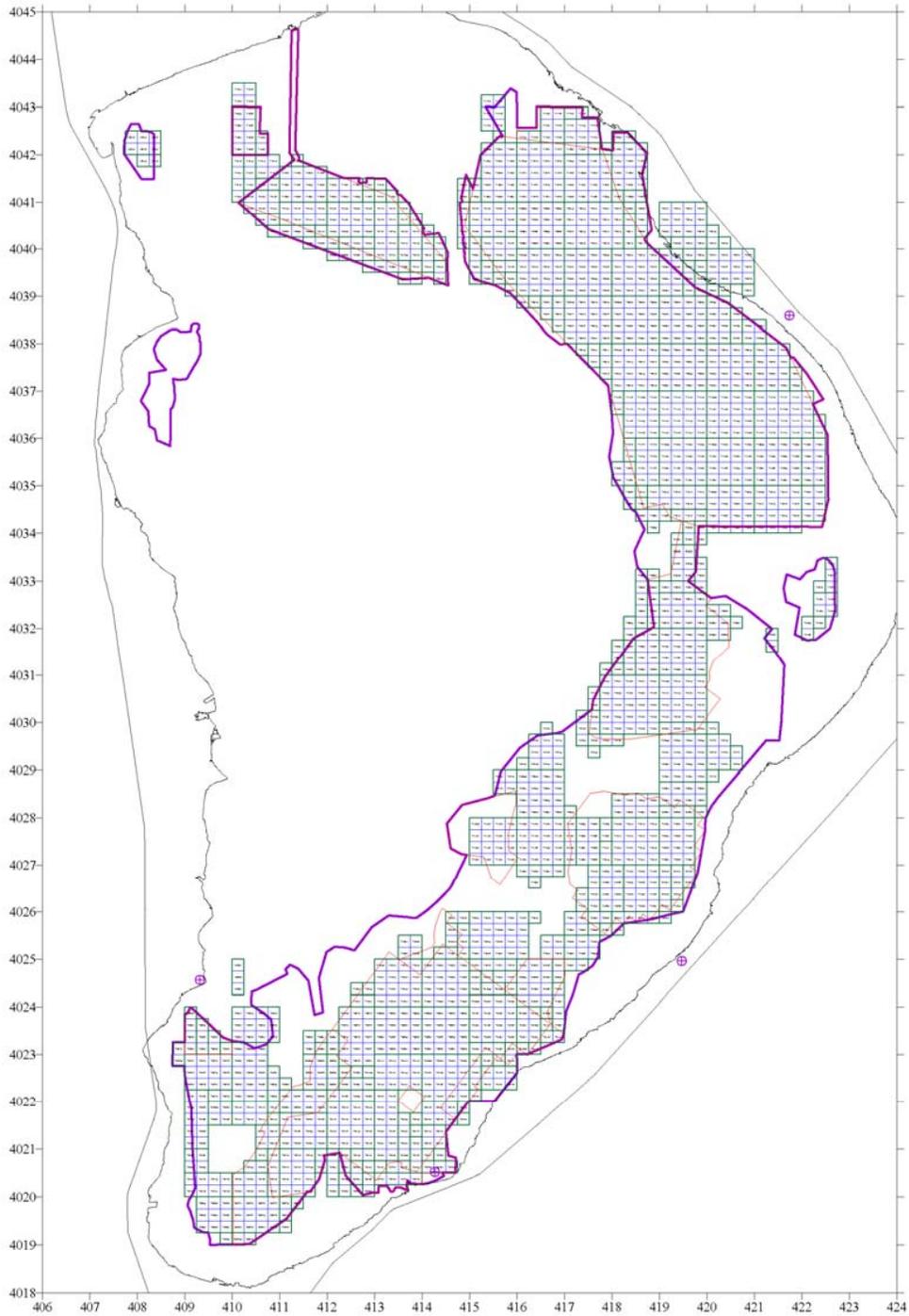


Figure 6.2 - Area source configuration using 250 m x 250 m cells for July 2002 through June 2003 Dust ID model run. Purple lines represent the control area boundary used with the Settlement Agreement.

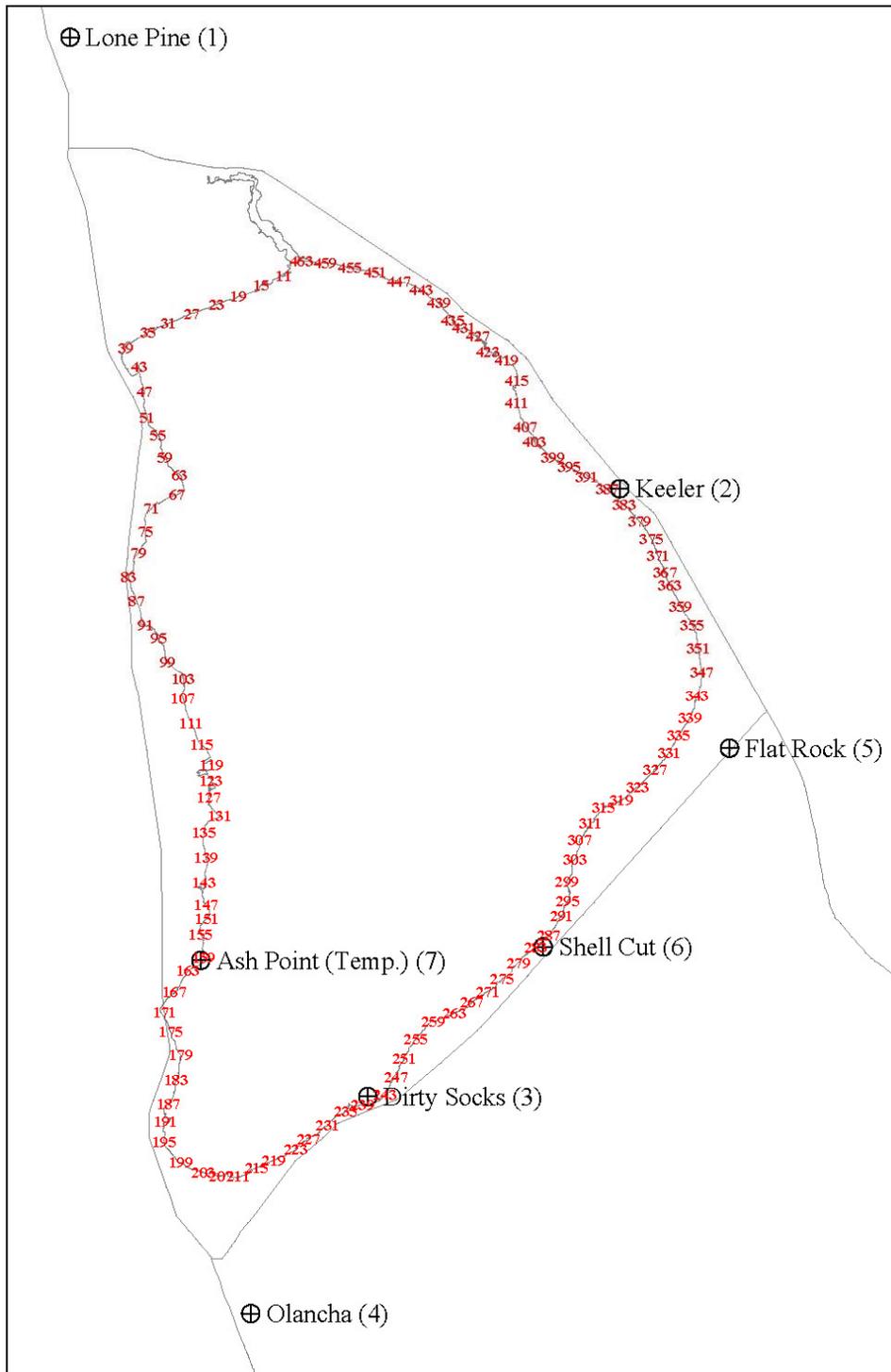


Figure 6.3 -The Dust ID model evaluates PM<sub>10</sub> impacts at over 460 receptor locations around Owens Lake.

All personnel that are involved with any fieldwork under the Dust ID Program are required to complete all safety training before working on the lake. Everyone must report going onto and leaving the lake. Workers are required to stop work and leave the lake when a dust storm starts. Every field worker will be issued a respirator, goggles for eye protection and earplugs to be used when caught in a dust storm while leaving the lake. Workers are required to leave the Keeler office when the dust impacts Keeler and the TEOM monitor reading exceeds  $1000 \mu\text{g}/\text{m}^3$ . Respirator training and face fits will be completed annually. First Aid and CPR training and successful certification is required every three years. Snowy Plover training is required before any new worker can start work on the lake. Other safety issues that all workers will be informed of include the proper use of tools, special weather conditions such as temperature extremes, rain and lightning and training in the operation of ATVs.

### **7.3 Reporting Procedure for Working on the Lake and Contacts**

1. Normal work hours on the Owens Lake are defined as sunrise to 4:45 PM, Monday through Friday. The lake is defined as any area below the 3600 ft. contour.
2. Every person or group must call the Bishop office and leave a message or speak to the Administrative Specialist (AS) to notify that they are working on the lake. They also must inform the AS what area of the lake they will be working. Examples: DIVIT, Dirty Socks sand sheet, "A" Met tower or any commonly used identifiable name of a site or area you will be working.
3. The AS will record the person's name (s) and area of the lake they are working on.
4. Every person or group working on the lake must notify the Bishop office before 4:45 PM on the same day; that they have left the lake OK. This must be done or a person will be sent out to look for you! False alerts will not be appreciated.
5. The AS will call the Director of Technical Services (DTS) in Keeler or one of the back up persons in order on the list below, and report the missing person if not notified before the specified time. An attempt will be first made to contact the missing person by phone and determine their situation. The DTS or an assigned person will begin a search for the missing person if the person cannot be contacted by phone. The search will continue until dark or unsafe conditions at which time the Inyo Sheriff will be notified for assistance.
6. Everyone may work outside normal work hours Monday through Friday at your own risk. However, they must call the Bishop office before the designated time and notify the AS that they will be working past 4:45 PM and call again and leave a message that they left the lake OK before 8:00 AM the next day.
7. The AS will check the messages every morning and record the information. The DTS will be notified if a person that worked after normal hours did not call and leave a message that they left the lake OK. The DTS or an assigned person will follow the procedure for a missing person outlined in step 5.

8. Nobody may work on the lake after 4:45 PM on Friday, all day Saturday or Sunday unless they receive special permission from their direct supervisor. The supervisor will be responsible for making sure the worker left the lake OK and responding to an emergency or search if necessary. The worker must notify their supervisor when they leave the lake OK during these periods.

**Emergency Assistance Reporting Contacts and Phone Numbers (Area Code 760):**

**Call 911 first if you have an emergency!**

Bishop Office AS	872-8211	
Bill Cox (DTS)	876-8103	Cell 937-2886
Earl Wilson	876-8104	Cell 937-1060
Nik Barbieri	876-1803	Cell 937-6696
Grace Holder	872-8211	Cell 937-2887
Guy Davis	876-8115	Cell 937-1766
Dan Johnson	876-4544	Cell 937-1715
Ted Schade	872-8211	Cell 937-3360

**7.4 Snowy Plover Training and Other Wildlife Protection Procedures**

Field technicians and other District personnel and contractors are required to take precautions to avoid disturbing western snowy plovers during the nesting and brooding season which is from March 15 through August 30 each year. All lake bed personnel must complete snowy plover awareness and avoidance training before venturing onto the lake bed during snowy plover season. A qualified biologist will provide training for all lake bed personnel. In addition to completing snowy plover training, the plover protection program requires the following:

- Report snowy plover sightings to the District's biological resources monitor for dissemination to all lake bed personnel and for scientific data collection purposes. The biological resources monitor will map and mark the sightings in the case of nesting pairs, and will map the last known locations of broods. Lake bed workers will be responsible for checking the latest maps before encroaching onto potential snowy plover use areas.
- If snowy plover nests are found within areas of potential conflict with Dust ID monitoring, they will be marked in the field with green stakes. Within the buffer area demarked by stakes, the maximum allowable time per visit is 10 minutes.
- Field personnel should use established ATV and 4WD vehicle trails to approach and depart monitoring sites. The maximum allowable speed on ATV and off-road 4WD on the lake bed is 15 mph during the snowy plover season.

All existing and new Dust ID monitoring installations will be fitted with raptor perching deterrent (eg., Nixalite) at potential perch sites with a height of greater than 60 inches above the

playa surface. Maintenance of perching deterrents will be routinely performed. Any new construction that causes new ground disturbance during the snowy plover season will require a pre-construction survey for snowy plover use. A qualified biologist will perform the survey within 1 week prior to the start of construction.

Monitoring will be performed on site in a manner that is least disturbing to wildlife and plant resources as possible. Potentially affected upland resources (those located outside the playa) that could be disturbed during any new ground-disturbing construction activities were identified during District environmental analyses. The animals that use upland areas vary seasonally, with nesting and foraging birds, mammals, reptiles, and invertebrates occurring during the period of dust monitoring. No special training is required to work in upland areas during the dust monitoring season, however pre-construction wildlife and rare plant surveys are required if placement of new facilities at any time of year will cause new ground disturbance.

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**Board Order 080128-01  
Attachment D**

**2008 Procedure for  
Modifying Best Available Control Measures (BACM)  
for the Owens Valley Planning Area**

The City may transition from one approved BACM to another provided that the performance standard of one or the other BACM is met at all times during the transition, and that the City makes a complete and technically well-supported written demonstration of that performance, with a built-in margin of safety, to the satisfaction of the APCO in advance of any actions by the City to transition. There are three circumstances under which temporary modifications may be allowed to the BACM identified in this SIP, if certain conditions are met. The circumstances are:

1. Adjustments to existing BACM. Research to demonstrate that sufficient PM<sub>10</sub> control efficiency during the dust season can be achieved and the NAAQS can be attained everywhere on or above the historic shoreline with a different performance standard for an existing BACM.
2. Research on new BACM
3. Transition from one BACM to another that requires a time period where neither BACM's performance standards can be met.

The City may make an application for any of these modifications in writing to the APCO. The complete application must include all necessary data and other technical information to support the application. Except for the specific limitations set forth below for BACM adjustments to Shallow Flooding, the APCO shall have full and sole discretion to accept, reject or condition the City's application for modifications to BACM on Owens Lake, to require additional technical information, and/or to independently monitor the results of the project, and shall provide her/his decision in writing. This same discretion shall apply to the APCO's consideration of each of the other applications that the City may make as further described below. The APCO will consider and respond to comments made by the City regarding any decision by the APCO to reject, condition or modify an application. Failure by the City to comply with any condition of the project approval may result in the APCO revoking the project approval and directing closure procedures be implemented for the project.

The flexible BACM description under the terms of the Order preclude the application of the U.S. Environmental Protection Agency's Natural Events Policy for monitoring data used to make the determinations in this Attachment. All monitored PM<sub>10</sub> concentrations that meet the EPA quality-assurance requirements contained in 40 CFR Part 58 and are measured at stations located at or no more than 3 kilometers above the historic shoreline (shoreline monitors) will be used in the analysis. The monitored values will be used as measured, and will not be adjusted for from-the-lake and non-lake wind directions as they are for the Supplemental Control Requirements.

The modeling for the determinations will be performed in accordance with the 2008 Owens Lake Dust Source Identification Program Protocol (Board Order 080128-01, Attachment C).

## **1. ADJUSTMENTS TO EXISTING BACM**

### **A. BACM Adjustments to Shallow Flooding**

1. After approval of the 2008 SIP, the City shall have the option to conduct field testing to refine the wetness cover requirement to achieve 99 percent control efficiency in Shallow Flood areas within the boundaries of the 2003 Dust Control Area (Shallow Flood Cover Test).
  - A. The Shallow Flood Cover Test shall occur on one or more areas totaling not more than 1.5-square-miles, to be selected by the City and approved by the APCO, which approval shall not be unreasonably withheld, from within the TDCA areas requiring 99 percent control.
  - B. The Shallow Flood Cover Test design shall be prepared by the City and approved by the APCO, which approval shall not be unreasonably withheld, prior to implementation. Based on that design, the APCO will reasonably determine wetness cover requirements for the Shallow Flood Cover Test.
  - C. The City will be CEQA lead agency for the Shallow Flood Cover Test and shall secure all required responsible agency approvals, permits and leases.
2. If the APCO reasonably determines in writing that the PM<sub>10</sub> Dust Control Measures in the 2008 Total Dust Control Area (TDCA) have been operational for one continuous year (defined as 365 consecutive days) with no exceedance of the federal standard at monitors located at or above the historic shoreline caused solely by sources within the 2008 TDCA, the City shall be permitted to reduce the wetness cover by an average of 10 percent over those Shallow Flood areas requiring 99 percent control efficiency, excluding areas identified in Section A.2.C, below, provided that:
  - A. Application of the 10 percent reduction in wetness cover during the May 16 through June 30 Shallow Flood areal wetness cover reductions provided for in Paragraphs 15.A.ii and 15.B.ii of Board order 080128-01 shall result in the lower of:
    - i. The areal cover resulting from a 10 percent reduction; or
    - ii. The areal cover required in Paragraphs 15.A.ii and 15.B.ii of Board Order 080128-01.
  - B. To implement the reductions set out in this Section, the City shall be required to first submit a written Wetness Cover Plan to the District for reducing the wetness cover on the eligible areas. The Wetness Cover Plan shall take into account:

- i. The results of testing carried out pursuant to Section A.1, if conducted; and
    - ii. The results of fall and spring Shallow Flood wetness cover reduction operations carried out pursuant to Paragraphs 15.A.ii and 15.B.ii of Board Order 080128-01.
  - C. If, in any year, the Wetness Cover Plan proposes reductions in wetness cover greater than 10 percent in any portion of the Shallow Flood areas covered by the Plan (consistent with the 10 percent limit on the overall average reduction), the City shall obtain the additional written approval of the APCO, which approval shall not be unreasonably withheld.
  - D. In the event shoreline monitors show an exceedance of the federal standard, whether that exceedance is caused by sources within, outside, or both within and outside of the 2008 TDCA, no further reductions in wetness cover shall be permitted for any Shallow Flood area that has contributed to the exceedance, as determined by the methodology in the “2008 Owens Valley Planning Area Supplemental Control Requirements Procedure” (Attachment B) and subject to the provisions of Section A.4, below.
  - E. Except as provided in Section A.4, below, the City may continue to operate using reductions of wetness cover pursuant to a previously approved Wetness Cover Plan.
3. For each Dust Control Season (October 1 of each year through June 30 of the next year) that wetness cover reductions have taken place under the provisions of Section A.2, the City shall prepare and submit to the District a written report summarizing the results of the wetness cover reductions within 90 days after conclusion of the corresponding Dust Control Season. The report shall document the percentage of wetness cover for Shallow Flood areas and the effect(s) of wetness cover reductions on PM<sub>10</sub> concentrations at the historic shoreline.
4. Any areas for which wetness cover has been reduced pursuant to Section A.2 and that cause or contribute to an exceedance of the federal standard at the historic shoreline shall be remediated by the City under the Remedial Action Plan prepared pursuant to the requirements of Attachment B.
  - A. Subject to APCO written approval, which approval shall not be unreasonably withheld, the City may further reduce the wetness cover beyond that allowed in Section A.2 provided that:
    - i. The maximum 24-hour PM<sub>10</sub> shoreline monitor values for at least 365 consecutive days of operation following initiation of the last approved Wetness Cover Plan does not exceed 130 µg/m<sup>3</sup>; and
    - ii. The City demonstrates to the reasonable satisfaction of the APCO that the modeled contributions from the lake bed for the same time period set forth in

Section A.4.A.(i) plus the background of  $20 \mu\text{g}/\text{m}^3$  do not exceed  $120 \mu\text{g}/\text{m}^3$  at the historic shoreline.

- B. If the monitored values at the historic shoreline exceed  $130 \mu\text{g}/\text{m}^3$ , and it is determined that non-lake bed sources are contributing greater than  $20 \mu\text{g}/\text{m}^3$ , then the District will expeditiously seek to identify and require control of those non-lake bed sources so that the City may continue to implement efficient DCMs on the lake bed.
- C. If the City is entitled to further reduce wetness cover pursuant to this Section, the City shall prepare and submit an updated Wetness Cover Plan to the District to describe the wetness cover proposed for the subsequent, applicable Dust Control Season. The updated Wetness Cover Plan shall include:
  - i. A map that depicts the eligible Shallow Flood areas;
  - ii. The proposed amount of wetness cover for each eligible Shallow Flood area; and
  - iii. The method for determining effectiveness of the proposed wetness cover.
- D. The Wetness Cover Plan shall be subject to approval of the APCO, which approval shall not be unreasonably withheld.

## **B. BACM Adjustment to Measures Other than Shallow Flooding within Existing Dust Control Areas**

### Requirements to Begin the Process

At least once per calendar year after May 1, 2010, the District's APCO will make a written determination as to whether the Owens Lake bed will require additional  $\text{PM}_{10}$  controls in order to attain or maintain the federal 24-hour  $\text{PM}_{10}$  NAAQS. The APCO will use the procedure forth in Board Order 080128-01 to make the determination.

If the APCO determines that there were no monitored or modeled exceedances of the  $\text{PM}_{10}$  NAAQS as described above for the previous calendar year, each calendar year the APCO will do the following:

- 1) determine from the modeling if there are shoreline receptors where the model shows the combined predicted yearly maximum 24-hour contribution from all source areas on the lake bed contributing to those receptors plus background (24-hour average of  $20 \mu\text{g}/\text{m}^3$ ) is less than  $120 \mu\text{g}/\text{m}^3$ , and
- 2) determine that there were no concentrations greater than  $120 \mu\text{g}/\text{m}^3$  measured at any shoreline or near-shore monitoring site in the area of those receptors.

The City may perform an independent assessment using the data and methods of the Dust ID Protocol in order to confirm the APCO's findings. The APCO will consider and respond to the

City's assessment before making his/her final determination. The APCO has full and sole discretion to make this determination.

#### First Step on Test Areas

If there are receptors that meet the requirements described above, and provided that the City is in compliance with SIP control requirements on all areas of the lake bed, the APCO will inform the City that they may submit an application to reduce the level of control within a 1 to 2-square-mile test area of an existing Shallow Flooding Dust Control Measure (DCM) area or within a 160 to 320 acre test area of an existing Managed Vegetation DCM area that the modeling shows contributes to, and only to, the shoreline receptors described above where the yearly maximum 24-hour contribution from the lake bed plus background is less than  $120 \mu\text{g}/\text{m}^3$ . Application may be made for more than one area to be tested simultaneously provided the test areas do not impact any of the same modeled shoreline receptors or monitors (no overlapping impacts). The above limitations on test area size and location do not apply outside the boundaries of existing Dust Control Areas.

For the Managed Vegetation DCM, the cover may be reduced by no more than 5%, e.g. 50% to 45%, (one step). For other BACM or changes to compliance averaging areas (e.g., one acre for Managed Vegetation), the APCO will determine the permitted test area size, averaging area, test location and step amount. An area with a non-zero contribution to a receptor will be considered not to contribute to a receptor if the contribution from that area is less than  $5 \mu\text{g}/\text{m}^3$  and the yearly maximum 24-hour contribution from the lake bed plus background ( $20 \mu\text{g}/\text{m}^3$ ) to that receptor is less than  $140 \mu\text{g}/\text{m}^3$ . (A "zero contribution" is defined by the accuracy of the instruments used to collect the data, but in no case shall it be greater than  $1 \mu\text{g}/\text{m}^3$ .) The City may also satisfy the requirements of a BACM test for Managed Vegetation with documentation of a site-specific BACM test, along with written justification for more general application of the results of this test.

The City's application to reduce the level of control over any area within the boundaries of existing Dust Control Areas must be accompanied by a modeling analysis that demonstrates that increasing  $\text{PM}_{10}$  emissions within the test area will not cause the predicted yearly maximum 24-hour concentrations along the shoreline to exceed  $120 \mu\text{g}/\text{m}^3$ , including background ( $20 \mu\text{g}/\text{m}^3$ ).

The application must also include, but is not limited to:

- 1) a project description,
- 2) site plan,
- 3) any necessary environmental documentation, responsible agency approvals, permits and leases,
- 4) a protocol to measure  $\text{PM}_{10}$  emissions and performance standards,
- 5) a time frame for project milestones and completion,
- 6) plans to control  $\text{PM}_{10}$  emissions if they exceed project limits,
- 7) project closure procedures if the project is discontinued,
- 8) soil texture information, soil chemistry, groundwater chemistry and applied water chemistry, and

- 9) a protocol to evaluate control effectiveness, estimate emissions and determine whether the results are transferable to other areas of the lake bed.

For BACM other than Shallow Flooding, the City will submit a relationship between control efficiency and performance standards based upon research results. The APCO has full and sole discretion to accept, reject, or modify that relationship. All modeling will be done according to the Dust ID Protocol.

Rectified aerial or satellite images of the area of adjusted BACM, or any other method approved by the APCO, will be used by the APCO to determine the performance standards for the adjusted BACM for this step and all subsequent steps.

All raw data must be shared with the APCO, and all data screening criteria must be approved (or disapproved) in writing by the APCO. The APCO may terminate the test at any time if modeling or monitoring show that modeled (including background of  $20 \mu\text{g}/\text{m}^3$ ) or monitored emissions are increasing above trigger levels set by the APCO based upon a  $140 \mu\text{g}/\text{m}^3$  modeled or monitored  $\text{PM}_{10}$  concentration at the shoreline, or if the City is not following the APCO-approved protocol. The APCO has full and sole discretion to determine whether these conditions have been met.

The APCO has full and sole discretion to approve or reject the City's application or require conditions. The APCO will take action and notify the City in writing within 90 days of receipt of the written application. No changes may be made to BACM in advance of the APCO's approval. Any adjustments to BACM will be reported to EPA by the APCO within 60 days of the APCO's approval.

#### Subsequent Steps on Test Areas

The adjusted BACM shall be maintained by the City for one year. No other adjustments to BACM may be made during that year that impact any of the same set of model shoreline receptors. At the end of the year, the City may submit a new application to the APCO to reduce the level of control in the test area by another step provided:

- 1) the modeled yearly maximum 24-hour contribution at all of the shoreline receptors identified above from all lake bed sources including the test area, plus background ( $20 \mu\text{g}/\text{m}^3$ ), during the test period is less than  $120 \mu\text{g}/\text{m}^3$ , and
- 2) no concentrations greater than  $120 \mu\text{g}/\text{m}^3$  were measured at any shoreline monitor in the area of those receptors during the test period.

The new application must contain all the same elements as the original application, and all the data and modeling from the first step of the test.

The APCO has full and sole discretion to approve or reject the City's application, or to require conditions. Subsequent steps may be made in the same manner. The APCO will take action and notify the City in writing within 90 days of receipt of the written application.

#### Requirement to Increase Controls on Test Areas

If, at the end of the year or any subsequent year before the SIP Revision to adjust BACM is approved by USEPA, the predicted yearly maximum 24-hour contribution from all lake bed sources including the test area plus background ( $20 \mu\text{g}/\text{m}^3$ ) exceeds  $140 \mu\text{g}/\text{m}^3$  at any of the shoreline receptors identified above, and/or concentrations greater than  $140 \mu\text{g}/\text{m}^3$  were measured at a shoreline monitor in the area of the identified receptors, then the City must increase the control efficiency on the test area to the last step that achieved concentrations below the  $140\text{-}\mu\text{g}/\text{m}^3$  threshold. For Managed Vegetation, this action must be taken within 12 months of the written determination by the APCO that the requirements for adjusting BACM were not met. For all other  $\text{PM}_{10}$  control measures, this action must be taken within 60 days of the written determination by the APCO that the requirements for adjusting BACM were not met. The APCO has full and sole discretion to make that determination. The APCO will determine the time scale for compliance for other BACM as part of the approval of the application.

#### SIP Revision for BACM for the Test Area

After three consecutive years of successful operation of the adjusted-BACM test area (modeled and monitored concentrations less than  $140 \mu\text{g}/\text{m}^3$  as described above), the City may apply to the District for a SIP Revision to redefine BACM for that test area on the Owens Lake bed provided:

- 1) the predicted yearly maximum 24-hour  $\text{PM}_{10}$  contribution for each year of the test from the test area plus background ( $20 \mu\text{g}/\text{m}^3$ ) at all shoreline receptors is  $140 \mu\text{g}/\text{m}^3$  or less, and
- 2) no  $\text{PM}_{10}$  concentrations greater than  $140 \mu\text{g}/\text{m}^3$  were measured at any shoreline monitor during the three years of the test.

The APCO has full and sole discretion to determine whether these conditions have been met. After public notice and comment and a public hearing, the District Board has full and sole discretion to determine whether to adopt the SIP revision.

#### Lake-Wide SIP Revision for BACM for a Soil Type

If, after three consecutive years of successful operation of the adjusted-BACM test area, the predicted yearly maximum 24-hour contribution from the test area and all source areas on the lake bed plus background ( $20 \mu\text{g}/\text{m}^3$ ) at all shoreline receptors for all three years of the test is  $140 \mu\text{g}/\text{m}^3$  or less and no concentrations greater than  $140 \mu\text{g}/\text{m}^3$  were measured at any shoreline monitor during the three years of the test, the research conducted on these test areas can be used to determine the relationship between the  $\text{PM}_{10}$  emissions, control efficiency and DCM performance standards. After the relationship has been identified, the City will use the research results in an updated modeling analysis that applies the test results to other areas on the lake bed with the same general soil type (sand-dominated, silt-dominated or clay-dominated) and under the same range of evaluated emissions or control efficiencies and performance standards as the test. The modeling will cover the entire test period, and will be done in accordance with the Dust ID Protocol. A DCM control map (map) will be prepared of lake bed control efficiencies (with corresponding DCM performance standards) that would be required to achieve the  $\text{PM}_{10}$  NAAQS everywhere along the historic shoreline with that DCM in the same general soil type

(sand-dominated, silt dominated or clay-dominated) as the test area and under the same range of control efficiencies, emissions, and performance standards evaluated in the test.

The City will then submit this draft map to the APCO for approval. The submittal must contain all the data from the test area and the modeling that produced the map. The APCO has full and sole discretion to approve, disapprove, or modify the draft map.

If the APCO approves the map, the City may apply to the District Board for a SIP Revision to redefine that BACM for that mapped area on the Owens Lake bed. After public notice and comment and a public hearing, the District Board has full and sole discretion to determine whether to adopt the SIP Revision. If a SIP Revision identifying a redefined BACM for Owens Lake is adopted by the District Board and approved by USEPA, the redefined BACM may be implemented anywhere designated by the new DCM control map. If the City has implemented a different DCM in the mapped area, the requirements of the following section below titled “Transitioning From One BACM to Another BACM After 2010” must also be met. If any modeled or monitored exceedance of the  $PM_{10}$  NAAQS results from these adjustments to BACM, the requirements of Board Order 080128-01, Paragraphs 10 and 11, will automatically apply to increase controls on these extreme violators to restore attainment of the NAAQS.

As many of the existing and potential dust control areas on the Owens Lake bed fall under the jurisdiction of the California State Lands Commission and other responsible agencies, the City must secure the appropriate approvals, leases and permits prior to implementing adjustments to existing BACM. However, nothing in this section is intended to give any responsible agency any authority beyond their authority under law.

## **2. RESEARCH ON POTENTIAL NEW BACM INCLUDING MOAT ROW**

The City may test new dust control measures at any time on areas of the lake bed that are emissive, except within the 43.0 square-mile 2008 Total Dust Control Area footprint where BACM (or on up to 3.5 square miles, the non-BACM dust control known as Moat & Row) must be implemented by April 1, 2010 or within any Supplemental Control Area where existing BACM has been implemented or is scheduled for implementation. This testing area exclusion does not apply to Moat & Row  $PM_{10}$  controls constructed within the 12.7 square-mile 2006 Supplemental Dust Control Area (SDCA). The City may test up to 3.5 square miles of Moat & Row within the SDCA. If the City has tested a new control measure for three years in this manner, it may apply in writing to the APCO for a SIP Revision to designate the new dust control measure as BACM. The application must meet all USEPA requirements for BACM designation and demonstrate to the APCO’s satisfaction that the new control measure is sufficient to achieve the required  $PM_{10}$  emission reductions or control efficiency during the dust season and attain the NAAQS everywhere on the shoreline. The APCO has full and sole discretion to determine whether these conditions have been met.

The application shall include, but not be limited to:

- 1) a description of the new dust control measure

- 2) a description of the test site and the meteorological conditions under which it was tested
- 3) the measured PM<sub>10</sub> emissions during the test
- 4) the test time frame
- 5) all raw data collected during the test
- 6) all data screening criteria and final data sets
- 7) data supporting the conclusion that the required control efficiency was achieved
- 8) a performance standard that the new dust control measure must meet in order to achieve the required emission reductions or control efficiency
- 9) an analysis of any environmental impacts of the dust control measure
- 10) the appropriate responsible agency approvals, permits and leases

The application must include modeling that demonstrates that the required PM<sub>10</sub> emission reductions or control efficiency can be achieved during the dust season anywhere this control measure may be implemented on Owens Lake, and the NAAQS can be met at all times everywhere along the historic shoreline.

If the APCO determines that the application is complete and the above conditions have been met, he/she will have full discretion to select or approve a method of determining compliance of the proposed new BACM with its performance standard and include that method in the description of the proposed BACM for the SIP Revision. The District Governing Board has full and sole discretion to determine whether to adopt a SIP Revision for approval of any new BACM.

Upon adoption by the District Board, approval by CARB, and submission to USEPA of a SIP Revision that identifies a new BACM for Owens Lake, the City may implement only this one new control measure on one-half square mile of the next area to be identified as needing control under the 2003 SIP Revision Supplemental Control Requirements until EPA approves this new measure as BACM. No other new control measures may be implemented on areas identified as needing control under the 2003 SIP Revision Supplemental Control Requirements until EPA approves this new measure as BACM. The District Governing Board may limit the new BACM to specific circumstances, for example, distance of the new dust control measure from the shoreline or approval in a specific general soil type. Upon approval by USEPA, the new BACM may be implemented per the requirements described in the following section, "Transitioning From One BACM to Another BACM After 2010," or on any subsequent areas requiring control under the "2008 Owens Valley Planning Area Supplemental Control Requirements Procedure" (Board Order 080128-01, Attachment B), subject to any limitation to specific circumstances.

As many of the existing and potential dust control areas on the Owens Lake bed fall under the jurisdiction of the California State Lands Commission and other responsible agencies, the City must secure the appropriate approvals, leases and permits prior to implementing any BACM test or new BACM. However, nothing in this section is intended to give any responsible agency any authority beyond their authority under law.

### **3. TRANSITIONING FROM ONE BACM TO ANOTHER BACM AFTER 2010**

If the City wishes to transition from one existing BACM to another existing BACM without meeting the performance standard of one or the other BACM at all times, it may submit an application to the APCO in writing for permission to do so after April 1, 2010. The APCO has full and sole discretion to accept, reject or condition the City's application. The transition may be done on no more than one and one-half (1.5) square miles lake-wide for any BACM except Managed Vegetation, or 320 acres lake-wide if the transition is to Managed Vegetation, at one time. The City shall not begin the transition in advance of the APCO's written approval.

The application shall include, but not be limited to:

- 1) a protocol that includes a project description
- 2) a site plan
- 3) a plan to measure PM<sub>10</sub> emissions
- 4) a time frame for project milestones and completion
- 5) plans to control PM<sub>10</sub> if emissions exceed any trigger value set by the APCO based upon a 140µg/m<sup>3</sup> modeled (including background of 20µg/m<sup>3</sup>) or monitored PM<sub>10</sub> concentration at the shoreline
- 6) data supporting the assumption that the transition can be completed and the BACM performance standards can be achieved within three years of the start-up of construction
- 7) project closure procedures if the project is discontinued for any reason or if the PM<sub>10</sub> trigger value is exceeded
- 8) any necessary environmental documentation, responsible agency approvals, permits and leases

The protocol must include modeling in accordance with the Dust ID Protocol that predicts that the NAAQS will be met at all times everywhere on the shoreline during the transition period, and must include a method to monitor emissions continuously throughout the transition period. The transition must be complete, and the new BACM performance standard achieved, within three years of written notification from the City to the APCO that they are no longer maintaining the performance standard for the existing BACM, and are beginning the transition.

All raw data must be shared with the APCO, and all data screening criteria must be approved (or disapproved) in writing by the APCO. The APCO may terminate the transition at any time if modeling or monitoring show that emissions are increasing above any pre-set trigger level described in 5) above, or if the City is not following the APCO-approved protocol. The APCO has full and sole discretion to determine whether these conditions have been met.

If the data show to the APCO's satisfaction that the transition has been accomplished while attaining the NAAQS everywhere at the shoreline, the City may submit an application to the APCO to allow another area to be transitioned. The APCO has full and sole discretion to accept, reject or condition the City's application. The same procedures outlined above will apply.

As many of the existing and potential dust control areas on the Owens Lake bed fall under the jurisdiction of the California State Lands Commission and other responsible agencies, the City must secure the appropriate approvals, leases and permits prior to BACM transitions. However, nothing in this section is intended to give any responsible agency any authority beyond their authority under law.

# ***Great Basin Unified Air Pollution Control District***

2013 Amendment to the Owens Valley PM<sub>10</sub> SIP

## **Board Order 130916-01**

Exhibit 2: District Hearing Board Order GB09-06, Findings and Order Granting Regular Variance from Requirements Set Forth in Governing Board Order 080128-01, September 25, 2009

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3

**BEFORE THE HEARING BOARD**  
**OF THE**  
**GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT**

**VARIANCE REQUEST**

## Petitioner:

City of Los Angeles  
Department of Water & Power  
111 North Hope Street, Suite 340  
Los Angeles, California 90012-2607

Request Received: August 21, 2009

Facility Location:  
Owens Lake Dust Mitigation Project  
111 Sulfate Road, Keeler, CA 93530

Docket Number: GB09-06

**FINDINGS AND ORDER GRANTING**  
**REGULAR VARIANCE FROM**  
**REQUIREMENTS SET FORTH IN**  
**GOVERNING BOARD**  
**ORDER 080128-01**

Hearing Date: September 25, 2009

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9  
10**BACKGROUND**

The City of Los Angeles Department of Water and Power (Petitioner) submitted a variance petition to the Great Basin Unified Air Pollution Control District (District) Hearing Board on August 21, 2009 pursuant to California Health and Safety Code Section 42350 and District Regulation VI (Rules 600 *et seq.*) Petitioner requested consideration of a variance to temporarily relieve it from the obligation to comply with District Board Order 080128-01, paragraphs 3, 7 and 10 and for one year of regulatory relief from October 1, 2009 deadline set forth in said order to complete 3.5 square miles of alternative

1 experimental dust control measure (DCM) known as “Moat & Row” on the dried bed of Owens Lake,  
2 California.

3 As described in the variance petition, Petitioner contended that delays in securing approvals for  
4 their Moat & Row project from State Lands Commission and California Department of Fish and Game  
5 will cause the 3.5 square-mile project to be completed one year late, by October 1, 2010. Petitioner  
6 contended that the delays were beyond its reasonable control. However in order to offset the excess air  
7 pollution emissions caused by the one year delay, Petitioner agreed to two additional dust control  
8 projects.

### 9 PROCEEDINGS

10 Pursuant to District Rule 617, upon receipt of the petition, the Air Pollution Control Officer  
11 (APCO) transmitted the Petition together with the APCO’s recommendation to grant the regular  
12 variance to the Hearing Board. The recommendations were set forth in the Staff Report for this matter,  
13 which is on file with the Hearing Board.

14 Pursuant to Government Code 42359.5 and District Rule 16, with notice and hearing, the  
15 Hearing Board considered the Petitioner’s Regular Variance petition and the District’s recommendations  
16 on September 25, 2009 in the Town of Mammoth Lakes Council Chambers, 437 Old Mammoth Road,  
17 Suite Z, Mammoth Lakes, California 93546, with participation and sworn testimony from Ted Schade,  
18 GBUAPCD APCO; Grace McCarley Holder , GBUAPCD Playa Geologist; William VanWagoner,  
19 Milad Taghavi, Brian Tillemans and Gene Coufal, City of Los Angeles Department of Water and Power.  
20 Tori Jenkins, Clerk of the Board; Julie Conboy Riley and David Hodgekiss, Counsel for the City of Los  
21 Angeles Department of Water and Power; George Poppic of the California Air Resources Board,  
22 Representing Counsel for the Hearing Board; and Mel Joseph of the Lone Pine Paiute Shoshone  
23 Reservation were in attendance. After hearing all testimony and considering all evidence, the Hearing

1 Board made the Findings and granted the issuance of a Regular Variance subject to certain conditions as  
2 set forth below.

### 3 FINDINGS

4 The Hearing Board makes the following findings as required by Sections 42352 and 42353 of the  
5 California Health and Safety Code:

- 6 1. Petitioner will be in violation of District Board Order 080128-01, Paragraph 3, which requires  
7 Petitioner to have any Phase 7 Moat & Row DCM operational by October 1, 2009.
- 8 2. Due to conditions beyond the reasonable control of the Petitioner, it has been prevented it from  
9 completing the Moat & Row DCM by the October 1, 2009 deadline specified in the Board Order.  
10 There is no practical method to achieve compliance with the Board Order sooner than through a  
11 time extension to complete the Dust Mitigation Project, Moat & Row. Closing the Los Angeles  
12 Aqueduct would not alleviate the PM10 emission problem. Immediate compliance would impose  
13 unreasonable burden upon an essential public service.
- 14 3. There would be no corresponding benefit to the closing or taking of the Los Angeles Aqueduct.  
15 Closing the aqueduct would not be an expeditious means of controlling emissions from the 3.5  
16 square-mile Moat & Row project area. The 3.5 square-mile Moat & Row project area is made up  
17 of seven small sub-areas, none of which have existing water-delivery infrastructure. Controlling  
18 the emissions from these widely dispersed areas by closing the Aqueduct and redirecting its  
19 waters onto the Owens Lake bed via the Owens River would take the full flow of the Aqueduct  
20 for 5 to 20 years.
- 21 4. Applicant has considered curtailing operations, however, such action would not lead to  
22 compliance with the Board Order, nor would it provide any immediate control of the emissions

1 associated with the 3.5 square-mile Moat and Row area. Closing the aqueduct would cause  
2 considerable hardship to the City of Los Angeles.

- 3 5. Petitioner has committed to control excess emissions from the Owens Lake bed to the maximum  
4 extent feasible during the period the variance is in effect. Petitioner proposes two methods during  
5 two periods.

6 The first period is the six months from October 1, 2009 until April 1, 2010. Petitioner  
7 will be continuing construction of the 9.7 square-mile of Phase 7 Shallow Flooding DCMs during  
8 this period. The Board Order requires the additional 9.7 square-miles of Shallow Flooding control  
9 to be operational by April 1, 2010. Petitioner is committed to providing at least 3.5 square-miles  
10 of temporary dust control within the 9.7 square-mile Phase 7 project by area by October 1, 2009.  
11 The temporary control will be provided by tilling 3.5 square-miles of clay soils up into very large  
12 clods that will increase the surface roughness of the lake bed and temporarily prevent emissions.  
13 Based on various studies conducted, Petitioner believes tilling will provide at least six months of  
14 sufficient control. As the Petitioner completes the Shallow Flooding construction in the tilled  
15 areas, water will cover the tilled surfaces and permanent control will be established. Petitioner is  
16 expediting control via tilling method in areas already scheduled for control by April 2010.

17 The second period for required emission reduction is the six-month period between April  
18 1, 2010 and October 1, 2010. Petitioner is unable to provide direct on-lake bed offsets of the  
19 emissions from the 3.5 square-mile of Moat & Row are during this six month period because  
20 required DCMs will occupy all lake bed areas (39.5 square miles) for which Petitioner has  
21 permits and approvals.

22 However, the District's air quality monitoring indicates that there are additional areas on  
23 the lake bed, beyond the 43 square miles currently ordered (39.5 square-miles with permits and

1 3.5 square-miles of Moat and Row), that require controls. District and Petitioner staffs have  
2 preliminarily identified two square miles that were emissive during the 2007 through 2009 period.  
3 However, the 2008 SIP and Board Order prevent the District from ordering controls on much of  
4 these areas until possibly well after May 1, 2010.

5 Petitioner has agreed that, as an offset to the emissions that will occur from the 3.5  
6 square-mile Moat & Row area, it will immediately begin the regulatory approval process required  
7 to construct two additional square miles of BACM dust controls on the lake bed and will  
8 complete those controls six months earlier than would ordinarily be required by the 2008 SIP.  
9 Because Petitioner is starting the process seven months earlier than the earliest it would normally  
10 start under an order from the District and it will complete the DCMs six months earlier than  
11 provided in the 2008 SIP, necessary dust controls will be in place on the lake bed more than a  
12 year earlier than under the normal procedures. The additional two square miles of expedited dust  
13 controls offsets the six months of excess emissions from the 3.5 square-mile Moat & Row area.

- 14 6. The District has an extensive air and emissions monitoring program at Owens Lake and will  
15 continue to operate the program and quantify dust emissions from the lake bed, including areas  
16 subject to this variance request. Petitioner provides annual funding through assessments levied by  
17 the Governing Board to conduct this monitoring.
- 18 7. Petitioner will continue to operate between 29.8 and 39.5 square-miles of DCMs on the lake bed  
19 during the one-year variance period. The existing controls have reduced historic PM10 levels  
20 about 90 percent and additional reductions are expected by April 1, 2010, when the current 9.7  
21 square-mile Phase 7 Shallow Flooding project areas are completed. The delay in implementing  
22 DCMs on 3.5 square-miles of Owens Lake is not expected to result in discharge of "air  
23 contaminants or other material which may cause injury, detriment, nuisance or annoyance to any

1 considerable number of persons or to the public, or which endanger the comfort, repose, health or  
2 safety of any such persons or the public, or which cause, or have a natural tendency to cause,  
3 injury or damage to business or property.”

#### 4 **ORDER**

- 5 1. Now therefore, the Hearing Board orders that the Petitioner, the City of Los Angeles Department  
6 of Water and Power, is granted a Regular Variance, subject to the conditions set forth in  
7 Paragraphs 3, 4 and 5, below, for a one-year extension of the deadline for the completion of Moat  
8 & Row dust control measures on the bed of Owens Lake. The existing deadline of October 1, 2009  
9 is required in Paragraph 3 of District Governing Board Order Number 080128-01, which is  
10 contained in the “2008 Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State  
11 Implementation Plan.” The Petitioner is granted regulatory relief from this requirement until  
12 October 1, 2010.
- 13 2. Further, the Hearing Board finds that, subject to the conditions set forth in Paragraphs 3, 4 and 5,  
14 below, that by granting one year of regulatory relief from the existing October 1, 2009 deadline for  
15 the completion of the Moat & Row dust controls contained in Paragraph 3 of Board Order  
16 080128-01, the Petitioner does not trigger the provisions in Paragraphs 7 and 10 of said Order,  
17 which provide for supplemental control determinations to resume prior to May 1, 2010, due to the  
18 non-completion of Moat & Row dust controls.
- 19 3. In order to reduce excess emissions to the maximum extent feasible, the Hearing Board conditions  
20 the variance to require the Petitioner to:
- 21 a. Temporarily control at least 3.5 square-miles of Owens Lake within the Shallow Flood  
22 portion of the current Phase 7 dust control construction project through surface tillage to

1 increase surface roughness by October 1, 2009. A map showing the locations of the tilled  
2 areas and the tilling specifications are attached as Order Exhibit 3.

- 3 b. Construct and operate a new dust control project on at least two square-miles of Owens Lake  
4 in the areas shown in Order Exhibit 4. This new dust control project shall be known as  
5 “Phase 8” of the Owens Lake Dust Mitigation Program. The Phase 8 project shall be  
6 implemented by the Petitioner in lieu of any other areas that would be required for control by  
7 the District under the supplemental control determination provisions in Paragraphs 7 and 10  
8 of Board Order 080128-01 for the period from July 1, 2006 through April 1, 2010. Thus,  
9 other than the determination that the Phase 8 areas require the implementation of DCMs, no  
10 supplemental control determination should be issued the Air Pollution Control Officer in  
11 2010. A set of geographic coordinates defining the boundaries of the Phase 8 dust control  
12 areas shall be developed by the District and provided to the Petitioner by January 1, 2010.  
13 The size and location of the Phase 8 areas may be modified upon mutual agreement of the  
14 District Governing Board and the Los Angeles Department of Water and Power Board of  
15 Commissioners. The type of dust control measures used in the Phase 8 areas will be selected  
16 at the Petitioner’s sole discretion from the list of Best Available Control Measures approved  
17 by the District as of the date construction begins on the Phase 8 project. The Petitioner shall  
18 conduct all required site investigations and environmental impact analyses and secure all  
19 required regulatory approvals and permits. The Petitioner shall start the regulatory approval  
20 and design processes for the Phase 8 project immediately upon receipt of this variance from  
21 the Hearing Board. The Petitioner shall complete construction and begin operation of the  
22 Phase 8 dust control measures six months earlier than it would have been required to do so

under the provisions of Board Order 080128-01. These modified times are set forth in the attached Order Exhibit 2.

4. The Hearing Board requires, as a condition of the variance, that the Petitioner agree to a stipulated order from the District Governing Board under the provisions of California Health and Safety Code Section 42316 ordering the Phase 8 project as set forth in Paragraph 3.b, above. This order will be issued by the District Governing Board within 90 days of the certification of the environmental impact analysis by the Petitioner but no later than October 1, 2010, whichever date is later.

5. The Hearing Board requires, as a condition of the variance, that the Petitioner meet the increments of progress schedule attached as Order Exhibit 1 and submit quarterly progress reports to the Hearing Board.

Dated the 25<sup>th</sup> day of September 2009



Brad Mettam  
Hearing Board Chairman

Attest:

  
Tori Jenkins, Board Clerk

Order Exhibit List:

- Exhibit 1 –Increments of Progress Schedule
- Exhibit 2 – Modified Times for Completion of Phase 8 Dust Controls
- Exhibit 3 – Map and Specifications for 3.5 square-mile Temporary Tilling Dust Controls
- Exhibit 4 – Map of Phase 8 Dust Control Project

**ORDER EXHIBIT 1**

**INCREMENTS OF PROGRESS SCHEDULE**

**FOR VARIANCE GB09-06**

**LOS ANGELES DEPARTMENT OF WATER AND POWER**

**MOAT & ROW DUST CONTROL MEASURE DEADLINE EXTENSION**

<b><u>By:</u></b>	<b><u>Milestone</u></b>
October 1, 2009	Petitioner shall complete 3.5 square miles of temporary tilling dust control within the Phase 7 dust control area as shown on Order Exhibit 3.
October 1, 2009	Start clock for completion of 2 square-mile Phase 8 dust control project (project times shown in Order Exhibit 2).
October 1, 2009	Petitioner shall begin preparation of required CEQA documentation for the 2 square-mile Phase 8 dust control project.
January 1, 2010	Petitioner shall commence construction of the Moat & Row dust controls.
April 1, 2010	Petitioner shall convert 3.5 square miles of temporary tilling dust controls to 3.5 square miles of Shallow Flooding dust controls.
October 1, 2010	Petitioner shall select and notify the District of the BACM to be used on the 2 square-mile Phase 8 project.
October 1, 2010	District Governing Board shall issue stipulated order under H&S Sec. 42316 requiring the 2 square-mile Phase 8 dust control project (subject to certification of Phase 8 CEQA document by Petitioner).
October 1, 2010	Petitioner shall complete 3.5 square miles of Moat & Row dust controls.
To be determined	Depending on which BACM Petitioner selects, Petitioner shall complete 2 square-mile Phase 8 dust control project (times for completion are set forth in Order Exhibit 2).

**DISTRICT EXHIBIT 2**  
**MODIFIED TIMES FOR COMPLETION OF PHASE 8 DUST CONTROLS**  
**FOR VARIANCE GB09-06**  
**LOS ANGELES DEPARTMENT OF WATER AND POWER**  
**MOAT & ROW DUST CONTROL MEASURE DEADLINE EXTENSION**

<b><u>Activity</u></b>	<b><u>Duration (years)</u></b>
New area of Shallow Flooding DCM	2.4*
New area of Managed Vegetation DCM	5.6*
New area of Gravel Cover DCM	1.7*
Other approved BACM	Determined by District**
Additions to above times:***	
Mainline capacity increase	2.1
New aqueduct turnout	1.4
New power feed	1.0
Expanded CEQA triggered	1.4

\* The durations shown for the three existing BACMs are 0.5 years shorter than the times provided in Attachment B, Exhibit 3 of District Board Order 080128-01.

\*\* If the District approves any new BACM prior to the start of the Phase 8 project, implementation durations will be included in the new BACM description. The Phase 8 durations will be 0.5 years shorter than non-Phase 8 durations.

\*\*\* Multiple additions to the BACM completion durations are not additive.

Order Exhibit 3



**Phase 7 Areas Selected for Tillage**

Total High Priority Area: 3.76 SM  
Total Contingency Area: 0.65 SM

Revised Aug 14, 2009

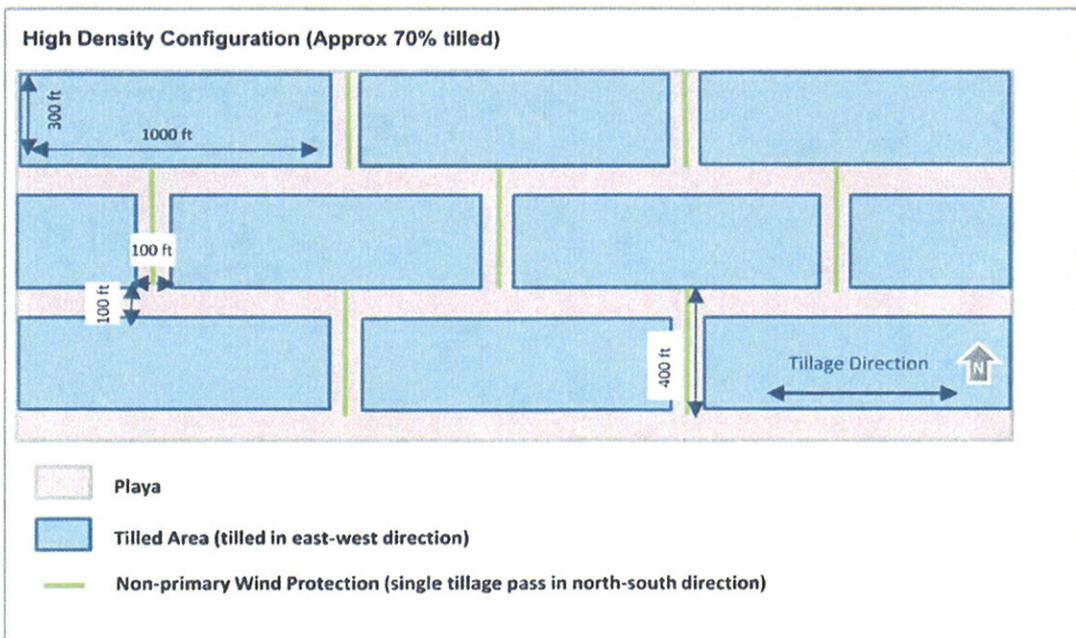
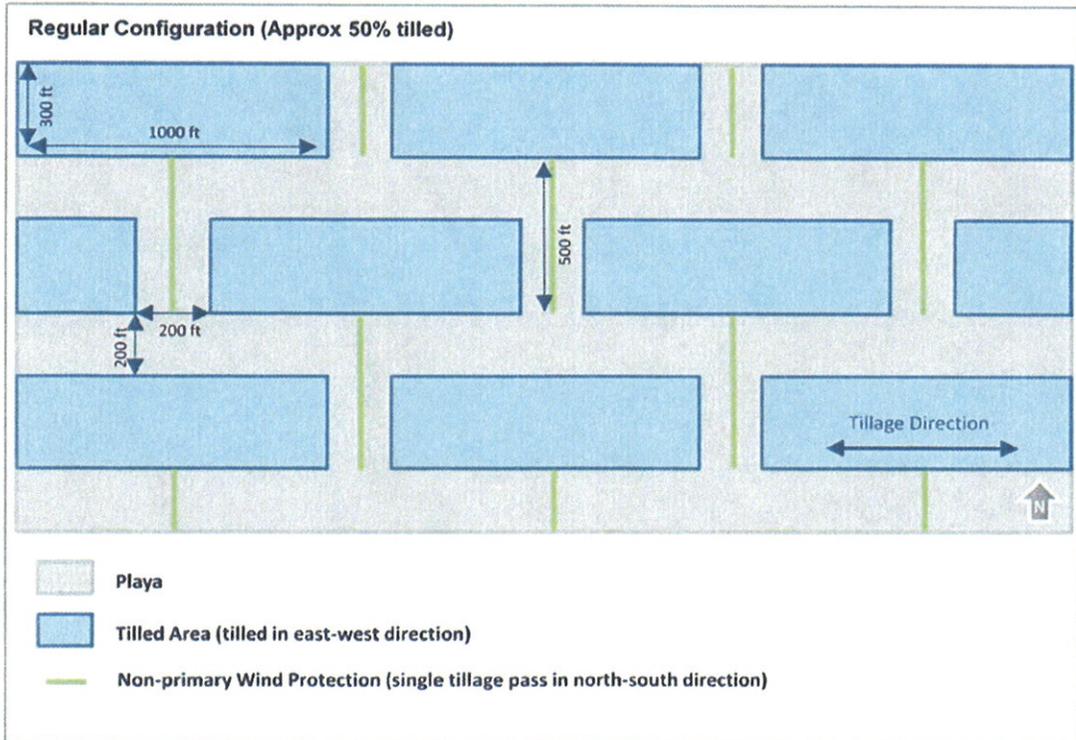
**Legend**

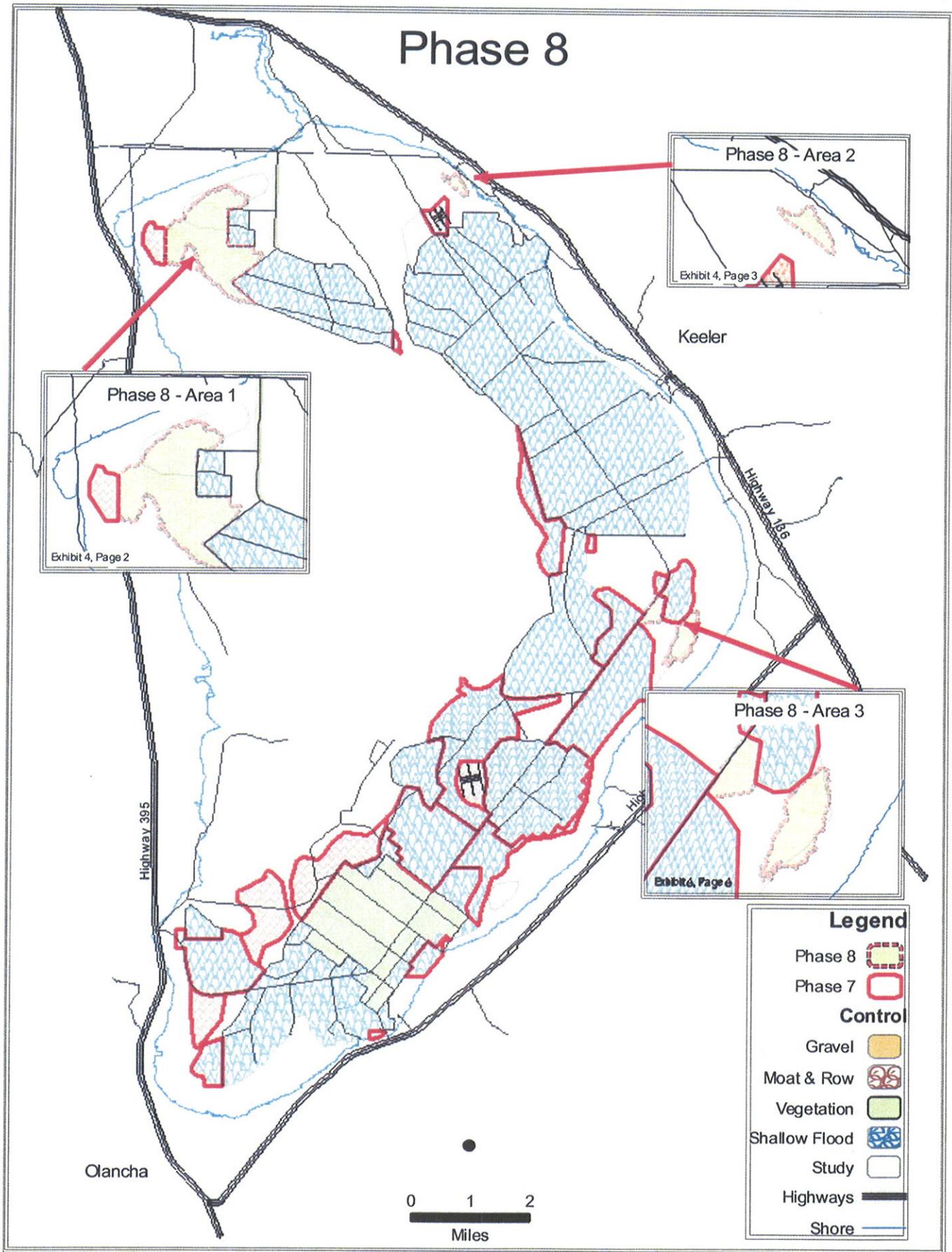
— Laterals	DCM Boundaries
— Brady Highway	GR
Potential Tillage Areas	HSP
Tillage Priority	MR
Contingency	MV
High Density	SFL
Regular Density	SFP

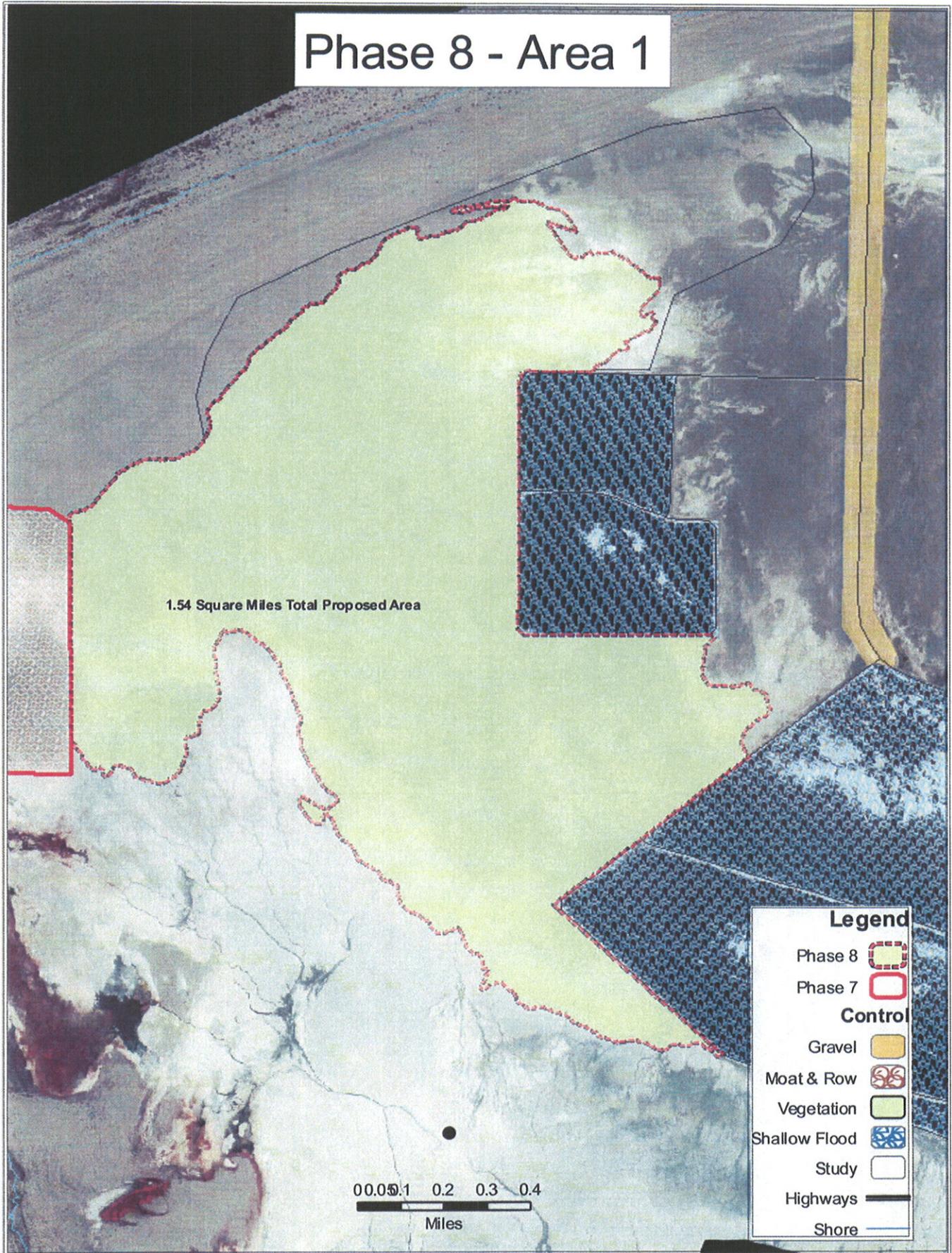


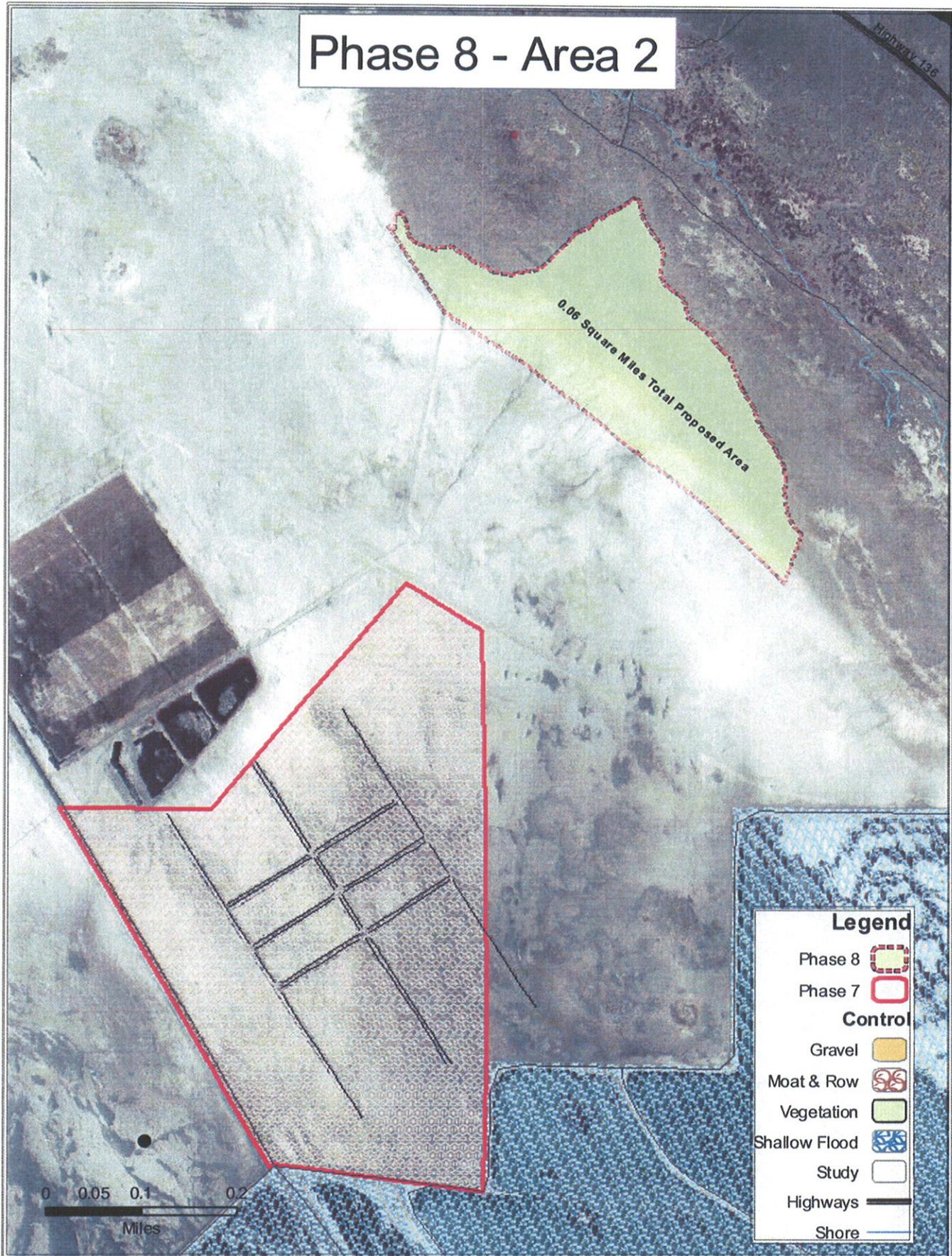
Order Exhibit 3

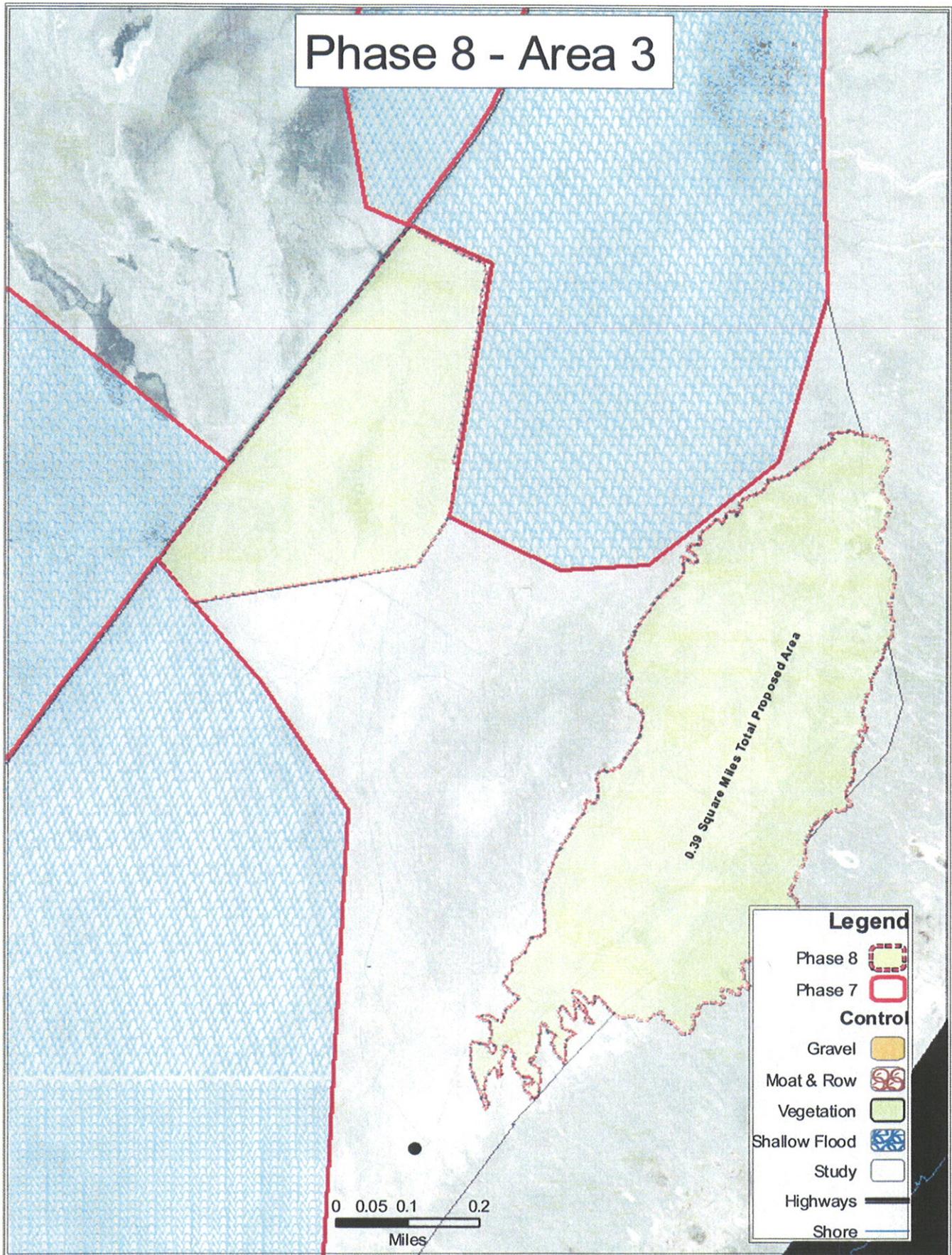
Phase 7 Tillage Configurations











***Great Basin Unified Air Pollution Control District***

2013 Amendment to the Owens Valley PM<sub>10</sub> SIP

**Board Order 130916-01**

Exhibit 3: Stipulated Order for Abatement Number  
110317-01

Theodore D. Schade  
Air Pollution Control Officer



## GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

157 Short Street, Bishop, California 93514-3537  
760-872-8211 Fax: 760-872-6109

**B/O #110317-01**

March 17, 2011

**I HEREBY CERTIFY** that at a regular meeting of the Great Basin Unified Air Pollution Control District Governing Board held in the multi-purpose room of the City of Los Angeles, Department of Water and Power, Bishop, California on March 17, 2011 an order was duly made and entered as follows:

**AGENDA ITEM #14: ADOPTION OF AN ORDER FOR ABATEMENT DIRECTING THE CITY OF LOS ANGELES TO IMPLEMENT AN ADDITIONAL 3.1 SQUARE MILES OF BEST AVAILABLE CONTROL MEASURES FOR CONTROL OF PM10 EMISSIONS FROM THE DRIED BED OF OWENS LAKE AND TO PAY SIX MILLION FIVE-HUNDRED THOUSAND DOLLARS (\$6,500,000 ) TO OFFSET EXCESS AIR POLLUTION EMISSIONS.**

A motion was made by Cervantes and seconded by Sweeney Adopting the Stipulated Order with the modifications relative to deleting references to the Hearing Board and replacing thereof the Governing Board. Directing Board Chair Arcularius to sign the Order following signatures from the General Manager of the City of Los Angeles Department of Water and Power and the Air Pollution Control Officer of the Great Basin Unified Air Pollution Control District. The following findings were also made by the Governing Board:

- 1) Notice of hearing on this matter was duly given and published in accordance with Health and Safety Code §42450 and District Rule 811.
- 2) All parties have stipulated to this matter being heard by the District Governing Board and have waived all rights to contest ongoing authority of the District Governing Board to hear this matter.
- 3) Members of the public were offered opportunity to provide comment on the Order of Abatement and comments of zero people were heard.

////

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Ayes: Board Members – Arcularius, Hansen, Johnston, Cervantes, Veatch, Sweeney, Eastman

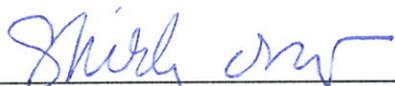
Noes: Ø

Abstain: Ø

Absent: Board Members - Ø

Motion carried 7/0 and so ordered.

ATTEST:



\_\_\_\_\_  
Shirley Ono, Acting Clerk of the Board

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**BEFORE THE GOVERNING BOARD OF THE  
GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT**

<p>In the Matter of</p> <p><b>THEODORE D. SCHADE</b> AIR POLLUTION CONTROL OFFICER GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT,</p> <p style="text-align:right">Petitioner,</p> <p style="text-align:center">vs.</p> <p><b>CITY OF LOS ANGELES DEPARTMENT OF WATER AND POWER</b></p> <p style="text-align:right">Respondent.</p>	<p><b>Order Number 110317-01</b></p> <p><b>FINDINGS AND DECISION OF GOVERNING BOARD UPON HEARING FOR STIPULATED ORDER FOR ABATEMENT</b></p> <p>Hearing Date: March 17, 2011 Location: Bishop, California</p>
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1                                   **FINDINGS AND DECISION OF THE GOVERNING BOARD**

2    A petition from the Great Basin Unified Air Pollution Control District's Air Pollution  
3    Control Officer for a Stipulated Order for Abatement ("Order") was heard on March 17,  
4    2011, pursuant to notice and in accordance with the provisions of California Health and  
5    Safety Code Section 40823 and District Rule 811. Seven members of the District Governing  
6    Board were present: Board Chair, Linda Arcularius, Board members Tom Sweeney, Henry  
7    Veatch, Larry Johnston, Tim Hansen, Richard Cervantes and John Eastman. The District  
8    Governing Board was represented by George Poppic of the California Air Resources Board.  
9    Petitioner, Theodore D. Schade, the Air Pollution Control Officer (APCO), was represented  
10   by Randy Keller, District Counsel. Respondent, the City of Los Angeles Department of  
11   Water and Power, was represented by Michelle Lyman, Deputy City Attorney for the City of

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1 Los Angeles. The public was given the opportunity to testify. The matter was submitted and  
2 evidence received. The District Governing Board finds, concludes and orders as follows:

3 **FINDINGS OF FACT**

4 1. The Great Basin Unified Air Pollution Control District (hereinafter "District")  
5 is organized pursuant to Division 16, Part 3, Chapter 3 of the California Health and Safety  
6 Code, and is the sole and exclusive agency with the responsibility for comprehensive air  
7 pollution control and regulation in the Great Basin Valleys Air Basin (California's Alpine,  
8 Mono and Inyo Counties), including that area of southern Inyo County known as the Owens  
9 Lake bed (Exhibit 1).

10 2. Respondent, the City of Los Angeles, acting by and through its Department of  
11 Water and Power, is a municipal corporation organized under the Los Angeles City Charter  
12 and the constitution and laws of the State of California, doing business within the jurisdiction  
13 of the Great Basin Unified Air Pollution Control District. Respondent operates a municipal  
14 water collection, distribution and aqueduct system in Inyo and Mono Counties for the  
15 purpose of supplying water to the residents of the City of Los Angeles.

16 3. Respondent is subject to District Governing Board Order 080128-01 adopted  
17 on January 28, 2008 (Exhibit 2). District Governing Board Order 080128-01 is the order  
18 contained in both the *2008 Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment*  
19 *State Implementation Plan* (2008 SIP) and the *2010 PM<sub>10</sub> Maintenance Plan and*  
20 *Redesignation Request for the Coso Junction Planning Area*. This order requires the  
21 Respondent to take a number of actions by certain specified dates in order to timely control  
22 the particulate matter air pollution (PM<sub>10</sub>) emissions caused by its water production,  
23 diversion, storage and conveyance activities.

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1           4.       Respondent is also subject to District Hearing Board Order GB09-06 (Exhibit  
2   3). District Hearing Board Order GB09-06 is the order associated with a variance, granted to  
3   the Respondent on September 25, 2009, that provided the Respondent additional time to  
4   implement PM<sub>10</sub> controls on some areas of the Owens Lake bed originally ordered by District  
5   Governing Board Order 080128-01.

6           5.       District Governing Board Order 080128-01 required Respondent to install a  
7   total of 13.2 square miles of additional PM<sub>10</sub> controls beyond the 29.8 square miles of PM<sub>10</sub>  
8   controls constructed prior to January 1, 2007. These 13.2 square miles are known as the  
9   “Phase 7” areas.

10          6.       Of the required 13.2 total square miles in Phase 7, Respondent implemented  
11   9.6 square miles in compliance with District Governing Board Order 080128-01 and District  
12   Hearing Board Order GB09-06 and there are 0.5 square miles known as the “Channel Area”  
13   on which no representations regarding compliance status are made in this Order. These 10.1  
14   square miles are not the subject of this Order.

15          7.       However, within the 3.1 square-mile balance of the 13.2 square-mile Phase 7  
16   areas, there are six sub-areas known collectively as “Phase 7a” where Respondent did not  
17   implement dust control measures in compliance with District Governing Board Order  
18   080128-01 and District Hearing Board Order GB09-06. For the Phase 7a areas, District  
19   Governing Board Order 080128-01 required Respondent to implement any combination of  
20   approved PM<sub>10</sub> controls known as Best Available Control Measures (“BACM”), which  
21   consists of Shallow Flooding, Managed Vegetation and Gravel Blanket, or an experimental,  
22   non-BACM PM<sub>10</sub> control measure known as “Moat and Row.”

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1           8.       Respondent had the legal option to select at its sole discretion any of the  
2 methods of dust control described in Findings of Fact Paragraph 7 herein and was required to  
3 secure all appropriate approvals and construct the controls by the deadline set forth in the  
4 order and modified by the variance. The deadline set by District Governing Board Order  
5 080128-01 for constructing controls on the Phase 7a project areas was originally April 1,  
6 2010, if Respondent selected BACM controls, or October 1, 2009, if Respondent selected  
7 Moat & Row controls.

8           9.       Using District-, State- and Federally-approved air pollution modeling  
9 techniques specifically developed for Owens Lake emissions (District Board Order  
10 080128-01, Attachment B, “Supplemental Control Requirements Determination Procedure”),  
11 for the period 2006 through 2010 the District determined that the Phase 7a areas emitted an  
12 annual average of approximately 6,265 tons of excess PM<sub>10</sub>. These excess emissions have  
13 caused and contributed to violations of the state and federal 24-hour PM<sub>10</sub> standards.

14          10.       All of the Phase 7a areas are on State of California public lands managed by  
15 the California State Lands Commission (“CSLC”). Respondent is required to secure a lease  
16 from the CSLC before it may proceed to conduct any dust control activities occurring on  
17 state lands. The CSLC is not subject to District Governing Board Order 080128-01 and  
18 District Hearing Board Order GB09-06 or any other current order requiring it to control PM<sub>10</sub>  
19 emissions from the areas of the dried bed of Owens Lake owned by the State of California  
20 and managed by the CSLC.

21          11.       Respondent exercised its discretion to implement Moat and Row controls on  
22 the Phase 7a project areas. In order to secure the necessary permits, leases and approvals  
23 from other public agencies, Respondent was required to and did conduct full-scale dust

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1 control performance testing of Moat and Row at two locations on the Owens Lake bed.

2 Results of the testing were disputed by the Petitioner and Respondent.

3 12. As a condition of considering Respondent's application for a Moat and Row  
4 lease for the Phase 7a areas, CSLC staff required that Respondent prepare a supplemental  
5 Environmental Impact Report ("SEIR") pursuant to the California Environmental Quality  
6 Act ("CEQA"). Respondent agreed to prepare the SEIR required by CSLC staff. The SEIR  
7 prepared and finalized by Respondent was not legally challenged by the CSLC or any other  
8 party.

9 13. Delays caused by preparation of the SEIR and securing the necessary permits,  
10 leases and approvals resulted in Respondent's inability to implement Moat and Row dust  
11 control measures on Phase 7a by October 1, 2009. Respondent therefore sought and was  
12 granted Variance Order GB09-06 from the District Hearing Board. The Variance Order  
13 extended the deadline for completion of the Phase 7a Moat and Row controls by one year  
14 from October 1, 2009 until October 1, 2010. The variance order also contained additional  
15 requirements designed to reduce excess PM<sub>10</sub> emissions to the maximum extent feasible.  
16 These requirements provided for PM<sub>10</sub> control through the use of temporary tilling on 3.5  
17 square miles of area then under construction (a portion of the Phase 7 areas) and through  
18 implementation of a future dust control project to be completed six months earlier than would  
19 have normally been required under the provisions of Governing Board Order 080128-01. The  
20 expedited future project is 2.03 square miles of BACM known as the "Phase 8" project,  
21 which was ordered by the District Governing Board on December 6, 2010 (Order Number  
22 101206-01).

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1           14.    For more than two years, Respondent negotiated with the CSLC in an attempt  
2 to procure a lease to implement Moat and Row controls in the Phase 7a project areas.

3           15.    On April 6, 2010, the CSLC denied Respondent's application for the Moat  
4 and Row lease. As a result of the CSLC's denial of the Moat and Row lease, Respondent  
5 was unable to construct Moat and Row dust control measures on any part of the 3.1 square-  
6 mile Phase 7a project areas and was required to remove the Moat and Row dust control  
7 measures in place at the two Phase 7a demonstration areas. Thereafter, Respondent had  
8 insufficient time to comply with CEQA, obtain the necessary permits, leases and approvals  
9 and construct BACM on the 3.1 square mile Phase 7a project areas by October 1, 2010.

10          16.    At all times relevant herein, Respondent acted in good faith to comply with  
11 District Governing Board Order 080128-01 and District Hearing Board Order GB09-06.

12          17.    As there were no approved PM<sub>10</sub> controls in place on the Phase 7a areas by  
13 the October 1, 2010 deadline, Petitioner determined that Respondent was in violation of  
14 District Governing Board Order 080128-01 and District Hearing Board Order GB09-06 on  
15 that date. Petitioner determines that Respondent will remain in violation of District  
16 Governing Board Order 080128-01 and District Hearing Board Order GB09-06 until  
17 approved PM<sub>10</sub> controls are fully installed and operational on all Phase 7a areas.

18          18.    "Fully installed and operational" means that all required Phase 7a and  
19 "Transition Areas" (additional areas that are transitioned from an existing BACM to another  
20 BACM in order to conserve water) infrastructure, earthwork and appurtenances necessary for  
21 compliant BACM operation is installed and, in the case of managed vegetation BACM, all  
22 plant materials are in place, but the plants may not necessarily be fully developed or grown

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1 sufficiently to meet the 2008 SIP requirements for cover conditions. The Phase 7a and  
2 Transition Areas locations are shown and described in Exhibit 4.

3 19. Due to the fact no approved controls were in place on the Phase 7a areas, on  
4 October 1, 2010 the APCO issued Notice of Violation (“NOV”) number 471 to Respondent  
5 for violating District Governing Board Order 080128-01 and District Hearing Board Order  
6 GB09-06.

7 20. Paragraph 11 of District Governing Board Order 080128-01 requires the  
8 APCO to use the “2008 Owens Valley Planning Area Supplemental Control Requirements  
9 Determination Procedure” (“SCR procedure,” contained in Attachment B of Order) to  
10 determine the need for additional PM<sub>10</sub> controls on the Owens Lake bed beyond those  
11 required by the original Order.

12 21. The SCR procedure provides that if Respondent is in compliance with the  
13 requirements set forth in “Board Order 080128-01 regarding the amount, timing and  
14 operation of existing and future dust controls, the APCO will not issue additional written  
15 SCR determinations until after May 1, 2010 and will not use data collected prior to April 1,  
16 2010 for new determinations.” The last SCR determination was issued in January 2008 in  
17 association with the 2008 SIP and used data up to June 30, 2006. The data collected starting  
18 July 1, 2006 has not previously been used to make an SCR determination.

19 22. Respondent maintains the right to challenge SCR determinations made by the  
20 APCO and orders for additional PM<sub>10</sub> controls issued by the APCO based on such SCR  
21 determinations. Respondent retains all of its rights pursuant to Health and Safety Code §  
22 42316, Attachment B to Board Order 080128-01, and all other available legal remedies to

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1 challenge SCR determinations and orders based on such determinations. Nothing in this  
2 Order for Abatement amends or otherwise changes the SCR procedures.

3 23. Notice of hearing on this matter was duly given and published in accordance  
4 with Health and Safety Code §42450 and District Rule 811.

5 24. All parties have stipulated to this matter being heard by the District Governing  
6 Board and have waived all rights to contest the ongoing authority of the District Governing  
7 Board to hear this matter.

8 25. Members of the public were offered the opportunity to provide comment on  
9 the Order of Abatement. No public comments were offered.

10 26. To the extent any of these Findings of Fact are considered or deemed to be  
11 Conclusions or part of the Order, they are incorporated into those sections as if fully set forth  
12 therein.

### 13 CONCLUSIONS

14 1. The District Governing Board finds that Respondent is in violation of  
15 requirements in District Governing Board Order 080128-01 and District Hearing Board  
16 Order GB09-06 due to Respondent's failure to implement approved PM<sub>10</sub> control measures  
17 on the 3.1 square-mile Phase 7a areas by October 1, 2010. The District estimates these  
18 violations are expected to result in approximately 6,265 tons of excess PM<sub>10</sub> per year to be  
19 emitted from the Phase 7a areas of the dried bed of Owens Lake. These emissions would  
20 have been controlled if the Phase 7a PM<sub>10</sub> controls had been implemented according to  
21 requirements. Excess PM<sub>10</sub> emissions from the Phase 7a areas are expected to continue to  
22 cause or contribute to exceedances of both state and federal 24-hour PM<sub>10</sub> standards.

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1           2.       The District Governing Board finds that Petitioner and Respondent have  
2 worked together to develop a number of corrective actions and Petitioner has committed to  
3 take such actions so as to provide effective PM<sub>10</sub> control on the Phase 7a as expeditiously as  
4 feasible. Until dust control measures are implemented pursuant to this Order, there is the  
5 potential for excess emissions and state and federal air quality standards violations to  
6 continue to occur.

7           3.       The District Governing Board finds that Respondent can achieve compliance  
8 with District requirements as expeditiously as feasible by implementing BACM, including an  
9 APCO-approved BACM test on Area T12-1 only, on the 3.1 square-mile Phase 7a areas.

10          4.       The District Governing Board finds that, in addition to the expeditious  
11 implementation of BACM, Respondent must offset the potential excess PM<sub>10</sub> air pollution  
12 emissions that may be emitted during the non-compliance period by taking additional actions  
13 to control and/or offset any excess air pollution emissions to the extent feasible.

14          5.       The District Governing Board finds that due to the need to construct extensive  
15 infrastructure to deliver water to the emissive Phase 7a areas, if Respondent were to  
16 terminate, or reduce its water production, diversion, storage or conveyance activities in Inyo  
17 County, the available water could not immediately or readily be put to use in reducing excess  
18 PM<sub>10</sub> air pollution emissions.

19          6.       The District Governing Board finds it is not reasonable under California  
20 Health and Safety Code section 42316 to require Respondent to cease or curtail its water  
21 production, diversion, storage and conveyance activities in Inyo County during the non-  
22 compliance period, since the water is needed to comply with dust control requirements for  
23 the existing 39.9 square miles of PM<sub>10</sub> control measures currently operating at Owens Lake

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1 as required by District Governing Board Order 080128-01 and District Hearing Board Order  
2 GB09-06.

3 7. Therefore, the District Governing Board finds that the cessation or curtailment  
4 of Respondent's water production, diversion, storage and conveyance activities in Inyo  
5 County during the non-compliance period is contrary to Health and Safety Code § 42316 and  
6 would not provide a corresponding benefit in reducing the excess PM<sub>10</sub> emissions.

7 8. The District Governing Board finds that, in addition to the essential and  
8 mandatory requirements that Owens Lake dust controls be effective and ensure that air  
9 quality standards are met in a timely manner, it is important that Owens Lake dust controls  
10 be as cost-efficient and water-use-efficient as possible.

11 9. The District Governing Board finds that issuance of this Order will not  
12 constitute a taking of property without due process of law.

13 10. The District Governing Board finds that corrective actions to be taken by the  
14 Respondent and compliance with the conditions set forth in this Order will bring the  
15 Respondent's water production, diversion, storage and conveyance activities into compliance  
16 with District orders, rules and requirements as expeditiously as feasible.

17 11. To the extent any of these Conclusions are considered or deemed to be  
18 Findings of Fact or part of the Order, they are incorporated into those sections as if fully set  
19 forth therein.

20



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1           3.       The BACM and BACM-testing described in Order Paragraphs 1 and 2 shall  
2 generally be constructed as set forth in the Project Description attached as Exhibit 5. The  
3 Parties agree that in order for the project to comply with Health and Safety Code Section  
4 42316, the Phase 7a project will rely upon and incorporate the use of all three approved  
5 BACMs.

6           4.       Respondent shall install fully operational BACM for the Phase 7a areas and  
7 Transition Areas according to the following schedule:

8                   a.       Except the T12-1 BACM test area, BACM controls shall be fully  
9 installed and operational (as defined in Findings of Fact Paragraph 18, above) by  
10 December 31, 2013. All Phase 7a and Transition areas controlled by the Managed  
11 Vegetation BACM are to achieve fully-compliant BACM vegetation cover as specified in  
12 the March 2010 Managed Vegetation BACM Proposal (Exhibit 6) by December 31,  
13 2015. The APCO shall submit said Proposal to the District Governing Board for  
14 approval and incorporation into the 2008 SIP prior to July 31, 2011.

15                   b.       For the T12-1 BACM test area (as provided in Order Paragraph 2,  
16 above) either any existing BACM or a District-approved new BACM shall be fully  
17 installed and operational by December 31, 2015 or an earlier date, if specified in the  
18 District's approval of the new BACM.

19           5.       Respondent shall not be deemed in violation of this Order if Respondent is  
20 acting in good faith to comply with the terms of Order Paragraphs 1 through 4, but is  
21 impeded in its ability to comply with one or more of those terms of this Order as applicable  
22 to the Phase 7a and Transition Areas due to:

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- 1           a.       Unreasonable delays caused by the California State Lands  
2 Commission (CSLC), the District, or any other agency, except the City of Los Angeles  
3 and its agencies, in processing Respondent's application for a required permit, approval  
4 or lease necessary to allow Respondent to implement any of the three BACM, or the  
5 proposed 7a project.
- 6           b.       Denial by the CSLC, the District, or any other agency, except the  
7 City of Los Angeles and its agencies, of a required permit, approval or lease necessary to  
8 allow Respondent to implement any of the three BACM, or the proposed 7a project.
- 9           c.       A condition for a required permit, approval or lease made by the  
10 CSLC, the District or any other agency, except the City of Los Angeles and its agencies,  
11 that is unreasonable, unduly onerous, or that is not comparable to conditions contained in  
12 similar permits, approvals or leases necessary to allow Respondent to implement any of  
13 the three BACM, or the proposed 7a project.
- 14          d.       Delays caused by any third party challenge to Respondent's  
15 compliance with CEQA related to the Phase 7a areas or the Transition Areas.
- 16          e.       A condition of Force Majeure, which is defined to mean an  
17 extraordinary event or circumstance beyond the control of the parties, such as a war,  
18 labor actions, riot, crime, disruption of utilities or acts of God (such as adverse weather,  
19 earthquake, volcanic eruption or other natural disaster). Adverse weather is any weather  
20 condition, including but not limited to flooding and dust storms, that forces the  
21 Respondent to suspend all construction operations or prevents the Respondent from  
22 proceeding with 50 percent or more of the normal labor force and of the equipment

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1 engaged on critical path work. Delays shall only be granted for adverse weather days  
2 greater than 30 days for each 12 month period from April 1 through March 31.

3 f. Force Majeure is not intended to excuse delays or conditions where  
4 non-performance is caused by the usual and natural consequences of external forces, or  
5 where the intervening circumstances are specifically contemplated.

6 The Parties shall follow the procedure set forth in Order Paragraph 6 to determine if  
7 Respondent acted in good faith, but has been impeded in its ability to comply with the Order  
8 for any of the causes or conditions set forth above.

9 6. If Respondent's Board of Commissioners determines that Respondent has  
10 been impeded in its ability to comply with the requirements of this Order due to one or more  
11 conditions set forth in Order Paragraph 5, the following procedure shall be followed:

12 a. The Board of Commissioners shall pass a resolution making such a  
13 finding. If such a resolution is passed by the Board of Commissioners, Respondent shall  
14 notify the APCO in writing within 15 days of such resolution, and propose a detailed  
15 schedule of increments of progress setting deadlines for future actions to come into full  
16 compliance with this Order and to request an extension of the deadlines contained in this  
17 Order ("Schedule of Increments").

18 b. If the APCO concurs with the Board of Commissioners resolution,  
19 the Respondent and APCO shall jointly petition the District Governing Board to modify  
20 this Order as provided in Order Paragraph 22.

21 c. If the APCO does not concur with the Board of Commissioners  
22 resolution, the following shall occur:

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1                   i. The APCO shall notify the Respondent and the District  
2 Governing Board in writing of his finding within 15 days of receipt of the Board of  
3 Commissioner's resolution.

4                   ii. Within 30 days of such written notice by the APCO to  
5 Respondent, two District Governing Board members and two of Respondent's Board  
6 members may meet to make a non-binding recommendation as to whether  
7 Respondent has met the requirements of Order Paragraph 5 and whether the requested  
8 Schedule of Increments should be granted, granted with modifications, or denied.  
9 The final recommendation, if any, shall be made in writing within 15 days of the  
10 meeting. If a recommendation is not made, or the meeting does not take place within  
11 30 days of written notice by the APCO, Respondent may request a final determination  
12 from the District Governing Board at a public hearing, as provided in Order  
13 Paragraph 22.

14                   iii. If there is written recommendation pursuant to Order Paragraph  
15 (6)(c)(ii), the APCO shall submit such written recommendation to the District  
16 Governing Board. The Respondent shall have the burden of proof by a  
17 preponderance of the evidence that the conditions set forth in Order Paragraph 5 have  
18 been met.

19                   iv. If, at a public hearing, as provided in Order Paragraph 22, the  
20 District Governing Board finds that Respondent has proved by a preponderance of the  
21 evidence that the conditions set forth in Order Paragraph 5 have been met, the District  
22 Governing Board shall grant or grant with modifications the Schedule of Increments  
23 to allow Respondent additional time to comply without additional financial penalties

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1 being imposed for the delay. In addition, Respondent shall not be found in violation  
2 of this Order.

3 d. The Respondent retains all of its appellate and other legal rights to  
4 contest the findings of the District Governing Board to a court of competent jurisdiction.

5 7. In order to decrease water use on Owens Lake consistent with the stated goals  
6 of the Respondent and the District, up to 3.0 square miles of existing Shallow Flood controls  
7 as described in the attached Project Description (Exhibit 5) may be transitioned to any  
8 combination of the three approved BACM measures (Managed Vegetation, Shallow  
9 Flooding and/or Gravel Blanket) in order to provide a water supply for the 3.1 square miles  
10 of Phase 7a areas. The Transition Areas and the Phase 7a areas (with the exception of Area  
11 T12-1, which will be a BACM test) when completed shall only include BACM and will not  
12 include Moat and Row or any other non-BACM.

13 8. The parties stipulate that during construction of the Transition Areas, the  
14 Transition Areas may not be compliant at all times with the BACM requirements set forth in  
15 Governing Board Order 080128-01. Respondent therefore shall take "Reasonable  
16 Precautions" to control particulate matter emissions to the extent practicable during  
17 construction of the Transition Areas as set forth in District Rule 401A (adopted 09/05/74;  
18 amended 12/04/06). Respondent has developed a Conceptual Dust Control Plan for the  
19 Transition Areas consistent with, and considered to be the Reasonable Precautions required  
20 by, District Rule 401A and (attached hereto as Exhibit 7). Upon completion of the design of  
21 the Transition Areas and prior to any construction or any time when dust control measures in  
22 Transition Areas may be modified in a manner that would cause the areas not to comply with  
23 BACM requirements, Respondent shall submit to the APCO for his approval a final Dust

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1 Control Plan. The APCO shall expeditiously review Respondent's plan and shall not  
2 unreasonably withhold his approval of such plan. Despite the terms of Sections 7.9 of the  
3 2008 SIP and Attachment D to the Board Order, if the Transition Areas are not BACM  
4 compliant and if there is a monitored exceedance or if the Dust ID Protocol predicts an  
5 exceedance of the National Ambient Air Quality Standard for PM<sub>10</sub> caused solely by  
6 emissions from the Transition Areas (as determined by the "Dust ID" procedure set forth in  
7 the 2008 SIP), the District shall not take enforcement action pursuant to the Health and  
8 Safety Code, a variance will not be required and the Respondent shall not be deemed in  
9 violation of this Order, District Governing Board Order 080128-01, the 2008 SIP, or other  
10 District rules or orders related to such exceedances, provided that Respondent implements  
11 the approved Dust Control Plan or under circumstances of force majeure prohibiting  
12 compliance with the Dust Control Plan during this transition period

13 9. Respondent shall submit quarterly written reports on Phase 7a and Transition  
14 Area progress to the APCO and Board Clerk. Quarterly reports shall describe the status of  
15 the work completed during that quarter, the planned work for the next four quarters,  
16 compliance with the schedule, and specifically identify issues that could delay progress on  
17 the Phase 7a project. Respondent shall promptly notify the District in writing of any  
18 circumstances that could cause project delays. Quarterly reports shall be due within 30 days  
19 of the end of each calendar quarter. The first quarterly report subject to this Order shall be  
20 due on or before July 30, 2011 and the last quarterly report subject to this Order shall be due  
21 for the quarter during which Respondent has achieved full compliance for all Phase 7a areas  
22 and all Transition Areas.

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1           10.     Based on the 2008 SIP modeling protocol estimate of 6,265 tons of excess  
 2     annual PM<sub>10</sub> air pollution emissions expected to be caused by Respondent's failure to  
 3     implement effective PM<sub>10</sub> controls on the Phase 7a areas by the mandatory deadlines,  
 4     Respondent shall pay six-million-five-hundred-thousand dollars (\$6,500,000.00) to the  
 5     District to offset and mitigate such excess emissions that may occur between October 1, 2010  
 6     and December 31, 2013.

7           11.     Except as provided in Order Paragraphs 5, 6, 8 and 9, above, and failure to  
 8     comply with BACM implementation and operation deadlines for all Phase 7a areas and  
 9     Transition areas as set forth in Order Paragraph 4, above, or by deadlines as subsequently  
 10    modified by the District as provided in Paragraph 22, Respondent shall be subject to  
 11    additional daily offset payments prorated by the amount of noncompliant area according to  
 12    the following formula:

$$13 \qquad \text{Offset Amount (\$/day)} = \$5,500 + \$4500 (A_{7a} + A_{TA})/6.1$$

14                   where,

15                   A<sub>7a</sub> = Non-compliant Phase 7a Area (square miles), and

16                   A<sub>TA</sub> = Non-compliant Transition Area (square miles).

17           12.     Respondent shall make the payment as set forth in of this Order Paragraph 10,  
 18     above, within 90 days of the date of this Stipulated Order for Abatement, or within 90 days  
 19     of the issuance of an order to pay, if additional payments are demanded, as provided in  
 20     Paragraph 11 above, for failure to meet the completion dates set forth in Order Paragraph 4,  
 21     above.

22           13.     Eighty-five percent (85%) of the excess air pollution offset/mitigation  
 23     payment made by Respondent to the District under Paragraphs 10 and 11 of this Order shall

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1 be deposited into an Owens Lake Excess Air Pollution Offset Fund established by the  
2 District. These monies shall be used for Clean Air Projects within the District (Inyo, Mono  
3 and Alpine Counties) with preference given to projects in the Owens Valley PM<sub>10</sub> Planning  
4 Area. "Clean Air Projects" are defined as improvements, replacements, or programs that  
5 directly or indirectly result in a reduction in air pollution emissions. Monies shall not be  
6 used to fund projects that Respondent is required to undertake or implement. The District  
7 Governing Board shall have the sole authority and discretion regarding project selection and  
8 approval, but will consider any project recommendations made by Respondent. Projects  
9 shall be publicized as joint projects of the Great Basin Unified Air Pollution Control District  
10 and the Los Angeles Department of Water and Power. Fifteen percent (15%) of the Clean  
11 Air Projects funds will be deposited into the District's regular budget account. All costs  
12 incurred by the District to administer the Clean Air Projects program will be paid by the  
13 District from the District regular budget account. The District shall have the sole discretion  
14 and responsibility for the Clean Air Projects program administration, planning and  
15 implementation, and Respondent shall not be responsible for program costs other than for the  
16 offset mitigation payments in compliance with Paragraphs 10 and 11 of this Order.

17 14. The APCO shall resume the Supplemental Control Requirement  
18 determinations required in Paragraph 10 of District Governing Board Order 080128-01 and  
19 shall use data collected since July 1, 2006 to make such determinations.

20 15. The parties commit to work cooperatively to support Respondent's efforts to  
21 develop and implement new PM<sub>10</sub> control measures or modify existing measures that are as  
22 water-use efficient as possible.

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1           16.     Respondent shall comply with all other District rules, codes, orders and  
2 regulations not covered by this Order for Abatement, including all provisions of District  
3 Governing Board Order 080128-01 and District Hearing Board order GB09-06 that have not  
4 been modified by this Order for Abatement. Respondent's violation of any District rules,  
5 codes, orders or regulations not covered by this Order for Abatement, including all other  
6 provisions of District Governing Board Order 080128-01 and District Hearing Board Order  
7 GB09-06, shall be subject to District enforcement and will be considered separate violations  
8 not subject to the limitations and reductions set forth in the Order for Abatement.

9           17.     This Order for Abatement does not act as a variance and Respondent is  
10 subject to all rules and regulations of the District except as provided in this Order for  
11 Abatement.

12           18.     Final compliance shall be achieved, and this Order for Abatement shall  
13 terminate when Phase 7a and the Transition Areas are fully operational, but no later than  
14 December 31, 2015. Respondent shall notify the Clerk of the Board and the APCO in  
15 writing when final compliance is achieved.

16           19.     Respondent enters into this Stipulated Order for Abatement without admitting  
17 liability and for the limited purpose of settling NOV No. 471 issued to Respondent by the  
18 APCO on October 1, 2010, and for violation of Governing Board Order 080128-01, and for  
19 violation of District Hearing Board Order GB09-06. Respondent specifically waives and  
20 agrees not to appeal or otherwise contest this Stipulated Order for Abatement under Health  
21 and Safety Code Section 42316 or any other cause of action. Respondent however, reserves  
22 its legal and appellate rights to contest any allegation that it has violated this Stipulated Order  
23 for Abatement. Respondent does not waive or give up its right to contest any other future

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1 order, NOV, civil or criminal prosecution, or any other action the District may bring against  
2 Respondent subsequent to entry of this Stipulated Order for Abatement.

3 20. This Stipulated Order for Abatement is a full and final settlement of NOV  
4 No. 471 issued by the APCO to Respondent on October 1, 2010, and for the violation of  
5 Governing Board Order 080128-01. The stipulated order is the final integrated agreement  
6 between the parties regarding the matters addressed herein. By entering this Stipulated Order  
7 of Abatement, Respondent is hereby released from any additional liability for these  
8 violations except as set forth in this Order.

9 21. The District Governing Board shall retain jurisdiction over this matter until  
10 December 31, 2015, unless the Order is amended or modified.

11 22. The parties may petition the District Governing Board for a modification of  
12 this Order for Abatement with or without a stipulation. The Governing Board may modify  
13 the Order for Abatement without the stipulation of the parties upon a showing of good cause  
14 therefore and upon making the findings required by Health and Safety Code Section  
15 42451(a) and District rule 805(a). Any modification of the Order shall be made only at a  
16 public hearing held upon ten (10) days published notice and appropriate notice to the parties.

17 23. The United States Environmental Protection (USEPA) Region 9 has been  
18 informed of this agreement made and entered into between the District and Respondent.

19 24. Petitioner and Respondent stipulate that the District Governing Board has full  
20 and complete jurisdiction in the matter of this Stipulated Order for Abatement.

21 25. Petitioner and Respondent affirm that their respective signatories below have  
22 the authority to represent and bind their respective parties to the terms of this Stipulated  
23 Order for Abatement.

24

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1 **Reviewed and Stipulated by:**

2 Air Pollution Control Officer, Petitioner:

3 *T. D. Schade*  
4 Theodore D. Schade, Air Pollution Control Officer

1 April 2011  
Date

5 Los Angeles Department of Water and Power, Respondent:

6 *Ronald O. Nichols*  
7 Ronald O. Nichols, General Manager

3/30/11  
Date

8 **ORDERED FOR THE BOARD BY:**

9 *Linda Arcularius*  
10 Linda Arcularius, Chair, District Governing Board

April 1, 2011  
Date

11 **ATTEST:**

12 *Shirley Ono*  
13 Shirley Ono, Acting Board Clerk

14 Date: April 1, 2011  
15

APPROVED AS TO FORM AND LEGALITY  
CARMEN A. TRUTANICH, CITY ATTORNEY

MAR 29 2011

*Michelle Lyman*  
MICHELLE LYMAN  
DEPUTY CITY ATTORNEY

Final: 3/17/2011

1 **List of Exhibits**

- 2 Exhibit 1 Owens Lake -- Map
- 3 Exhibit 2 District Governing Board Order 080128-01, contained in the *2008 Owens*
- 4 *Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State*
- 5 *Implementation Plan*, January 28, 2008
- 6 Exhibit 3 District Hearing Board Order GB09-06, *Findings and Order Granting*
- 7 *Regular Variance from Requirements Set Forth in Governing Board Order*
- 8 *080128-01*, September 25, 2009
- 9 Exhibit 4 Phase 7a and Transition Areas-- Map and Coordinate Description
- 10 Exhibit 5 Phase 7a and Transition Areas Project Description
- 11 Exhibit 6 March 2010 Managed Vegetation BACM Proposal
- 12 Exhibit 7 Conceptual Transition Area Dust Control Plan



**GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT**

***Board Order Number 110317-01 ~ Exhibits 1 through 7***

**City of Los Angeles, Department of Water & Power**

**Abatement Hearing**

***March 17, 2011***

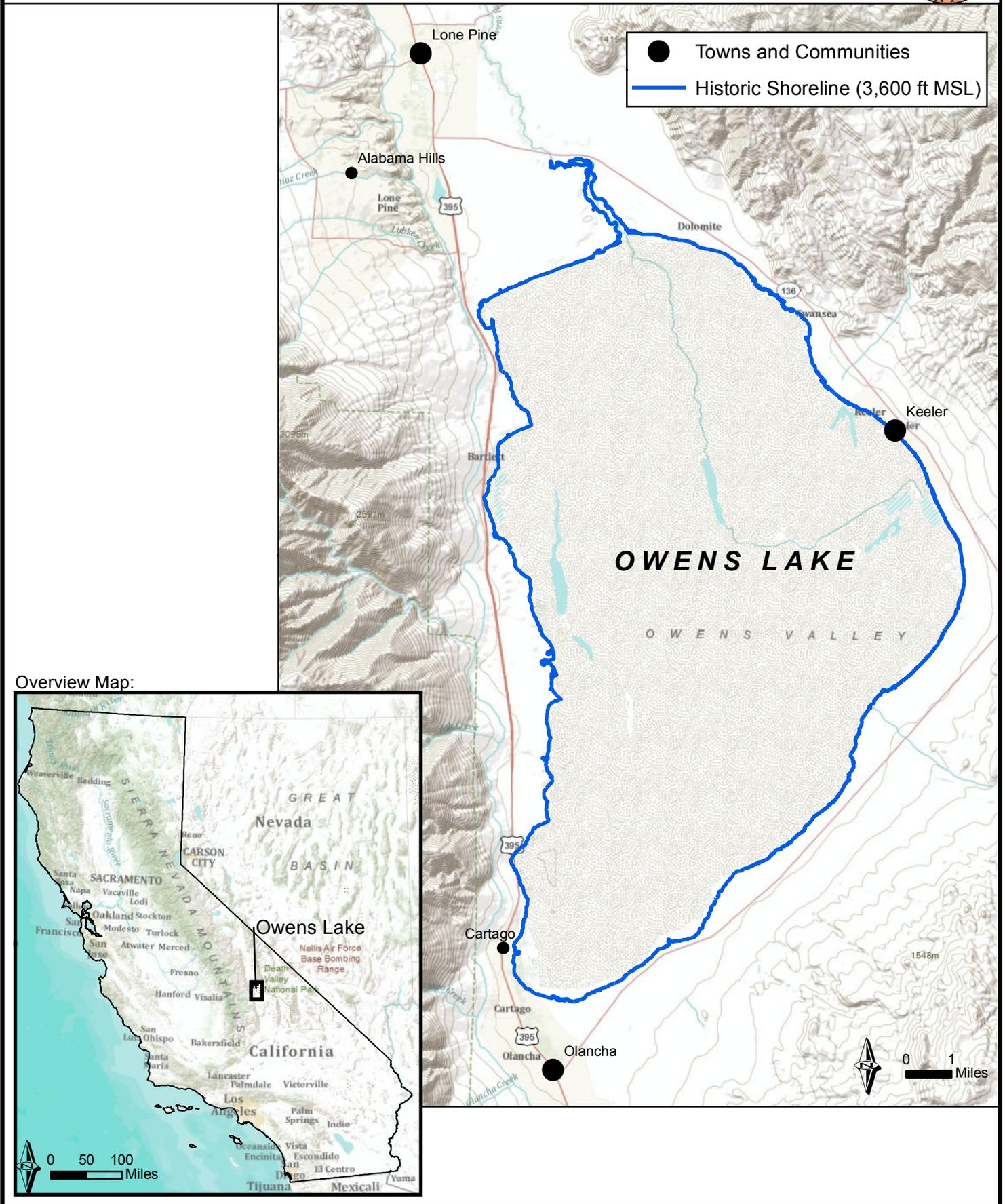
GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

# EXHIBIT 1

# OWENS LAKE – MAP



# Exhibit 1: Owens Lake General Vicinity Map



GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

**EXHIBIT 2**

**DISTRICT GOVERNING**

**BOARD ORDER**

**080128-01**

*Board Order Number 110317-01 March 17, 2011*

Theodore D. Schade  
Air Pollution Control Officer

Exhibit 2



## GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

157 Short Street, Bishop, California 93514-3537  
760-872-8211 Fax: 760-872-6109

**Board Order No. #080128-01**

**2008 Revision to the Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment  
State Implementation Plan (SIP) and associated Environmental Impact Report (EIR)**

**January 28, 2008 / February 1, 2008**

**I HEREBY CERTIFY** that Board Order No. 080128-01 was duly adopted and issued by the Governing Board of the Great Basin Unified Air Pollution Control District at a regular meeting on February 1, 2008, continued from January 28, 2008, held in the Inyo County Board of Supervisors Chamber, Inyo County Administrative Center, 224 North Edwards Street (US Highway 395), Independence, California. A true and correct copy is attached hereto.

ATTEST:

Wendy Sugimura, Clerk of the Board

**BOARD ORDER # 080128-01**  
**REQUIRING THE CITY OF LOS ANGELES TO UNDERTAKE MEASURES TO**  
**CONTROL PM<sub>10</sub> EMISSIONS FROM THE DRIED BED OF OWENS LAKE**

With regard to the control of PM<sub>10</sub> emissions from the bed of Owens Lake, the Governing Board of the Great Basin Unified Air Pollution Control District (District) orders the City of Los Angeles (City) as follows:

**PREAMBLE**

- A. WHEREAS, the 1998 Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State Implementation Plan (1998 SIP), dated November 16, 1998 and the 2003 Revision to the Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State Implementation Plan (2003 SIP), dated November 13, 2003, require the City to implement a series of measures and actions to reduce particulate emissions from the Owens Lake bed such that the Owens Valley Planning Area (OVPA) will attain and maintain the federal 24-hour National Ambient Air Quality Standards (NAAQS) for particulate matter (PM<sub>10</sub>) by the statutory deadlines;
- B. WHEREAS, the District is required by law to maintain its discretion to protect the environment, public health and safety, and this Order is intended to fulfill those duties without improperly constraining that lawful exercise of discretion;
- C. WHEREAS, based on additional information collected subsequent to the information used to adopt the 1998 SIP and 2003 SIP, the District has determined that additional measures and actions will be required to continue to reduce particulate emissions in the OVPA such that the OVPA will attain and maintain the federal 24-hour NAAQS for PM<sub>10</sub> by the statutory deadlines;
- D. WHEREAS, in 2006 a dispute arose between the District and the City regarding the District's requirements for the City to control dust from additional areas at Owens Lake beyond those areas identified in the 2003 SIP;
- E. WHEREAS, on December 4, 2006 a Settlement Agreement was approved by both the District and the City. Under the provisions of this agreement, the City agreed to implement additional dust control measures by April 1, 2010 and the District agreed to revise the 2003 SIP before March 1, 2008 to incorporate the provisions of the Settlement Agreement;
- F. WHEREAS, on March 23, 2007, the U.S. Environmental Protection Agency (USEPA) published a finding that the Owens Valley Planning Area did not attain the 24-hour NAAQS for particulate matter of 10 microns or less (PM<sub>10</sub>) by December 31, 2006 as mandated by the U.S Clean Air Act Amendments of 1990;
- G. WHEREAS, as a result of the USEPA finding, the 2003 SIP must be revised to include a control strategy that will provide for attainment in the Owens Valley Planning Area as

soon as practicable and that said revised SIP must be submitted to the USEPA by December 31, 2007;

- H. WHEREAS, in consideration of the District's continuing duties under federal and state law, including but not limited to the Clean Air Act, to control particulate emissions from the Owens Lake bed without interruption, the District intends, if this Order is stayed or disapproved, that Board Order #031113-01 (adopted on November 13, 2003) shall continue to be in effect, so that at all times there will be continuous control of these emissions;
- I. WHEREAS, the District thereby intends that if this Order is stayed due to a legal challenge, including but not limited to a challenge to this Order under California Health and Safety Code Section 42316, to the State Implementation Plan, or to the Environmental Impact Report for this SIP, or if this Order is disapproved by the California Air Resources Board (CARB), the District will revert to enforce the terms of Board Order #031113-01 which shall continue to be in effect and shall remain in full force for the duration of any stay or, in the case of disapproval, unless and until another Order is issued by this Board; and
- J. WHEREAS, to prevent the deterioration of air quality due to dismantling or "backsliding" on control measures that have already been implemented before any such stay or disapproval, the District intends that the City shall continue to operate and maintain all control measures already implemented at the time of any such stay or disapproval without interruption, unless and until a further Order of the District allows for such interruption, if the City has not appealed the control measures under Section 42316 within 30 days of the effective date of this Order, and if those control measures were not invalidated as a result of that appeal;
- K. WHEREAS, it is the District's intention that this 2008 revised SIP is consistent with the 2006 Settlement Agreement between the District and the City and that it is the District's intention to independently meet all its commitments and obligations under said Settlement Agreement.

**THEREFORE, IT IS HEREBY ORDERED AS FOLLOWS:**

**ORDER**

**IMPLEMENTATION OF OWENS LAKE BED PM<sub>10</sub> CONTROL MEASURES**

1. Existing PM<sub>10</sub> controls – From the date of adoption of this order, the City shall continue to operate and maintain the existing Best Available Control Measures (BACM) for PM<sub>10</sub>, as described in Paragraph 8 hereof, on 29.8 square miles of the Owens Lake bed within the 2003 Dust Control Area (DCA) delineated in Exhibit 1.
2. Additional Shallow Flood supplemental PM<sub>10</sub> controls – By April 1, 2010 the City shall implement a minimum of 9.2 square miles of additional Shallow Flooding BACM PM<sub>10</sub>

controls within the 12.7 square-mile area known as the 2006 Supplemental Dust Control Area (SDCA) delineated in Exhibit 1. The areas within the SDCA designated for Shallow Flooding only are delineated in Exhibit 1. Shallow Flooding BACM is described in Paragraphs 8, 9 and 15 hereof.

3. Other additional supplemental PM<sub>10</sub> controls – On a maximum of 3.5 square miles within the 2006 SDCA delineated in Exhibit 1, the City shall implement BACM for PM<sub>10</sub>, as described in Paragraphs 8, 9 and 15 through 17 hereof, or the City may implement the alternative non-BACM PM<sub>10</sub> control measure known as “Moat & Row,” as described in Paragraph 18. If BACM are installed, the controls shall be operational by April 1, 2010. If Moat & Row is installed, it shall be operational by October 1, 2009.
4. Channel Area PM<sub>10</sub> controls – A 0.5 square-mile area of natural drainage channels on the south area of the Owens Lake bed is known as the “Channel Area” and is delineated in Exhibit 1. The City shall control PM<sub>10</sub> emissions from the Channel Area by implementing and operating BACM, modified-BACM or alternative non-BACM controls approved by the District’s Air Pollution Control Officer (APCO), that take into account the resource issues in the Channel Area, by April 1, 2010. Portions of the Channel Area that are determined by the APCO to be naturally non-emissive (for example, adequately vegetated areas) will not require controls. If BACM are implemented in the Channel Area, they shall be as described in paragraphs 8, 9 and 15 through 17 hereof. If the City seeks to implement modified-BACM or alternative non-BACM, the City will apply such modifications as are permissible to resource agencies in this channel, with the primary objective of controlling dust, and provide the District with a monitoring plan aimed at identifying source areas that could cause or contribute to shoreline violations. Should such areas be identified after facilities are fully operational (including vegetative development), the District and the City will work with resource agencies to develop site-specific and implementable dust control approaches. Regardless of the approach selected for Channel Area dust control, the City shall prepare and submit to the District a detailed plan demonstrating the need and effectiveness of the control measures and their projected impacts to the environment, and obtain the prior approval of the District and any other applicable regulatory agencies with jurisdiction over the Channel Area for use of the modified-BACM. The City shall be responsible for any additional environmental analyses that may be required and for all required permits.
5. Total PM<sub>10</sub> control area – The 29.8 square-mile 2003 Dust Control Area (DCA), the 12.7 square-mile 2006 Supplemental Dust Control Area (SDCA) and the 0.5 square-mile Channel Area together comprise the 43.0 square-mile area known as the 2008 Total Dust Control Area (TDCA). These PM<sub>10</sub> control areas are delineated in Exhibit 1.
6. Minor adjustments to PM<sub>10</sub> control area boundaries – Upon written request by the City to the District and written approval by the District’s APCO, minor adjustments may be made to the interior and exterior boundaries of the 2006 SDCA, for example to avoid impacts to existing resources or features, or for constructability reasons, which approval shall not be unreasonably withheld. In the event of such modification, the boundaries of the 2008 TDCA shall also be modified to reflect the modified 2006 SDCA boundaries.

7. Study Areas – The District has identified four additional “Study Areas” on the Owens Lake bed totaling up to 1.85 square miles that may require some level of control in order to attain the PM<sub>10</sub> NAAQS. The four Study Areas are delineated in Exhibit 1. The District will study emissions from the Study Areas occurring between July 1, 2006 and April 1, 2010 to determine whether they will cause or contribute to PM<sub>10</sub> NAAQS exceedances such that controls will be required. The District will use the data collected during this period to make a determination after May 1, 2010 as to the need for additional controls, as set forth in Paragraph 10, below. However, if the City is not in compliance with Paragraphs 1 and 3 of this Order, the determination as to the need for additional controls in the Study Areas may be made prior to May 1, 2010.

#### PM<sub>10</sub> CONTROL MEASURES

8. The City shall implement BACM PM<sub>10</sub> control measures as set forth in this Order, described below in Paragraphs 15 through 17. The City may implement the alternative non-BACM PM<sub>10</sub> control measure as set forth in this Order, described below in Paragraph 18. To complete implementation of a specified control measure by a date as required by this Order means that the control measure shall be constructed, installed, operated and maintained without interruption, so as to comply with the performance standards for the specified control measure not later than 5:00 p.m. on the required date.
9. All PM<sub>10</sub> control measures within the 2006 SDCA shall be designed, constructed, installed, operated and maintained by the City to achieve the initial target minimum dust control efficiencies (MDCEs) shown on the MDCE Map, attached as Exhibit 2. MDCEs are the actual dust control measure control efficiencies required to meet the PM<sub>10</sub> NAAQS, based on data collected during the four-year period between July 2002 and June 2006. Prior to April 1, 2010, upon request of the City and written approval of the APCO, which approval shall not be unreasonably withheld, the initial target MDCEs may be modified if the modified target MDCEs meet the criteria set forth in the MDCE Selection Process Spreadsheet, as set forth in the 2006 Settlement Agreement between the District and the City. This Settlement Agreement is attached as Attachment A.

#### CONTINGENCY MEASURES – SUPPLEMENTAL CONTROL DETERMINATIONS

10. At least once per calendar year after May 1, 2010, the District’s APCO will make a written determination as to whether any areas, in addition to those described in Exhibit 1, require air pollution control measures in order to attain or maintain compliance with the NAAQS for PM<sub>10</sub>. The APCO’s determination will also contain an analysis of the minimum dust control efficiency provided by the PM<sub>10</sub> controls in the 2008 TDCA to determine if a higher level of control efficiency is required in order to attain or maintain compliance with the NAAQS for PM<sub>10</sub>. In making these determinations, the APCO shall employ the methods described in Paragraph 11 of this Order. If the City is not in compliance with Paragraphs 1 and 3 of this Order, the determination as to the need for additional controls may be made prior to May 1, 2010.
  - A. If the APCO determines under this Paragraph that additional areas require air pollution control measures or that existing PM<sub>10</sub> control measures require a higher level of control efficiency, the APCO shall issue a written determination to the City informing them that

the provisions of Paragraph 11 of this Order require the City to implement, install, operate and maintain PM<sub>10</sub> BACM on additional areas of the Owens Lake bed or that the control efficiency on existing PM<sub>10</sub> controls must be increased. The determination will identify those areas of the lake bed that will require PM<sub>10</sub> BACM and the control efficiency necessary to attain the PM<sub>10</sub> NAAQS. The City shall secure all permits and leases necessary to implement BACM and conduct any additional analysis, if any, required to comply with the California Environmental Quality Act and any other applicable laws.

- B. The APCO's annual determinations will use data collected after April 1, 2010, except as provided in Paragraph 7, above, for the four Study Areas. The annual determinations for the Study Areas will use data collected after July 1, 2006.
- C. In the event the City appeals the supplemental control determination under Health & Safety Code Section 42316, and pending a decision of the CARB, the City is not required to comply with any measure imposed by the supplemental control determination. The District relies upon action by the CARB to issue its decision on the City's appeal within 90 days. If CARB does not affirm the District supplemental control determination, or otherwise require the City to immediately undertake alternative supplemental control measures within 90 days in such circumstances where automatic control measures are required under Sections 172(c)(1) or 182(c)(9) of the federal Clean Air Act, 42 U.S.C. Sections 7502(c)(9) and 7511a(c)(9), the District relies upon the CARB to take these federal requirements into account in its determination of the City's appeal and to issue such interim orders as necessary to implement automatic supplemental control measures so that this Order complies with the Clean Air Act and can be approved by the U.S. Environmental Protection Agency as a proper State Implementation Plan. The foregoing is not intended to provide the CARB with any authority other than its authority under state law.
- D. Paragraph 11 fixes the period of time within which the implementation of the additional control measures must be completed. Upon implementation, the City shall continuously operate and maintain, without interruption, the control measures to comply with performance standards set forth for such measures in the control measure descriptions contained in this Order.

#### CRITERIA FOR DETERMINING THE NEED FOR ADDITIONAL PM<sub>10</sub> CONTROLS

- 11. The criteria, methods and procedures for the APCO's determination of the need for additional PM<sub>10</sub> controls described in Paragraph 10 shall be those described in detail in the "2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure" document incorporated as Attachment B along with its referenced "2008 Owens Lake Dust Source Identification Program Protocol" incorporated as Attachment C.

#### NEW BACM, ADJUSTMENTS TO EXISTING BACM, AND BACM TRANSITIONS

- 12. Upon written request by the City, the APCO may approve new BACM, a modification or adjustment to the existing BACMs described in Paragraphs 15, 16 and 17 of this Order, and/or the transition from one BACM to another provided that, at all times, the performance

standards of one or the other BACM are continuously met during the transition to assure that the transition shall not prevent the OVPA from attaining or maintaining the NAAQS for PM<sub>10</sub>. The City's request shall contain a detailed description of the proposed alternative and a demonstration that the request satisfied all requirements of law and this Order. The APCO shall have full discretion to consider any such application for a change in BACM, and to accept, reject or condition its approval of such application. Non-compliance with any such condition shall be enforceable as noncompliance with a District Order. Without limiting the District's discretion as provided herein, the procedures for transitions of implemented control measures or adjustments to BACM shall be those described in Attachment D, "2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area."

#### ALTERNATIVE METHODS FOR IMPLEMENTING CONTINGENCY MEASURES AND SUPPLEMENTAL CONTROLS

13. Notwithstanding any other provision of this Order, the District shall maintain its authority under Health and Safety Code Section 42316 to order the City to implement additional controls, to control additional emissive areas and/or to undertake additional reasonable measures necessary to mitigate the air pollution caused in the District by the City's water-gathering activities in order to prevent the OVPA from failing to attain or maintain the NAAQS for PM<sub>10</sub>, if circumstances arise that are not specifically addressed in Paragraphs 10 or 12 of this Order.

#### RELATIONSHIP TO BOARD ORDER 031113-01

14. The District hereby stays the force and effect of Board Order 031113-01 for all times that this Order is in full force and effect. In the event this Order, or any provision of this Order, is stayed due to a legal challenge, including but not limited to a challenge to this Order under Health & Safety Code Section 42316, or any other law, to the State Implementation Plan, or to the Environmental Impact Report for this Revised SIP, or in the event the Order is disapproved by the CARB, the following shall apply:
  - A. If the stay or disapproval causes Paragraph 1 through 5 of this Order to cease its operative force and effect, Board Order #031113-01 shall immediately be in effect and shall remain in full force for the duration of any stay or, in the case of disapproval, until another Order is issued by this Board. In addition, the City shall continue to operate and maintain without interruption all control measures already implemented in any area if those control measures were not appealed under Health & Safety Code Section 42316 within 30 days of the date of this Order, and if those measures were not invalidated as a result of that appeal.
  - B. If the stay or disapproval causes Paragraph 10 and/or 11 of this Order to cease its operative force and effect, but does not affect Paragraphs 1 through 5 of this Order, the City shall continue to operate and maintain all control measures already implemented without interruption.
  - C. If the stay or disapproval does not affect Paragraphs 1 through 7, 10 or 11 of this Order, those Paragraphs and any other terms of this Order that are not stayed or disapproved

shall be in effect, and shall remain in full force for the duration of any stay. In all cases, the City shall continue to operate and maintain, without interruption, all control measures already implemented.

- D. If a stay of this Order is imposed, then lifted so that this Order is in effect, the City shall, immediately, meet all requirements and deadlines set by this Order as if no stay had been imposed. The City shall not remove or decrease any control measures without the express written permission of the APCO, and the provisions of Board Order 031113-01 shall again be stayed. If the stay of this Order is only partially lifted such that any portion of this Order remains stayed, Board Order 031113-01 shall remain in effect as provided under Paragraphs 14.A., 14.B. and 14.C, above.

### PM<sub>10</sub> CONTROL MEASURES

#### 15. BACM Shallow Flooding

The “Shallow Flooding” PM<sub>10</sub> control measure will apply water to the surface of those areas of the lake bed where Shallow Flooding is used as a PM<sub>10</sub> control measure. Water shall be applied in amounts and by means sufficient to achieve the following performance standards:

A. For Shallow Flooding areas within the 29.8 square-mile 2003 DCA:

- i. Until April 1, 2010: At least 75 percent of each square mile of the designated areas shall continuously consist of standing water or surface-saturated soil, substantially evenly distributed for the period commencing on October 1 of each year, and ending on June 30 of the next year. If a contiguous Shallow Flood dust control area is less than one square mile, 75 percent of the entire contiguous area shall consist of substantially evenly distributed standing water or surface-saturated soil.
- ii. After April 1, 2010:
  - a. At least 75 percent of each square mile of the designated areas shall continuously consist of standing water or surface-saturated soil, substantially evenly distributed for the period commencing on October 16 of each year, and ending on May 15 of the next year. If a contiguous Shallow Flood dust control area is less than one square mile, 75 percent of the entire contiguous area shall consist of substantially evenly distributed standing water or surface-saturated soil.
  - b. Beginning May 16 and through May 31 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 70 percent.
  - c. Beginning June 1 and through June 15 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 65 percent.
  - d. Beginning June 16 and through June 30 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 60 percent.
  - e. If for any Shallow Flooding area, the percent of areal wetness cover in the periods specified in Paragraphs 15.A.ii,b, c, and d, above, is below the minimum percentages specified for each shallow flood area based on the air quality model for the analysis period from July 2002 through June 2006, and there were no monitored or modeled exceedances of the federal standard at the historic

shoreline, that area will be deemed to be in compliance, if the City demonstrates in writing and the APCO reasonably determines in writing that maximum water delivery mainline flows were maintained throughout the applicable period.

- B. For Shallow Flooding areas within the 12.7 square-mile 2006 SDCA:
- i. The percentage of each area that must have substantially evenly distributed standing water or surface-saturated soil shall be based on the Shallow Flood Control Efficiency Curve (SFCE Curve) attached as Exhibit 3 to achieve the control efficiency levels in the MDCE Map (Exhibit 2).
  - ii. For Shallow Flooding areas with control efficiencies of 99 percent or more:
    - a. Beginning May 16 and through May 31 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 70 percent.
    - b. Beginning June 1 and through June 15 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 65 percent.
    - c. Beginning June 16 and through June 30 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 60 percent.
    - d. If for any Shallow Flooding area, the percent of areal wetness cover in the periods specified in Paragraph 15.B.ii.a,b, and c, above, is below the minimum percentages specified for each shallow flood area based on the air quality model for the analysis period from July 2002 through June 2006, and there were no monitored or modeled exceedances of the federal standard at the historic shoreline, that area will be deemed to be in compliance if the City demonstrates in writing and the APCO reasonably determines in writing that maximum water delivery mainline flows were maintained throughout the applicable period.
- C. Beginning on April 1, 2010, if modeled or monitoring data shows an exceedance or exceedances of the PM<sub>10</sub> NAAQS at the historic shoreline as a result of excessive dry areas within Shallow Flooding control areas during the dust control periods for each year between October 1 and June 30 of the next year, the provisions of Paragraph 10 shall apply.
- D. From July 1 through September 30 of each year, the City is not required by the 2008 SIP to apply water to Shallow Flooding areas for dust control purposes, but is required to maintain minimum areal wetness cover as required by applicable environmental documents, permits, leases and approvals.
- E. Aerial photography, satellite imagery or other methods approved at the sole discretion of the APCO shall be used to confirm wetness coverage.
- F. The following portions of the areas designated for control with Shallow Flooding are exempted from the requirement of dust control by means of a saturated surface:

- i. Raised berms, roadways and their shoulders necessary to access, operate and maintain the control measure which are otherwise controlled and maintained to render them substantially non-emissive and
  - ii. Raised pads containing vaults, pumping equipment or control equipment necessary for the operation of Shallow Flooding infrastructure which are otherwise controlled and maintained to render them substantially non-emissive.
- G. “Substantially non-emissive” shall be defined to mean that the surface is protected with gravel, durable pavement or other APCO-approved surface protections sufficient to meet the requirements of District Rules 400 and 401 (visible emissions and fugitive dust).
- H. Excess surface waters and shallow groundwaters above the annual average water table that existed before site construction that reach the lower boundary of the dust control areas will be contained, collected and recirculated for reapplication to dust control areas or otherwise lawfully discharged. The dust control measure areas shall have lateral boundary edge berms and/or drains as necessary to contain excess waters in the control areas and to isolate the dust control measure areas from each other and from areas not controlled. If drains are used, they shall be designed and constructed so that they may be regulated such that groundwater levels, surface water extent and wetlands in adjacent uncontrolled areas are not impacted. These requirements do not apply to Shallow Flood area T36-4, due to its adjacency to the Lower Owens River Project (LORP) and the City’s intention to integrate the design and operation of T36-4 into the LORP.
- I. The City shall remove all exotic pest plants, including salt cedar (*Tamarix ramosissima*), that invade any of the areas designated for control by Shallow Flooding.
- J. As necessary to protect human health, the City shall prevent, avoid and/or abate mosquito, other pest vector and biting nuisance insect breeding and swarming within and in the vicinity of the control areas, including within communities less than three miles from a PM<sub>10</sub> control area, by effective means that minimize adverse effects upon adjacent wildlife.

#### 16. BACM Managed Vegetation

##### A. Existing Managed Vegetation areas

For areas controlled with the Managed Vegetation PM<sub>10</sub> control measure prior to January 1, 2007, the areas shall be operated and maintained in accordance with a Managed Vegetation Operation and Management Plan to be approved in writing by the APCO, which approval shall not be unreasonably withheld. The requirements of the Plan may be revised upon written request by the City and written approval of the APCO, which approval shall not be unreasonable withheld,. The City’s request shall contain a specific description of the modification requested and provide a demonstration regarding the effect of the modification on the environment and PM<sub>10</sub> control effectiveness.

B. New Managed Vegetation areas

In PM<sub>10</sub> control areas constructed after January 1, 2007 where Managed Vegetation is used as a PM<sub>10</sub> control measure, the following performance standard shall be achieved commencing on October 1 of each year, and ending on June 30 of the next year: substantially evenly distributed live or dead vegetation coverage of at least 50 percent on each acre designated for Managed Vegetation.

C. All Managed Vegetation areas

- i. The vegetation planted for dust control shall consist only of locally-adapted native species approved by the APCO or other species approved by both the APCO and the California State Lands Commission (CSLC). To date, the only approved locally-adapted native species is saltgrass (*Distichlis spicata*). However, other appropriate species may be approved upon written request of the City and written approval of both the APCO and CSLC.
- ii. Vegetation coverage shall be measured by the point-frame method, by ground-truthed remote sensing or by other methods approved at the sole discretion of the APCO.
- iii. The following portions of the areas designated for control with Managed Vegetation are exempted from the requirements set forth in Paragraphs 16.A. and 16.B., above:
  - a. Portions consistently inundated with water, such as reservoirs, ponds and canals,
  - b. Roadways and equipment pads necessary to access, operate and maintain the control measure which are otherwise controlled and maintained to render them substantially non-emissive, and
  - c. Portions used as floodwater diversion channels or desiltation/retention basins.
- iv. "Substantially non-emissive" shall be defined to mean that the surface is protected with gravel, durable pavement or other APCO-approved surface protections sufficient to meet the requirements of District Rules 400 and 401 (visible emissions and fugitive dust).
- v. Excess surface waters and shallow groundwaters above the root zone depths that reach the lower boundary of the dust control areas shall be collected and recirculated for reapplication to dust control areas or otherwise lawfully discharged. The dust control measure areas shall have lateral boundary edge berms and/or drains as necessary to contain excess waters in the control areas and to isolate the dust control measure areas from each other and from areas not controlled. Drains shall be designed and constructed so that they may be regulated such that groundwater levels, surface water extent and wetlands in adjacent uncontrolled areas are not impacted.
- vi. To protect the Managed Vegetation control measure from flood damage and alluvial deposition, the City shall incorporate stormwater and siltation control facilities into and around Managed Vegetation areas adequate to maintain the dust mitigation function of Managed Vegetation. The Managed Vegetation protection facilities shall be designed to dissipate flood waters and capture the alluvial material carried by

flood waters, so as to avoid greater than normal water flows and deposition of alluvial material into the Owens Lake brine pool.

- vii. The City shall remove all exotic pest plants, including salt cedar (*Tamarix* spp.), that invade any of the areas designated for control by Managed Vegetation.
- viii. As necessary to protect human health, the City shall prevent, avoid and/or abate mosquito, other pest vector and biting nuisance insect breeding and swarming within and in the vicinity of the dust control areas, including within communities less than three miles from a PM<sub>10</sub> control area, by effective means that minimize adverse effects upon adjacent wildlife.

#### 17. BACM Gravel Blanket

- A. In areas where Gravel Blanket is used as a PM<sub>10</sub> control measure, the City shall meet the following performance standard: one hundred percent of the control area shall be covered with a layer of gravel at least four inches thick. All gravel material placed must be screened to a size greater than one-half inch (½ inch) in diameter. Where it is necessary to support the gravel blanket, it shall be placed over a permanent permeable geotextile fabric. The gravel shall have resistance to leaching and erosion. It shall be no more toxic than the gravel from the Keeler fan site analyzed by the District in the Final Environmental Report prepared for the 1997 SIP. To minimize visual impacts, all gravel used shall be comparable in coloration to the existing lake bed soils.
- B. To protect the Gravel Blanket control measure from flooding, the City shall incorporate drains and channels into and around the control measure areas adequate to maintain the dust mitigation function of the Gravel Blanket, and outlet flood waters into the Owens Lake brine pool, Shallow Flooding areas, or reservoirs. The drains and channels shall be designed to incorporate features such as desiltation or retention basins that are adequate to capture the alluvial material carried by the flood waters and to avoid greater than normal deposition of this material into the Owens Lake brine pool.
- C. The gravel placement design and implementation shall adequately protect the graveled areas from the deposition of wind- and water-borne soil or infiltration of sediments from below. All graveled areas will be visually monitored to ensure that the Gravel Blanket is not filled with sand, dust or salt and that it has not been inundated or washed out from flooding. If any of these conditions are observed over areas larger than one acre, additional gravel will be transported to the playa and applied to the playa surface such that the original performance standard is maintained. The City shall apply best available control measures (BACM) and New Source Performance Standard (NSPS) emission limits to its gravel mining and transportation activities occurring within the District's geographic boundaries as required by the District in the City's District-issued Authority to Construct and Permit to Operate.

#### 18. Alternative Non-BACM Moat & Row Control Measure

- A. The Moat & Row PM<sub>10</sub> control measure is not a currently-approved BACM. The preliminary form of Moat & Row is described in Exhibit 4 of the 2006 Settlement

Agreement between the District and the City (Attachment A). The final form of the Moat & Row PM<sub>10</sub> control measure will be determined from the results of a demonstration project and testing to be conducted by the City on the lake bed. All Moat & Row controls will be designed, constructed and operated to achieve the MDCEs described in Paragraph 9.

- B. The PM<sub>10</sub> control effectiveness of Moat & Row may be enhanced by combining it with other dust control methods such as vegetation, water, gravel, or the addition of other features that enhance sand capture and sheltering or directly protect the lake bed surface from wind erosion. The effectiveness of the array can also be increased by adding additional moats and rows to the array.
- C. Final design for the Moat & Row control measure will be determined solely by the City after consultation with and written notification to the District. The City shall consider the following elements in its final design:
  - i. Test results demonstrating that the required MDCE for each Moat & Row area can be met,
  - ii. Completion of all required environmental documentation, approvals, permits and leases, and
  - iii. Inclusion of monitoring in the infrastructure design to continuously monitor compliance with the target MDCE for each area.
- D. Upon written request of the City, the APCO shall determine in writing if any given Moat & Row design constitutes BACM or MDCE-BACM in accordance with Attachment D, “2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area.”
- E. Areas of Moat & Row that do not function as designed or that cause or contribute to an exceedance of the federal 24-hour PM<sub>10</sub> NAAQS will be remediated as specifically provided in Attachment B, the “2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure.”

#### PM<sub>10</sub> CONTROL MEASURE COMPLIANCE AND ENFORCEMENT

19. The District and City will work collaboratively to develop improved wetness and vegetative cover measurement techniques, control efficiency relationships, and compliance specifications for all PM<sub>10</sub> control measures. Final acceptance and implementation of all compliance measurement techniques and PM<sub>10</sub> control measure compliance specifications with regulatory impact will be at the sole discretion of the APCO.

#### STORMWATER MANAGEMENT

20. The City shall design, install, continually operate and maintain flood and siltation control facilities to protect the all PM<sub>10</sub> control measures installed on the lake bed at all times, and in a manner that groundwater levels, surface water extent, and wetlands in adjacent

uncontrolled areas are not impacted by induced drainage. Flood and siltation control facilities shall be integrated into the design and operation of the PM<sub>10</sub> control measures. All flood and siltation control facilities and PM<sub>10</sub> control measures damaged by stormwater runoff or flooding shall be promptly repaired and restored to their designed level of protection and effectiveness. All flood and siltation control facilities shall be designed and operated in a manner to prevent any greater threat of alluvial material contamination to the existing trona mineral deposit lease area (State Lands Commission leases PRC 5464.1, PRC 3511 and PRC 2969.1) than would have occurred under natural conditions prior to the installation of PM<sub>10</sub> control measures.

### SCHEDULE

21. The Control Measures shall be implemented on the areas set forth in Paragraphs 1 through 4 by the dates set forth in those Paragraphs. Supplemental Control Requirements shall be met on the schedule provided for in Attachment B.

### PERFORMANCE MONITORING PLAN

22. The City, in consultation with the District, shall annually develop and provide to the District in writing a Performance Monitoring Plan (PMP) to aid in its operation of the Owens Lake dust mitigation program on the Owens Lake bed.

- A. The PMP shall describe the measurements and methods used to verify the performance of the constructed DCMs. The PMP shall also describe the measurements and methods used to maximize information on dust emissions from any areas of special interest.
- B. The City shall implement the PMP, and will use the results as a guide for making operational decisions about the type, location, timing, and level of dust control measures needed to prevent exceedances of the federal standard at the shoreline.
- C. The District may use information from the PMP to assist in determining the likely sources of dust emissions causing or contributing to exceedances (if any) of the federal standard at the shoreline.
- D. The PMP for each calendar year shall be submitted to the APCO by March 31 of the following calendar year.

### ADDITIONAL REQUIREMENTS

23. The District Board orders the City of Los Angeles to satisfy the following requirements related to the implementation of the Shallow Flooding, Managed Vegetation, Gravel Blanket and Moat & Row control measures:

- A. The City's construction, operation and maintenance activities shall comply with all Mitigation Measures set forth in Final Environmental Impact Reports, EIR Addendums and Mitigated Negative Declarations associated with the areas on which dust controls are placed, and all subsequent environmental documents adopted by the District for implementation of the requirements of this SIP.

- B. The City shall comply with any and all applicable requirements of the Mitigation Monitoring and Reporting Programs adopted by the District and associated with the Final Environmental Impact Reports and Final Environmental Impact Report Addendums for this project, and with all subsequent environmental documents adopted by the District for implementation of the requirements of this SIP. All mitigation measures required in certified environmental documents associated with the implementation, operation and maintenance of PM<sub>10</sub> control measures required by this order are hereby incorporated as requirements of this order and may be enforced as such.
- C. The City shall apply best available control measures (BACM) to control air emissions from its construction/implementation activities occurring in the District's geographic boundaries.

### **Exhibits**

- Exhibit 1 Map and Coordinates of PM<sub>10</sub> Control Areas
- Exhibit 2 Minimum Dust Control Efficiency Map
- Exhibit 3 Shallow Flood Control Efficiency Curve

### **Attachments**

- Attachment A 2006 Settlement Agreement between the Great Basin Unified Air Pollution Control District and the City of Los Angeles
- Attachment B 2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure
- Attachment C 2008 Owens Lake Dust Source Identification Program Protocol
- Attachment D 2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area

# Exhibit 1 - Map and coordinates of PM<sub>10</sub> control areas

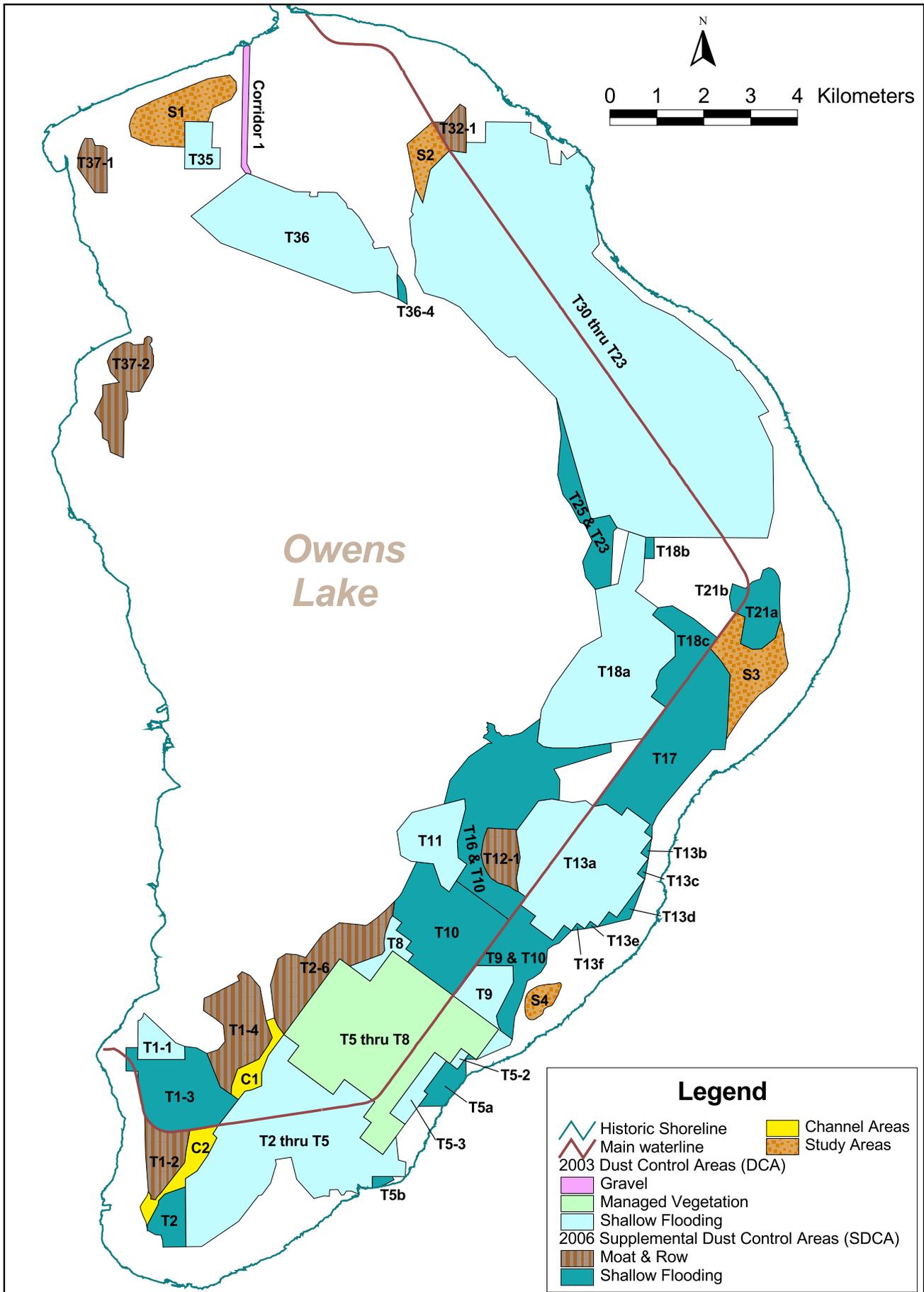


Exhibit 1 - Map and coordinates of PM<sub>10</sub> control areas

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates
T32-1	0.17	SDCA	415,639.7810	4,042,385.2695	T25 & T23	0.57	SDCA	418754.0310	4033026.4648
			415,283.2810	4,043,000.1953				418552.9690	4033287.6914
			415,539.4060	4,042,999.0234				418484.0000	4033621.1133
			415,866.3750	4,043,383.8359				418689.0940	4034066.4102
			415,994.4060	4,043,304.2109				418529.0310	4034424.5078
			416,002.6250	4,042,981.9922				418434.8130	4034452.0664
			416,005.6250	4,042,568.5234				418325.1880	4034653.5234
			416,000.9380	4,042,344.1055				418224.7810	4034845.3438
			415,872.2190	4,042,360.3477				418067.7500	4035047.7852
			415,645.7500	4,042,391.2070				417953.1880	4035467.4961
			415,639.7810	4,042,385.2695				417980.5000	4035865.3203
								418027.9060	4036319.6094
								417924.7190	4037107.5195
T37-1	0.21	SDCA	408,348.9690	4,041,492.4844	T18b	0.03	SDCA	419802.4690	4033687.7656
			408,085.5000	4,041,493.3164				420012.7190	4033690.4844
			407,718.8130	4,042,027.7422				420006.8750	4034140.9297
			407,731.5000	4,042,299.3945				419832.0310	4034141.9609
			407,804.9060	4,042,524.2148				419802.4690	4033687.7656
			407,873.2810	4,042,654.1211					
			408,032.2500	4,042,647.6875					
			408,089.5630	4,042,502.0625					
			408,267.6560	4,042,491.4219					
			408,347.0630	4,042,440.3203					
			408,348.9690	4,041,492.4844					
T36-4	0.03	SDCA	414,532.5630	4,039,759.7188	T21a	0.43	SDCA	421766.0310	4032526.5938
			414,583.3750	4,039,699.2617				421758.4690	4032529.3477
			414,643.3130	4,039,605.6250				421806.2810	4032593.7305
			414,700.5000	4,039,498.9766				421884.3440	4032697.7148
			414,718.6880	4,039,441.7188				421918.7190	4032746.2988
			414,729.1250	4,039,314.2500				421948.4060	4032795.7422
			414,747.2500	4,039,108.7500				421977.7500	4032858.2227
			414,550.5940	4,039,224.6563				421994.8130	4032902.9766
			414,528.0310	4,039,697.5039				422010.1880	4032960.1484
			414,532.5630	4,039,759.7188				422019.3130	4033018.7031
								422022.5630	4033079.4023
								422021.5000	4033108.1875
								422103.3750	4033191.3320
T37-2	0.59	SDCA	408,694.5000	4,035,836.9883	T21b	0.06	SDCA	422021.5000	4033108.1875
			408,417.2190	4,035,957.7344				421959.5000	4033044.5586
			408,370.5940	4,036,191.9453				421680.6250	4033146.5156
			408,249.5940	4,036,258.3164				421615.5310	4032859.4297
			408,231.6880	4,036,571.0625				421668.6250	4032569.9238
			408,075.5000	4,036,791.1719				421758.4690	4032529.3477
			408,254.4060	4,037,157.2813				421806.2810	4032593.7305
			408,249.9060	4,037,387.3789				421884.3440	4032697.7148
			408,606.5630	4,037,448.5391				421918.7190	4032746.2988
			408,414.0000	4,037,664.3359				421948.4060	4032795.7422
			408,348.8750	4,037,888.7227				421977.7500	4032858.2227
			408,415.9060	4,038,042.2422				421994.8130	4032902.9766
			408,494.0000	4,038,156.0977				422010.1880	4032960.1484
			408,687.9380	4,038,284.6484				422019.3130	4033018.7031
			408,762.7190	4,038,303.7813				422022.5630	4033079.4023
			408,853.0940	4,038,290.2422				422021.5000	4033108.1875
			408,911.3130	4,038,246.2109				422103.3750	4033191.3320
			409,028.9380	4,038,251.5742				422274.9380	4033248.8359
			409,126.1560	4,038,258.7344				422331.4380	4033437.2383
			409,134.0630	4,038,309.6602				422451.9060	4033492.2617
			409,144.5940	4,038,382.5547				422530.2190	4033470.0195
			409,201.0630	4,038,424.0508				422579.0940	4033430.6797
			409,255.5940	4,038,422.9180				422659.7190	4033313.9453
			409,299.1250	4,038,391.3789				422698.6880	4033173.2383
			409,304.7190	4,038,329.9609				422688.0630	4032830.0469
			409,254.9380	4,038,259.1797				422701.7500	4032367.5195
			409,308.0940	4,038,163.0195				422592.2190	4031994.7988
			409,312.7190	4,038,061.7695				422299.6560	4031762.5020
			409,335.7190	4,038,017.0195				422105.2500	4031749.0176
			409,334.3750	4,037,792.3008				421854.9690	4031871.4102
			409,260.5630	4,037,628.4492				421952.1880	4032442.4199
			409,184.9060	4,037,508.1055				421827.1560	4032498.3555
			409,044.0630	4,037,256.8359				421778.4380	4032522.0762
408,869.9060	4,037,236.6055	421766.0310	4032526.5938						
408,755.8130	4,037,260.8867								
408,768.2810	4,037,143.0156								
408,784.9690	4,037,079.6914								
408,789.7190	4,036,817.3555								
408,751.4060	4,036,667.7344								
408,706.5940	4,036,616.2422								
408,694.5000	4,035,836.9883								

**Exhibit 1 - Map and coordinates of PM<sub>10</sub> control areas**

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates
T18c	0.53	SDCA	420,276.9060	4,030,498.4297	T16 & T10 continued	2.00	SDCA	416449.2500	4029947.3340
			419,947.7810	4,030,741.5820				416459.1250	4029961.2246
			420,067.1880	4,030,907.8086				416462.9690	4029976.8418
			420,051.5940	4,031,073.7539				416471.5630	4029988.3965
			420,132.5000	4,031,300.5000				416481.0000	4029994.3359
			420,460.9690	4,031,604.8574				416483.2500	4030000.4590
			420,448.8130	4,032,104.4238				416476.4690	4030004.0684
			420,133.6880	4,032,354.6504				416464.6250	4030013.5332
			419,976.0000	4,032,480.4629				416452.1250	4030020.7266
			420,091.3440	4,032,635.9063				416447.3130	4030031.0762
			420,399.6560	4,032,679.1270				416454.8750	4030042.8809
			420,847.1880	4,032,406.2988				416467.7500	4030052.9766
			421,369.5310	4,031,989.5391				416466.0630	4030067.6035
			421,208.0630	4,031,771.3574				416454.5310	4030077.5586
			421,204.5310	4,031,775.5723				416440.6250	4030076.0938
			420,996.0630	4,031,494.8789				416437.6250	4030084.6914
			420,276.9060	4,030,498.4297				416445.8130	4030098.3496
T17	1.77	SDCA	419,965.0000	4,027,728.2129	416459.0310	4030110.6875			
			419,803.2190	4,027,847.7363	416465.9060	4030126.0488			
			419,922.8440	4,028,009.4902	416467.1560	4030142.7871			
			419,437.4690	4,028,368.0195	416461.5310	4030157.1523			
			419,317.9690	4,028,206.2617	416450.1560	4030168.0938			
			418,994.5310	4,028,445.2656	416439.0940	4030177.2402			
			418,723.3130	4,028,395.6211	416443.8750	4030188.7227			
			418,709.8750	4,028,405.5527	416458.4380	4030192.3809			
			418,741.5630	4,028,448.9863	416470.3130	4030190.8789			
			419,397.6250	4,029,329.5273	416479.0310	4030177.9727			
			419,791.5940	4,029,850.3008	416493.8130	4030171.2637			
			419,798.7500	4,029,851.3320	416510.6250	4030166.2656			
			420,276.9060	4,030,498.4297	416527.2190	4030165.8828			
			420,996.0630	4,031,494.8789	416541.7810	4030161.9238			
			421,204.5310	4,031,775.5723	416568.0630	4030143.3945			
			421,439.0940	4,031,498.2363	416585.0000	4030137.3281			
			421,631.0310	4,031,208.7773	416601.6250	4030130.7734			
			421,571.8750	4,030,077.3184	416608.7190	4030112.7188			
			421,548.9690	4,029,833.7383	416614.8750	4030093.7324			
			421,523.2500	4,029,607.1328	416614.1560	4030081.1367			
			421,241.1880	4,029,607.8887	416606.9690	4030057.0176			
			421,116.0000	4,029,457.7559	416610.2810	4030041.6328			
			420,776.0000	4,029,075.9551	416621.0310	4030029.7910			
			420,233.7500	4,028,421.8027	416626.8440	4030016.4492			
			420,070.9690	4,028,193.2832	416634.6560	4030003.4863			
			419,973.2500	4,027,978.3457	416639.6560	4029988.0273			
			419,965.0000	4,027,728.2129	416642.2500	4029973.2676			
			T16 & T10	2.00	SDCA	416,930.1250	4,025,968.3438	416656.7190	4029972.4727
						415,789.8440	4,026,810.3555	416688.3750	4029977.5293
						416,016.5310	4,027,163.7949	416704.9380	4029976.5762
						415,829.9690	4,027,301.7383	416715.9690	4029964.5742
						415,812.0000	4,027,654.7695	416723.1250	4029949.7949
						415,987.3440	4,028,348.7813	416734.4690	4029937.7109
415,969.6880	4,028,562.7461	416747.7190				4029929.2070			
415,530.3750	4,028,446.4922	416759.0310				4029916.4004			
415,660.2500	4,028,955.4551	416768.4690				4029902.2207			
416,062.8130	4,029,458.0664	416781.8130				4029898.3633			
416,386.1560	4,029,683.9746	416790.3750				4029900.3945			
416,436.9060	4,029,720.7148	416827.0940				4029907.2129			
416,449.5000	4,029,732.7207	416838.2500				4029915.7813			
416,468.5940	4,029,742.7246	416845.7500				4029917.9492			
416,489.8750	4,029,746.4355	416852.5940				4029916.0938			
416,529.4060	4,029,741.9941	416867.9690				4029916.1543			
416,547.9690	4,029,741.4180	416880.3440				4029917.7637			
416,541.4060	4,029,755.8789	416895.6880				4029914.7402			
416,528.0940	4,029,767.9277	416925.9380				4029904.3965			
416,515.2190	4,029,777.7969	416940.7190				4029903.4805			
416,501.9690	4,029,786.2637	416954.8130				4029907.8730			
416,489.6560	4,029,794.9004	416966.3750				4029914.2246			
416,430.1250	4,029,834.6543	417119.3130				4029946.7070			
416,415.3750	4,029,843.4570	417187.6250				4029971.9180			
416,400.7190	4,029,849.4766	417581.8750				4030267.7148			
416,387.3130	4,029,856.1563	417521.0310				4029772.5156			
416,372.5940	4,029,860.3105	417653.4060				4029674.6738			
416,368.5310	4,029,870.0703	417852.7810				4029647.5566			
416,375.7810	4,029,880.6270	418383.2810				4029647.0859			
416,384.4690	4,029,895.7617	419085.9690				4029748.5098			
416,385.5310	4,029,910.9023	419093.6560				4029564.0527			
416,395.3130	4,029,918.6621	417877.2810				4029195.6055			
416,406.0630	4,029,922.9727	418000.2190				4028968.8594			
416,419.9060	4,029,929.8086	417985.4380				4028529.5684			
416,435.1560	4,029,936.6543	417827.8440				4028557.0566			
		417546.5630				4028514.7832			
		417094.6880				4027903.0527			

Exhibit 1 - Map and coordinates of PM<sub>10</sub> control areas

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates
T16 & T10 continued	2.00	SDCA	416,457.7500 416,404.6880 416,365.0310 416,321.9690 416,373.0940 416,439.1560 416,529.0000 416,679.5310 416,794.3130 416,918.4690 417,059.9690 417,118.0940 417,289.0630 416,930.1250	4,027,936.9766 4,027,788.4297 4,027,655.1465 4,027,364.6660 4,027,155.4727 4,026,996.8691 4,026,870.1172 4,026,765.2285 4,026,730.5000 4,026,690.9277 4,026,600.0957 4,026,580.9805 4,026,454.5645 4,025,968.3438	T2-6	0.97	SDCA	411915.1560 411828.0940 411988.0310 412161.8440 412387.4060 412577.3130 412752.9380 412942.5940 413298.0630 413700.7190 413843.4060 413892.3750 414103.4380 414294.0310 414474.4380 414432.8750 414383.9380 414275.7810 414249.7810 414265.6560 414210.4380 413520.9060 413307.2500 412118.5000 411983.4060 411915.1560	4023883.7793 4024594.2207 4025141.2695 4025254.5859 4025234.3184 4025175.8184 4025413.6777 4025667.2090 4025913.1816 4025878.1113 4025859.0313 4025869.0625 4026021.7207 4026188.3672 4026371.4551 4026064.3691 4025998.1035 4025684.7422 4025496.0488 4025321.0762 4025245.9102 4024987.7734 4025145.6113 4023536.9766 4023714.6152 4023883.7793
T12-1	0.33	SDCA	417,094.6880 416,457.7500 416,404.6880 416,365.0310 416,321.9690 416,373.0940 416,439.1560 416,529.0000 416,679.5310 416,794.3130 416,918.4690 417,059.9690 417,118.0940 417,075.7810 417,153.0940 417,068.6250 417,094.6880	4,027,903.0527 4,027,936.9766 4,027,788.4297 4,027,655.1465 4,027,364.6660 4,027,155.4727 4,026,996.8691 4,026,870.1172 4,026,765.2285 4,026,730.5000 4,026,690.9277 4,026,600.0957 4,026,580.9805 4,026,862.2246 4,027,305.2637 4,027,867.7852 4,027,903.0527	T9 & T10	0.70	SDCA	416221.4060 416930.1250 417169.6250 417483.0630 417363.6560 417848.8440 418087.8130 418249.6250 417981.1560 417862.3130 417742.6560 417731.0940 417711.4060 417596.9060 417427.9690 417308.1560 417192.2500 417038.6560 416987.0630 416718.5940 416734.5000 416700.3130 416688.8130 416678.0000 416644.1880 417009.4380 416999.7190 416221.4060	4025003.5195 4025968.3438 4026292.8027 4026061.2207 4025899.4727 4025540.9238 4025864.4414 4025744.9199 4025483.1621 4025432.8262 4025357.7832 4025299.8848 4025042.9023 4024857.0391 4024735.2051 4024673.9160 4024288.4082 4023907.3789 4023427.0801 4023625.4961 4023647.0195 4023672.3301 4023734.0977 4023742.0566 4023924.8242 4024643.3945 4024998.1367 4025003.5195
T13B	0.02	SDCA	419,887.6880 419,726.0630 419,965.0000 419,949.5310 419,887.6880	4,027,285.1777 4,027,404.7207 4,027,728.2129 4,027,659.1582 4,027,285.1777	T13e	0.01	SDCA	418530.9060 418650.3750 418812.1880 418722.7810 418530.9060	4025787.1563 4025948.9160 4025829.3945 4025817.3457 4025787.1563
T13c	0.02	SDCA	419,810.5000 419,648.7500 419,887.6880 419,878.5000 419,810.5000	4,026,842.1797 4,026,961.7246 4,027,285.1777 4,027,228.6270 4,026,842.1797	T13f	0.01	SDCA	418249.6250 418369.0940 418530.9060 418416.1250 418249.6250	4025744.9199 4025906.6797 4025787.1563 4025770.9355 4025744.9199
T10	1.51	SDCA	414,755.7190 414,875.1560 414,713.3750 414,832.8130 414,509.4060 414,628.8750 414,432.8750 414,474.4380 414,574.5630 414,628.3130 414,946.8130 415,303.7810 415,463.6880 415,641.0630 415,789.8440 416,930.1250 416,221.4060 415,803.2190 415,788.3750 415,755.0630 415,740.0630 415,730.9380 414,755.7190	4,025,075.7422 4,025,237.4785 4,025,356.9609 4,025,518.7363 4,025,757.7637 4,025,919.4863 4,026,064.3691 4,026,371.4551 4,026,473.5742 4,026,552.7695 4,027,212.2402 4,027,171.2852 4,026,710.9355 4,026,578.4043 4,026,810.3555 4,025,968.3438 4,025,003.5195 4,024,437.5703 4,024,419.2480 4,024,385.7285 4,024,367.4102 4,024,355.1348 4,025,075.7422	T1-4	0.81	SDCA	410989.3130 410984.9060 410759.9060 410472.0310 410718.0630 410862.1250 410821.5940 410665.3750 410401.5000 410411.4380 410520.6560 411162.2810 411124.9690 411222.3440	4022252.0020 4022253.3125 4022411.6719 4023123.1973 4023206.8965 4023378.8164 4023731.0039 4023862.7910 4024041.8867 4024308.5215 4024349.3066 4024681.8047 4024778.6250 4024873.7930
T13d	0.08	SDCA	418,812.1880 419,051.1560 419,212.9380 419,810.5000 419,654.8130 419,499.9380 419,182.9690 418,812.1880	4,025,829.3945 4,026,152.9102 4,026,033.3887 4,026,842.1797 4,026,404.0859 4,025,999.3496 4,025,925.2813 4,025,829.3945					

Exhibit 1 - Map and coordinates of PM<sub>10</sub> control areas

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates
T1-4 continued	0.81	SDCA	411,392.4060	4,024,792.1602	T1-2 continued	0.39	SDCA	409710.2810	4021438.8574
			411,607.8130	4,024,539.2461				409583.4380	4021449.5684
			411,737.1560	4,023,825.0313				409495.3440	4021478.5996
			411,867.2500	4,023,463.2520				409464.4690	4021488.9551
			411,784.7500	4,023,306.3613				409351.8750	4021549.4316
			411,582.4060	4,023,006.9551				409255.5940	4021639.3984
			411,126.7810	4,022,795.5957				409218.6880	4021681.9980
			410,994.2500	4,022,416.6367				409176.1250	4021738.1621
			410,989.3130	4,022,252.0020				409146.5630	4021804.0762
								409166.6250	4020986.3672
		409223.5310	4020182.5996						
T1-3	1.09	SDCA	410,109.0000	4,021,484.2637	T5b	0.03	SDCA	414001.2500	4020257.5078
			410,014.9380	4,021,469.1094				414001.4690	4020502.4766
			409,986.8440	4,021,465.6152				414426.0000	4020500.8613
			409,959.4380	4,021,467.4043				414464.0310	4020432.0313
			409,836.5940	4,021,452.1992				414293.7190	4020338.7207
			409,710.2810	4,021,438.8574				414135.9690	4020279.6660
			409,583.4380	4,021,449.5684				414001.2500	4020257.5078
			409,464.4690	4,021,488.9551					
			409,351.8750	4,021,549.4316					
			409,255.5940	4,021,639.3984					
			409,218.6880	4,021,681.9980	T2	0.29	SDCA	410025.1560	4019002.0527
			409,176.1250	4,021,738.1621				410016.8750	4020278.1387
			409,146.5630	4,021,804.0762				409576.6880	4020126.1250
			409,136.6880	4,021,861.1289				409445.4060	4019983.3887
			409,118.7810	4,021,931.0723				409435.7810	4019902.2852
			409,108.8130	4,021,989.7910				409208.0310	4019472.8008
			409,094.0000	4,022,070.1055				409200.4380	4019355.6914
			409,085.6880	4,022,117.5977				409374.7500	4019259.9512
			409,078.5310	4,022,146.7773				409428.5630	4019253.1973
			409,061.1250	4,022,247.9473				409493.8750	4019250.0898
			409,045.9690	4,022,310.3633	409534.9380	4019112.7676			
			409,033.1250	4,022,381.5703	409535.8130	4018994.6445			
			409,029.3750	4,022,398.8301	410025.1560	4019002.0527			
			409,009.4380	4,022,518.7207	S1	0.71	Study	410001.6560	4042464.2656
			409,000.8440	4,022,749.8164				409290.7190	4042500.2383
			408,748.8130	4,022,752.2285				408861.2190	4042688.4688
			408,748.6880	4,022,994.9199				408813.8750	4042910.9609
			408,752.0000	4,023,250.6855				408859.4380	4043071.8984
			409,002.0630	4,023,249.9121				408972.0940	4043285.6914
			408,999.6250	4,023,000.2637				409337.5310	4043461.0000
			410,005.2500	4,022,997.9414				410500.6560	4043924.3945
			410,001.3440	4,023,280.3730				410962.4690	4044000.3555
			410,254.3750	4,023,245.9746				411096.8440	4043852.2109
			410,472.0310	4,023,123.1973	411108.0630	4043672.6836			
			410,759.9060	4,022,411.6719	410984.4380	4043481.0273			
410,984.9060	4,022,253.3125	410592.0940	4043294.9219						
410,989.3130	4,022,252.0020	410496.6250	4043013.0352						
411,145.5940	4,022,140.7344	410088.4380	4043009.1836						
410,718.8440	4,021,593.2148	410003.7500	4043010.8320						
410,712.3750	4,021,582.9375	410001.6560	4042464.2656						
410,529.8750	4,021,556.1816	S2	0.28	Study	414928.6560	4041572.7617			
410,438.7190	4,021,533.8438				415075.1250	4041273.9336			
410,335.4060	4,021,518.5000				415237.3130	4041985.5195			
410,242.0940	4,021,502.6836				415639.7810	4042385.2695			
410,174.2810	4,021,494.7188				415283.2810	4043000.1953			
410,109.0000	4,021,484.2637				414740.2500	4042529.6992			
					414928.6560	4041572.7617			
					S3	0.72	Study	421208.0630	4031771.3574
								421766.0310	4032526.5938
								421778.4380	4032522.0762
		421827.1560	4032498.3555						
		421952.1880	4032442.4199						
		421854.9690	4031871.4102						
		422105.2500	4031749.0176						
		422299.6560	4031762.5020						
		422592.2190	4031994.7988						
		422701.7500	4032367.5195						
		422732.5630	4032243.8984						
		422746.8130	4032159.0254						
		422779.7500	4032064.7734						
		422779.7190	4031946.8984						
		422793.9060	4031814.8984						
		422817.5310	4031682.9316						
		422840.9690	4031565.0645						
		422869.3130	4031447.2109						
		422836.2810	4031338.7852						
		422713.7500	4031206.8086						
		422529.9380	4030985.2422						
		422250.5940	4030779.7578						
		422000.0310	4030499.9922						
T1-2	0.39	SDCA	409,223.5310	4,020,182.5996					
			409,280.3750	4,020,086.8984					
			409,276.4690	4,020,023.0879					
			409,360.9380	4,020,010.4766					
			409,373.6560	4,020,006.3652					
			409,409.3130	4,020,065.3262					
			409,487.5940	4,020,143.3262					
			409,998.0310	4,020,801.4766					
			410,027.5940	4,021,036.2754					
			410,109.0000	4,021,484.2637					
			410,014.9380	4,021,469.1094					
			409,986.8440	4,021,465.6152					
			409,959.4380	4,021,467.4043					
			409,836.5940	4,021,452.1992					

Exhibit 1 - Map and coordinates of PM<sub>10</sub> control areas

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates
S3 continued	0.72	Study	422,006.2810	4,030,500.0156	S4 continued	0.15	Study	418032.4060	4024597.6895
			421,836.9380	4,030,271.0234				418034.6560	4024589.4512
			421,548.9690	4,029,833.7383				418035.8750	4024580.7773
			421,571.8750	4,030,077.3184				418035.6560	4024570.7617
			421,631.0310	4,031,208.7773				418034.0630	4024559.9766
			421,439.0940	4,031,498.2363				418031.0630	4024548.3418
			421,208.0630	4,031,771.3574				418026.3750	4024535.4473
S4	0.15	Study	417,410.5630	4,023,845.5176	418020.4690	4024521.3984	418000.5310	4024478.6465	
			417,398.8440	4,023,845.8750	417984.5630	4024435.9668			
			417,387.4380	4,023,846.9883	417970.9060	4024402.7227			
			417,377.4060	4,023,848.7207	417957.8130	4024373.8125			
			417,367.8440	4,023,851.0527	417943.3130	4024343.8242			
			417,358.9380	4,023,853.9434	417931.2500	4024320.3027			
			417,350.9380	4,023,857.4238	417918.0940	4024295.7734			
			417,343.0940	4,023,861.6250	417880.1250	4024228.6719			
			417,335.2810	4,023,866.7793	417859.5000	4024190.0117			
			417,327.4690	4,023,872.8066	417854.1250	4024181.0176			
			417,319.6880	4,023,879.7500	417848.9380	4024173.2773			
			417,310.5940	4,023,888.9688	417843.6250	4024166.4160			
			417,301.9690	4,023,899.1680	417838.3130	4024160.3535			
			417,293.6560	4,023,910.1230	417832.0940	4024154.4258			
			417,286.2810	4,023,921.5137	417825.1250	4024149.1992			
			417,281.1250	4,023,930.3848	417816.9690	4024144.4160			
			417,276.9060	4,023,939.6543	417807.5630	4024140.0762			
			417,273.1560	4,023,949.9414	417799.1250	4024136.8242			
			417,269.7190	4,023,961.3281	417789.4690	4024133.5957			
			417,266.5000	4,023,975.5664	417744.3750	4024120.6641			
			417,263.6560	4,023,992.3125	417733.3130	4024116.6641			
			417,257.5630	4,024,036.4043	417723.6250	4024112.4082			
			417,255.7810	4,024,053.0898	417716.8440	4024108.7773			
			417,254.3440	4,024,071.4844	417710.6880	4024104.8281			
			417,253.3440	4,024,112.0410	417693.1880	4024092.0859			
			417,253.6880	4,024,135.3887	417683.1250	4024084.1797			
			417,256.4690	4,024,211.2207	417674.4380	4024076.5137			
			417,258.9380	4,024,248.6602	417667.2810	4024069.1191			
			417,260.8130	4,024,266.7930	417661.4690	4024061.8086			
			417,266.0630	4,024,299.1426	417657.0630	4024054.5488			
			417,269.5630	4,024,313.8516	417654.5000	4024048.2773			
			417,274.6560	4,024,330.5859	417652.5000	4024040.8516			
			417,281.5940	4,024,349.5684	417647.9060	4024009.5918			
			417,289.7810	4,024,368.9414	417646.3750	4024002.8047			
			417,298.0630	4,024,386.4863	417644.5940	4023996.9746			
			417,306.2810	4,024,401.4785	417640.7500	4023988.9395			
			417,314.9690	4,024,415.0508	417636.0310	4023980.8086			
			417,324.0630	4,024,427.2441	417630.3750	4023972.9629			
			417,333.2500	4,024,437.8730	417623.6560	4023965.2930			
			417,341.8130	4,024,446.3809	417617.2810	4023958.7949			
			417,362.2810	4,024,463.6328	417609.9690	4023952.3184			
			417,374.6880	4,024,472.7871	417601.7810	4023945.7832			
			417,391.6880	4,024,484.4727	417592.6250	4023939.0781			
			417,422.5940	4,024,504.8984	417575.3440	4023927.6641			
			417,438.9380	4,024,515.1504	417540.5940	4023906.3262			
			417,454.8440	4,024,524.5742	417526.8440	4023897.4316			
			417,469.5000	4,024,532.6895	417515.0940	4023889.3320			
			417,483.8130	4,024,540.1250	417487.6880	4023868.7949			
			417,497.9690	4,024,546.9180	417472.0940	4023858.9844			
			417,525.0310	4,024,558.3184	417463.6560	4023854.8926			
			417,537.3130	4,024,562.7500	417455.1880	4023851.9063			
417,550.9690	4,024,567.0371	417444.7810	4023849.1504						
417,565.6880	4,024,571.1504	417433.6250	4023847.1348						
417,595.7190	4,024,578.3379	417422.1560	4023845.9258						
417,644.3750	4,024,588.4512	417410.5630	4023845.5176						
417,671.1560	4,024,593.2676	C1	0.21	Channel	410989.3130	4022252.0020			
417,699.5630	4,024,597.4395				410994.2500	4022416.6367			
417,729.9690	4,024,601.0371				411126.7810	4022795.5957			
417,763.4060	4,024,604.2285				411582.4060	4023006.9551			
417,801.4380	4,024,607.2109				411784.7500	4023306.3613			
417,876.5000	4,024,612.3184				411867.2500	4023463.2520			
417,885.9690	4,024,613.4160				411737.1560	4023825.0313			
417,906.1880	4,024,617.6074				411915.1560	4023883.7793			
417,954.9060	4,024,630.4629				411983.4060	4023714.6152			
417,966.3750	4,024,632.8535				412118.5000	4023536.9766			
417,976.4690	4,024,634.2813				411783.0000	4023082.8359			
417,984.4060	4,024,634.8398				411698.3750	4022867.5078			
417,991.7190	4,024,634.7266				411641.7810	4022726.1934			
417,998.0940	4,024,633.9082				411641.2190	4022434.6367			
418,004.0310	4,024,632.4531				411422.2810	4022348.0508			
418,009.1560	4,024,630.2891				411285.7500	4022320.5957			
418,013.8130	4,024,627.4102				411145.5940	4022140.7344			
418,017.8750	4,024,623.8594				410989.3130	4022252.0020			
418,021.4380	4,024,619.5566								
418,027.1560	4,024,609.7598								



Exhibit 1 - Map and coordinates of PM<sub>10</sub> control areas

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates
T18a continued	2.67	DCM	418,383.2810 417,852.7810 417,653.4060 417,521.0310 417,581.8750	4,029,647.0859 4,029,647.5566 4,029,674.6738 4,029,772.5156 4,030,267.7148	T5 thru T8 continued	3.53	DCM	413307.2500 413954.0000 414432.0940 416696.5940 416218.7190 415895.2810 415656.1880 415332.7190 414376.5630 414700.1560 414505.9690	4025145.6113 4024667.7598 4025314.7227 4023641.5605 4022994.5840 4023233.6211 4022910.1016 4023149.1055 4021855.0645 4021616.0996 4021353.3281
T11	0.67	DCM	415,789.8440 415,641.0630 415,463.6880 415,303.7810 414,829.7500 414,603.4060 414,525.4380 414,845.5630 415,969.6880 415,987.3440 415,812.0000 415,829.9690 416,016.5310 415,789.8440	4,026,810.3555 4,026,578.4043 4,026,710.9355 4,027,171.2852 4,027,225.6699 4,027,348.4004 4,027,872.6914 4,028,265.1602 4,028,562.7461 4,028,348.7813 4,027,654.7695 4,027,301.7383 4,027,163.7949 4,026,810.3555	T9	0.46	DCM	416218.7190 416696.5940 415730.9380 415740.0630 415755.0630 415788.3750 415803.2190 416221.4060 416999.7190 417009.4380 416644.1880 416678.0000 416688.8130 416700.3130 416734.5000 416718.5940 416987.0630 416933.0310 416218.7190	4022994.5840 4023641.5605 4024355.1348 4024367.4102 4024385.7285 4024419.2480 4024437.5703 4025003.5195 4024998.1367 4024643.3945 4023924.8242 4023742.0566 4023734.0977 4023672.3301 4023647.0195 4023625.4961 4023427.0801 4023305.0703 4022994.5840
T13a	2.47	DCM	417,169.6250 417,289.0630 417,118.0940 417,075.7810 417,153.0940 417,068.6250 417,546.5630 417,827.8440 418,270.9380 418,552.2190 418,723.3130 418,994.5310 419,317.9690 419,437.4690 419,922.8440 419,803.2190 419,965.0000 419,726.0630 419,887.6880 419,648.7500 419,810.5000 419,212.9380 419,051.1560 418,812.1880 418,650.3750 418,530.9060 418,369.0940 418,249.6250 418,087.8130 417,848.8440 417,363.6560 417,483.0630 417,169.6250	4,026,292.8027 4,026,454.5645 4,026,580.9805 4,026,862.2246 4,027,305.2637 4,027,867.7852 4,028,514.7832 4,028,557.0566 4,028,479.7695 4,028,522.0059 4,028,395.6211 4,028,445.2656 4,028,206.2617 4,028,368.0195 4,028,009.4902 4,027,847.7363 4,027,728.2129 4,027,404.7207 4,027,285.1777 4,026,961.7246 4,026,842.1797 4,026,033.3887 4,026,152.9102 4,025,829.3945 4,025,948.9160 4,025,787.1563 4,025,906.6797 4,025,744.9199 4,025,864.4414 4,025,540.9238 4,025,899.4727 4,026,061.2207 4,026,292.8027	T1-1	0.24	DCM	410001.3440 410005.2500 408999.6250 409007.7810 409051.0310 409110.8440 409125.3750 409135.9380 409555.1250 409806.6880 410001.3440	4023280.3730 4022997.9414 4023000.2637 4023833.0859 4023839.1992 4023908.2500 4023977.1719 4023986.4395 4023595.2637 4023351.0098 4023280.3730
T8	0.21	DCM	413,520.9060 413,954.0000 414,432.0940 414,755.7190 414,875.1560 414,713.3750 414,832.8130 414,509.4060 414,628.8750 414,432.8750 414,383.9380 414,275.7810 414,249.7810 414,265.6560 414,210.4380 413,520.9060	4,024,987.7734 4,024,667.7598 4,025,314.7227 4,025,075.7422 4,025,237.4785 4,025,356.9609 4,025,518.7363 4,025,757.7637 4,025,919.4863 4,026,064.3691 4,025,998.1035 4,025,684.7422 4,025,496.0488 4,025,321.0762 4,025,245.9102 4,024,987.7734	T2 thru 5	3.62	DCM	410025.1560 410015.6880 410264.9380 410488.7190 410687.5940 410604.9060 410718.8440 411285.7500 411422.2810 411641.2190 411641.7810 411698.3750 411783.0000 412112.0000 412435.5630 412196.4380 413088.5940 413166.9380 413406.0630 414053.0940 413814.0000 413975.7810 413736.8130 414222.0630 414505.9690 414557.3750 414717.5310 414704.8750	4019002.0527 4020454.4141 4020620.1895 4020946.6582 4021327.9746 4021412.4785 4021593.2148 4022320.5957 4022348.0508 4022434.6367 4022726.1934 4022867.5078 4023082.8359 4023528.1816 4023289.1914 4022965.6328 4022306.4473 4022248.5879 4022572.1836 4022094.1016 4021770.5449 4021651.0234 4021327.4629 4020969.0215 4021353.3281 4020853.0215 4020809.5039 4020499.7988
T5 thru T8	3.53	DCM	414,505.9690 414,222.0630 413,736.8130 413,975.7810 413,814.0000 414,053.0940 413,406.0630 413,166.9380 412,196.4380 412,435.5630 412,112.0000	4,021,353.3281 4,020,969.0215 4,021,327.4629 4,021,651.0234 4,021,770.5449 4,022,094.1016 4,022,572.1836 4,022,248.5879 4,022,965.6328 4,023,289.1914 4,023,528.1816				414001.4690 414001.2500 413767.6560 413695.4380 413677.0630 413700.3440 413549.0940 413444.4060 413394.0000 413343.6560 413266.1250	4020502.4766 4020257.5078 4020273.3301 4020332.7383 4020225.3008 4020128.3535 4020190.3926 4020190.3945 4020105.0723 4020101.2031 4020221.4121

**Exhibit 1 - Map and coordinates of PM<sub>10</sub> control areas**

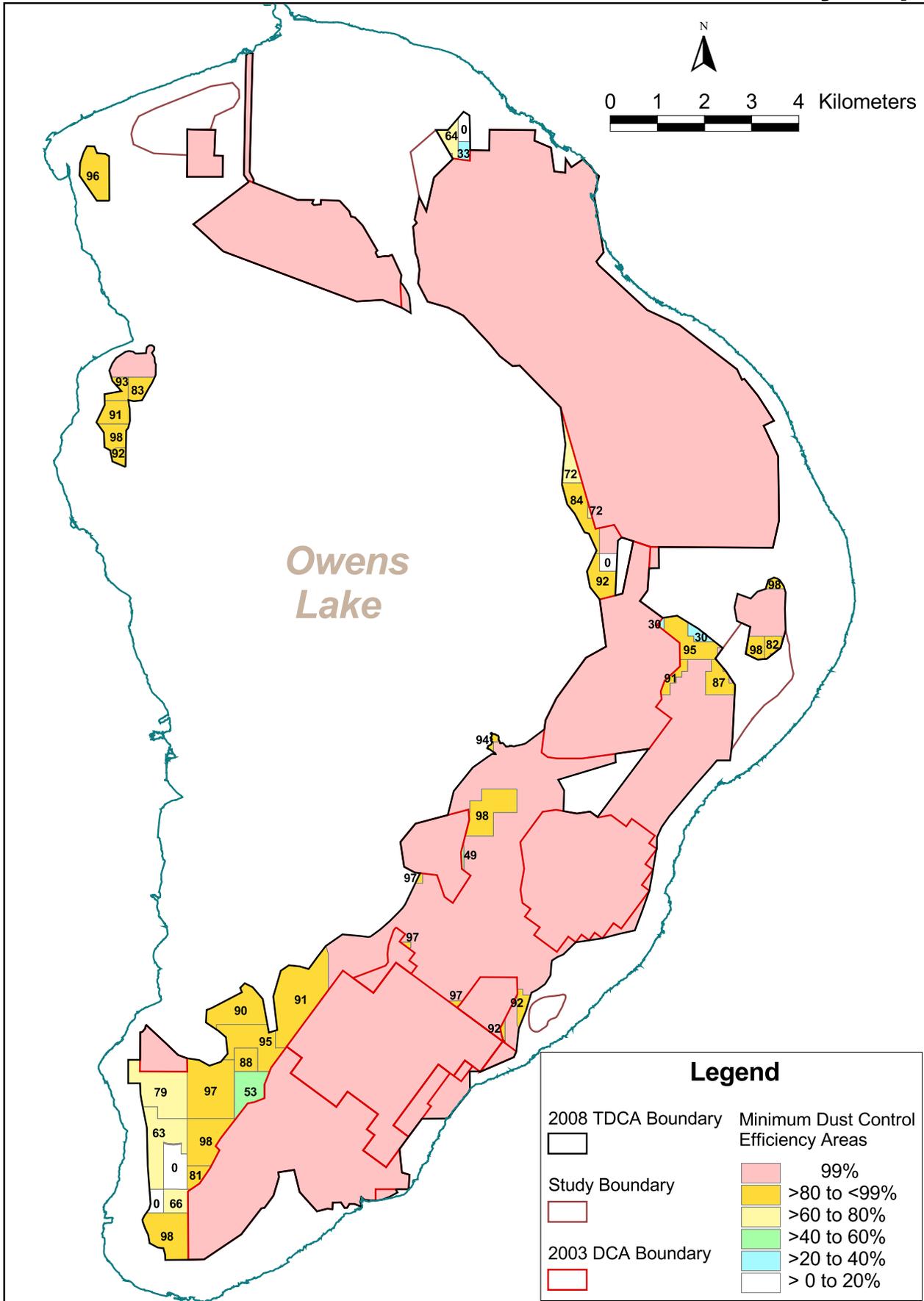
Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates
T2 thru 5 continued	3.62	DCM	413090.0310	4020217.8281
			413082.4060	4020077.9375
			412973.9060	4020085.6738
			412756.6880	4020031.3984
			412389.2810	4020442.0293
			412270.9690	4020910.1992
			411937.4060	4020860.1270
			411952.8130	4020757.8945
			411835.6880	4020364.6348
			411,644.0940	4,020,105.5039
			411,579.3750	4,020,095.7637
			411,149.7500	4,019,542.1543
			410,360.7190	4,019,008.5000
			410,025.1560	4,019,002.0527
T5-2	0.03	DCM	415,656.1880	4,022,910.1016
			415,817.9380	4,022,790.5840
			416,056.9690	4,023,114.1348
			415,895.2810	4,023,233.6211
			415,656.1880	4,022,910.1016
T5-3	0.22	DCM	414,700.1560	4,021,616.0996
			414,376.5630	4,021,855.0645
			415,332.7190	4,023,149.1055
			415,581.1880	4,022,965.4980
			415,103.1880	4,022,318.4160
			415,178.0630	4,022,263.0664
			414,700.1560	4,021,616.0996

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates

Total SDCA 12.86  
 Total Study 1.86  
 Total Channel 0.50  
 Total DCM 30.12

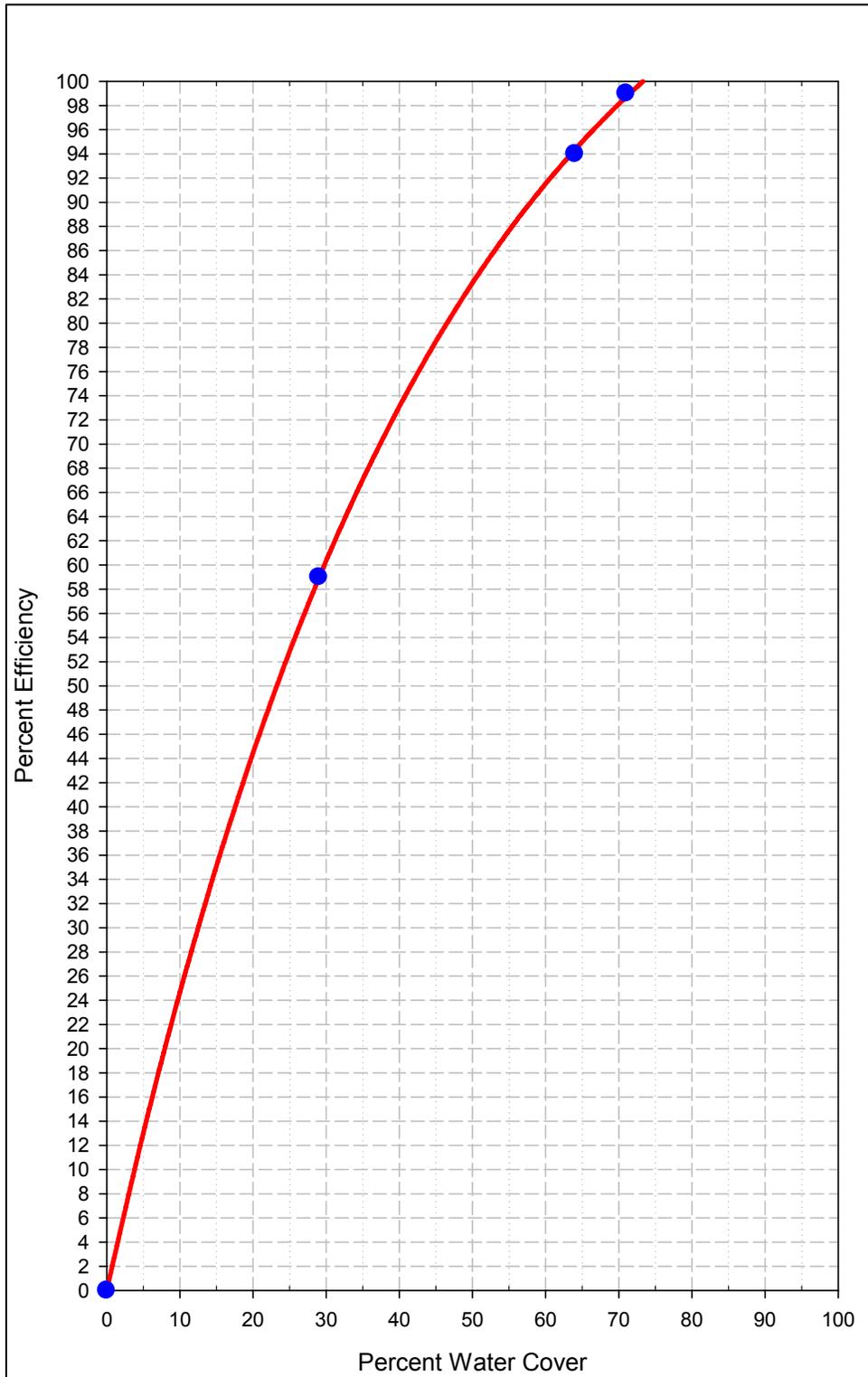
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# Exhibit 2 - TDCA Minimum Dust Control Efficiency map



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### Exhibit 3 - Shallow Flood control efficiency curve



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## SETTLEMENT AGREEMENT

This Settlement Agreement (Agreement) is entered into between the Great Basin Unified Air Pollution Control District (District) and the City of Los Angeles by and through its Department of Water and Power (collectively “City”) (the City and District to be referred to as the “Parties”) to resolve the City’s challenge to the District’s Supplemental Control Requirement (SCR) determination for the Owens Lake bed issued on December 21, 2005, and modified on April 4, 2006.

### RECITALS

#### WHEREAS:

- A. Owens Lake is located in Inyo County in eastern California, south of the town of Lone Pine and north of the town of Olancho.
- B. Large portions of the Owens Lake bed are comprised primarily of dry saline soils and crusts.
- C. The lake bed soils and crusts are a source of wind-borne dust during significant wind events, and contribute to elevated concentrations of particulate matter less than 10 microns in diameter (PM<sub>10</sub>).
- D. PM<sub>10</sub> is a criteria pollutant regulated by the federal Clean Air Act, 42 U.S.C. Section 7401 *et seq.*, as amended (CAA).
- E. Under the National Ambient Air Quality Standard (NAAQS) adopted pursuant to the CAA, PM<sub>10</sub> levels may not exceed an average concentration of 150 micrograms per cubic meter (µg/m<sup>3</sup>) during a 24-hour period more than one time per calendar year averaged over three years.
- F. The District has regulatory authority over air quality issues in the region where Owens Lake is situated.
- G. Under Health and Safety Code Section 42316, enacted by the California Legislature in 1983, the District has authority to require the City to undertake reasonable measures at Owens Lake in order to address the impacts of its activities that cause or contribute to violations of federal and state air quality standards, including but not limited to the NAAQS for PM<sub>10</sub>.
- H. In 1987, the United States Environmental Protection Agency (EPA) identified the Owens Valley Planning Area (OVPA), which encompasses

Owens Lake, as an area not meeting the NAAQS for PM<sub>10</sub>. In 1993, the OVPA was reclassified as a serious non-attainment area under the CAA.

- I. In 1997, the District adopted the Owens Valley PM<sub>10</sub> Demonstration of Attainment State Implementation Plan as required by the CAA (1997 SIP). In 1998, the District and the City agreed that the City would construct control measures on 16.5 square miles of the Owens Lake bed by the end of 2003 as part of a SIP revision in 1998.
- J. In 2003, through District Board Order 03111-01 (Order), the District required the City to construct dust control measures (DCMs) on an additional 13.3 square miles of the Owens Lake bed by the end of 2006, for a total of 29.8 square miles of dust control measures, as part of a Revised SIP (2003 SIP). The Order and 2003 SIP also established a process whereby the Air Pollution Control Officer of the District (APCO) must evaluate on at least an annual basis the potential need for additional DCMs and “watch areas” at Owens Lake bed in order to attain the NAAQS. The process involves a determination by the APCO and an opportunity for the City to present an alternative analysis.
- K. On December 21, 2005, the APCO issued the 2004/2005 SCR determination finding that the City would be required to implement DCMs on an additional 9.31 square miles of Owens Lake bed and identifying 0.66 square miles as “watch area.”
- L. On January 20, 2006, the City appealed the 2004/2005 SCR determination to the California Air Resources Board (CARB). The District disagreed that the determination was subject to such an appeal.
- M. On February 22, 2006, the City submitted an Alternative Analysis contesting aspects of the 2004/2005 SCR determination.
- N. On April 4, 2006, the APCO modified the SCR determination issued on December 21, 2005 to reduce the supplemental DCM area to 8.66 square miles and increased the “watch area” to 0.79 square miles (Modified SCR determination).
- O. On May 3, 2006, the City filed an appeal of the April 4, 2006 Modified SCR determination with the CARB. The District disagreed that the determination was subject to such an appeal.
- P. On May 4, 2006, the City filed a petition for writ of mandate challenging the APCO’s April 4, 2006 Modified SCR determination (*City of Los Angeles Department of Water and Power v. Great Basin Unified Air Pollution Control District*, Kern County Superior Court Case No. S-1500-

CV-258678, RJO). The Parties entered into mediation and a temporary stay of the litigation.

#### AGREEMENT

NOW, THEREFORE, in consideration of the provisions herein contained and to resolve the disputes over methods to address air quality at Owens Lake, including the disputes over the SCR determination issued on December 21, 2005, and modified on April 4, 2006, the City and the District hereby agree as follows:

#### DUST CONTROL MEASURES (DCMs)

1. The City shall apply DCMs as provided in this Agreement on additional areas of the lake bed beyond the 29.8 square miles required in the 2003 SIP.
  - A. The areas on the lake bed on which DCMs will be applied are designated in this Agreement as follows:
    - (i) The 12.7 square-mile area of additional DCMs shall be known as the 2006 Supplemental Dust Control Area (SDCA).
    - (ii) The 29.8 square miles of DCMs required by the 2003 SIP shall be known as the 2003 Dust Control Area (DCA).
    - (iii) The 0.5 square miles of natural drainage channels on the south area of the lake bed shall be known as the Channel Area.
    - (iv) The combined 43.0 square miles of DCMs and Channel Area shall be known as the Total Dust Control Area (TDCA).
    - (v) The SDCA, DCA, Channel Area and TDCA are delineated on the TDCA Map, attached as Exhibit 1. The SDCA and Channel Area coordinate descriptions are attached as Exhibit 2. The DCA coordinate description is contained in the 2003 SIP.
  - B. Minor adjustments may be made to the boundaries of the SDCA upon written request by the City to the District and written approval by the APCO, which approval shall not be unreasonably withheld. In the event of such modification, the boundaries of the TDCA shall also be modified to reflect the modified SDCA boundaries.
  - C. The City may, at its sole option, apply DCMs to additional areas outside the TDCA.
  - D. The City shall begin full operation of the DCMs within the SDCA as follows:

- (i) Moat and row controls shall be operational by October 1, 2009.
  - (ii) All other controls shall be operational by April 1, 2010.
- E. Following the dates set out above in this Section, the City shall continuously operate and maintain the DCMs within the TDCA. The City shall continuously operate and maintain DCMs within the DCA as required under the 2003 SIP, except as otherwise provided in this Agreement.
- 2. A. The City shall construct within the SDCA a minimum of 9.2 square miles of Shallow Flood dust controls. The Shallow Flood areas are delineated on the Dust Control Measure Map, attached as Exhibit 3.
- B. On the remaining 3.5 square miles of the SDCA not specifically designated for Shallow Flood on the DCM Map (Exhibit 3), the City shall
  - (i) construct Shallow Flood, Managed Vegetation, or gravel cover, as described in the Dust Control Measures Description, attached as Exhibit 4, and which are currently approved as Best Available Control Measures (BACM) under the 2003 SIP; or
  - (ii) subject to Sections 3, 7 and 8, treat up to 3.5 square miles of the SDCA with the alternative dust control measure known as “Moat and Row,” as described in the DCM Description (Exhibit 4).
- C. TDCA areas designated as Channel Area represent areas containing natural drainage channels having potentially significant resource issues and regulatory constraints. While these areas are not a part of the SDCA, they shall be addressed as part of the control strategy for the SDCA. However, it is acknowledged that the control strategy in this area may be subject to additional regulatory constraints, design considerations, and impacts caused by adjacent DCMs.
- D. The internal control measure boundaries delineated on the DCM Map (Exhibit 3) are approximate and are subject to final written approval by the APCO. The areas designated on the DCM Map (Exhibit 3) for Shallow Flood and Moat and Row may be modified upon written request by the City to the District and written approval by the APCO, which approval shall not be unreasonably withheld.
- 3. All DCMs within the SDCA shall be designed, constructed, operated and maintained by the City to achieve the initial target minimum dust control efficiencies (MDCEs) shown on the MDCE Map, attached as Exhibit 5. The initial target MDCEs (Target MDCEs):

- A. Are based on the results of air quality modeling, as described in the 2003 SIP, conducted by the City and approved by the APCO for the period July 2002 through June 2006;
  - B. Assume 100 percent control efficiency in the 29.8 square miles of the DCA required under the 2003 SIP, except during the fall and spring ramping periods as described in Section 26, and achievement of the target MDCEs for the areas in the SDCA. Control efficiencies during the fall and spring ramping periods shall be based on modeling that accounts for reduced wetness cover pursuant to Sections 5 and 26;
  - C. Have been selected to achieve PM<sub>10</sub> concentrations that will not exceed the federal 24-hour PM<sub>10</sub> ambient air quality standard of 150 µg/m<sup>3</sup> (federal standard) at all historic shoreline (elevation 3600 feet above sea level) receptors.
4. Prior to April 1, 2010, the Target MDCEs may be modified, upon request of the City and written approval of the APCO, which approval shall not be unreasonably withheld, if the modified MDCEs meet the criteria set forth in the MDCE Selection Process Spreadsheet, attached as Exhibit 6, pursuant to Section 3.
  5. For the Shallow Flood areas identified in DCM Map (Exhibit 3), the percentage of each area that must be wetted shall be based on the Shallow Flood Control Efficiency Curve (SFCE Curve) attached as Exhibit 7, or an update of the SFCE Curve mutually agreeable to the Parties, to achieve the control efficiency levels in the MDCE Map (Exhibit 5).
  6. The Parties believe that the City's existing Managed Vegetation site may currently achieve a control efficiency of 99 percent. Therefore, the City shall continue to maintain and the District shall continue to monitor the site to ensure that it achieves 99 percent control efficiency. No later than July 1, 2007, the City shall submit to the District an operation and management plan for the City to maintain cover conditions that achieve 99 percent control efficiency in the Managed Vegetation areas. The plan shall be subject to written approval by the APCO, which approval shall not be unreasonably withheld. Prior to the time that the Managed Vegetation area is in compliance with an approved SIP, the District will not issue a Notice of Violation (NOV) for the existing Managed Vegetation area as long as:
    - A. From January 1, 2007, to the earlier of July 1, 2007 or the date when the City's operation and management plan is approved by the APCO, the City maintains its current operation and management practices for its Managed Vegetation areas; and

- B. After the APCO's written approval of the operation and management plan, the City implements all provisions of its operation and management plan; and
  - C. The City's Managed Vegetation area site does not cause an exceedance of the federal standard at the historic shoreline.
7. As Moat and Row is not a currently approved BACM dust control measure under the 2003 SIP, the City will develop, in consultation with the District, and conduct Moat and Row Demonstration Projects on the lake bed. These Demonstration Projects will be conducted on two or more locations on the lake bed outside of the DCA. The proposed location of these Demonstration Project areas are shown on attached Moat and Row Demonstration Project Map (Exhibit 8). The actual locations of the projects may be changed by the City, and in such event, the City shall notify the APCO in writing of the changed locations. The City will be the California Environmental Quality Act (CEQA) lead agency for implementation of the Moat and Row Demonstration Projects.
8. Based on results of the Moat and Row Demonstration Projects described in Section 7 and subject to Sections 2 and 3, the City in its sole discretion may decide which DCMs to implement in the areas designated for Moat and Row in Section 2 and Exhibit 3 of this Agreement. The City shall consult with the District before making its decision and inform the District of its decision in writing.
- A. Depending on the results of the Moat and Row Demonstration Projects, the measures implemented in these areas by the City may include Moat and Row, enhanced Moat and Row (*e.g.*, closer Moat and Row spacing, Moat and Row with some Shallow Flooding, Moat and Row with some vegetation), combined Moat and Row/Shallow Flood, MDCE-BACM, or BACM.
  - B. If the City implements Moat and Row, it shall design and construct Moat and Row to achieve the Target MDCEs described in Section 3. The Moat and Row configuration required to achieve these Target MDCEs will be decided solely by the City, after consultation with and written notification to the District.
  - C. In the event of a dispute regarding the City's proposed decision or action pursuant to Section 8.A or 8.B, either Party may initiate the Dispute Resolution Process pursuant to Section 32.
  - D. Upon written request of the City, the APCO shall determine in writing if Moat and Row and/or Enhanced Moat and Row constitutes BACM or MDCE-BACM, in accordance with the revisions to the 2003 SIP provided in Section 28.

DUST IDENTIFICATION (DUST ID) PROGRAM

9. The Parties mutually recognize that a method for identifying sources of potential exceedances of the federal standard at the historic shoreline could be developed that is superior to and could replace or modify the current Dust ID Program.
  - A. The Parties will work cooperatively, with the participation of a mutually agreeable independent third party technical expert or experts under contract to the District and jointly managed by the Parties, in a good faith effort to develop, before April 1, 2010, an improved Dust ID Program. The APCO will implement all mutually-agreeable changes to the Dust ID Program and notify the City in writing of those changes.
  - B. The District will continue to work with the City after April 1, 2010 to further improve the Dust ID Program and will implement all additional mutually agreeable changes in a written decision.
  - C. In furtherance of efforts to improve the Dust ID Program:
    - (i) The Parties will promptly begin a mediated process for refining the Dust ID Program and resolving disputes.
    - (ii) The Parties will select a mutually agreeable expert or panel of independent third-party technical experts.
    - (iii) The District, after consultation with the City, will increase the number of PM<sub>10</sub> monitors at or near the historic shoreline. In all cases, the District will notify the City of the location of the monitors within 30 days of placement of the monitors. If a PM<sub>10</sub> monitor is located above the historic shoreline, the District will make reasonable attempts to account for non-lake bed sources that may affect the monitor.
    - (iv) The District, after consultation with the City, will modify the existing sand flux monitor network to concentrate on areas of special interest, and will, in all cases, notify the City of the modifications within 30 days of any modification.
    - (v) The Parties will establish mutually agreeable model performance measures. Such measures may, but are not required to, include a minimum model performance standard.
    - (vi) The District will make reasonable efforts to account for impacts of DCM construction activities.

10. The City will lead a joint effort with the District to develop methods for directly measuring PM<sub>10</sub> emission rates from the lake bed. The District will incorporate mutually agreeable methods into the Dust ID Program.
11.
  - A. If the City is in compliance with Sections 1 and 2 of this Agreement, the following shall apply to the time period before April 1, 2010.
    - (i) The APCO will not issue any further determinations regarding the need for SCRs that provide for additional requirements beyond those in this Agreement. However, the District will continue to use the Dust ID Program, as that program may be modified pursuant to Sections 9 and 10. The District will periodically advise the City of results in writing and may recommend actions to the City based on the model results.
    - (ii) Data collected before April 1, 2010 will not be used in future determinations requiring SCRs, except in those areas delineated as Study Areas on the Study Area Map attached as Exhibit 9 and described in Exhibit 2. Data collected from the Study Areas between July 1, 2006 and April 1, 2010 may only be used in SCR determinations after April 1, 2010, and may be used only in accordance with the current form of the Dust ID Program that is in effect after April 1, 2010.
    - (iii) The District will not issue an order requiring the City to implement any additional controls on any lake bed dust source areas in order to achieve the state PM<sub>10</sub> standard of 50 micrograms per cubic meter unless compelled to issue such an order by state law.
  - B. The District shall determine compliance with the state PM<sub>10</sub> standard based on concentrations only in the surrounding communities, unless otherwise compelled by state law.
12. The City, in consultation with the District, shall annually develop and provide to the District a Performance Monitoring Plan (PMP) to aid in its operation of the Owens Lake dust mitigation program on the Owens Lake bed.
  - A. The PMP will describe the measurements and methods used to verify the performance of the constructed DCMs and Moat and Row test areas. The PMP will also describe the measurements and methods used to maximize information on dust emissions from areas of special interest.
  - B. The City shall implement the PMP, and will use the results as a guide for making operational decisions about the type, location, timing, and level of dust control measures needed to prevent exceedances of the federal standard at the shoreline.

- C. The District may use information from the PMP to assist in determining the likely sources of dust emissions causing or contributing to exceedances (if any) of the federal standard at the shoreline.

#### SHALLOW FLOOD BACM REFINEMENT

- 13. The City shall have the option to conduct field testing to refine the wetness cover requirement to achieve 99 percent control efficiency in Shallow Flood areas within the DCA (Shallow Flood Cover Test).
  - A. The Shallow Flood Cover Test shall occur on one or more areas totaling not more than 1.5-square-miles, to be selected by the City and approved by the APCO, which approval shall not be unreasonably withheld, from within the TDCA areas requiring 99 percent control.
  - B. The Shallow Flood Cover Test design shall be prepared by the City and approved by the APCO, which approval shall not be unreasonably withheld, prior to implementation. Based on that design, the APCO will reasonably determine wetness cover requirements for the Shallow Flood Cover Test.
  - C. The City will be CEQA lead agency for the Shallow Flood Cover Test.
- 14. If the APCO reasonably determines in writing that DCMs in the TDCA have been operational for one full year (defined as 365 consecutive days) with no exceedance of the federal standard at monitors located at or above the historic shoreline caused solely by sources within the TDCA, the City shall be permitted to reduce the wetness cover by an average of 10 percent over Shallow Flood areas requiring 99 percent control efficiency, excluding areas identified in Section 14.C, provided that:
  - A. Application of the 10 percent reduction in wetness cover during the Fall and Spring Shallow Flood DCM Compliance periods set out in Sections 25 and 26 shall result in the lower of:
    - (i) The areal cover resulting from a 10 percent reduction; or
    - (ii) The areal cover required in Section 26.A.
  - B. To implement the reductions set out in this Section, the City shall be required to first submit a written Wetness Cover Plan to the District for reducing the wetness cover on the eligible areas. The Wetness Cover Plan shall take into account:

- (i) the results of testing carried out pursuant to Section 13, if conducted; and
    - (ii) the results of fall and spring Shallow Flood wetness cover reduction operations carried out pursuant to Section 26.
  - C. If, in any year, the Wetness Cover Plan proposes reductions in wetness cover greater than 10 percent in any portion of the Shallow Flood areas covered by the Plan (consistent with the 10 percent limit on the overall average reduction), the City shall obtain the additional written approval of the APCO, which approval shall not be unreasonably withheld.
  - D. In the event shoreline monitors show an exceedance of the federal standard, whether that exceedance is caused by sources within, outside, or both within and outside of the TDCA, no further reductions in wetness cover shall be permitted for any Shallow Flood area that has contributed to the exceedance, as determined by the methodology in Section 18 and subject to the provisions of Section 16.
  - E. Except as provided in Section 16, the City may continue to operate using reductions of wetness cover pursuant to a previously approved Wetness Cover Plan.
15. For each Dust Control Season (October 1 of each year through June 30 of the next year) that wetness cover reductions have taken place under the provisions of Section 14, the City shall prepare and submit to the District a written report summarizing the results of the wetness cover reductions within 90 days after conclusion of the corresponding Dust Control Season. The report shall document the percentage of wetness cover for Shallow Flood areas and the effect(s) of wetness cover reductions on PM<sub>10</sub> concentrations at the historic shoreline.
16. Any areas for which wetness cover has been reduced pursuant to Section 14 and that cause or contribute to an exceedance of the federal standard at the historic shoreline shall be remediated by the City under the Remedial Action Plan requirements pursuant to Sections 18 and 22 below.
- A. Subject to APCO written approval, which approval shall not be unreasonably withheld, the City may further reduce the wetness cover beyond that allowed in Section 14 provided that:
    - (i) The maximum 24-hour PM<sub>10</sub> shoreline monitor values for at least 365 consecutive days of operation following initiation of the last approved Wetness Cover Plan does not exceed 130 µg/m<sup>3</sup>; and
    - (ii) The City demonstrates to the reasonable satisfaction of the APCO that the modeled contributions from the lake bed for the same time

period set forth in Section 16.A.(i) plus the background of 20  $\mu\text{g}/\text{m}^3$  do not exceed 120  $\mu\text{g}/\text{m}^3$  at the historic shoreline.

- B. If the monitored values at the historic shoreline exceed 130  $\mu\text{g}/\text{m}^3$ , and it is determined that non-lake bed sources are contributing greater than 20  $\mu\text{g}/\text{m}^3$ , then the District will expeditiously seek to identify and require control of those non-lake bed sources so that the City may continue to implement efficient DCMs on the lake bed.
- C. If the City is entitled to further reduce wetness cover pursuant to this Section, the City shall prepare and submit an updated Wetness Cover Plan to the District to describe the wetness cover proposed for the subsequent, applicable Dust Control Season. The updated Wetness Cover Plan shall include:
  - (i) A map that depicts the eligible Shallow Flood areas;
  - (ii) The proposed amount of wetness cover for each eligible Shallow Flood area; and
  - (iii) The method for determining effectiveness of the proposed wetness cover.
- D. The Wetness Cover Plan shall be subject to approval of the APCO, which approval shall not be unreasonably withheld.

#### ACTIONS TO ADDRESS STANDARD VIOLATIONS

- 17. After May 1, 2010, the APCO will recommence written SCR determinations under the revisions to the 2003 SIP as provided in Section 28. Recommended determinations will use Dust ID data collected only after April 1, 2010, except as provided in Section 11.A.(ii) for Study Areas, and shall be made at least once in every calendar year.
- 18. If, pursuant to Section 17, the APCO determines that a monitored or modeled exceedance of the federal standard caused by emissions from the lake bed has occurred at or above the historic shoreline:
  - A. The APCO, based on all available information, including visual observation, monitoring and modeling, and in consultation with the City, will identify the need for additional controls, monitoring, or both.
  - B. (i) If the APCO identifies the need for additional controls, the APCO shall issue a SCR determination.

- (ii) If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an Alternative Analysis. If the City submits an Alternative Analysis, the APCO shall consider the Analysis and may withdraw, modify or confirm the SCR determination.
  - (iii) If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's action, the City may initiate the Dispute Resolution Process pursuant to Section 32. The APCO may modify the SCR determination based on the Dispute Resolution process.
  - (iv) In the event the Parties are unable to resolve disagreements over future SCR determinations through the Dispute Resolution Process, the City may appeal future determinations to CARB under the provisions of Health and Safety Code Section 42316 (Section 42316), provided that the Parties expressly intend that this Agreement be the final resolution regarding the existing disputes between the Parties that are the subject of this Agreement. Based on the foregoing, the City stipulates and agrees that all of the provisions and determinations, including the measures and procedures, contained in the 2003 SIP, the provisions of this Agreement to be included in modifications to the 2003 SIP pursuant to this Agreement, and the SCR determination dated April 4, 2006, which the City in good faith disputed, shall be deemed to be valid and reasonable, and that the City will not challenge those provisions or determinations by appeal under Section 42316 or in any other proceeding, including any other administrative or judicial forum. Subject to this Paragraph, the City may challenge any future SCR determination under Section 42316; however any arguments or challenges must be based on data and information that do not currently exist, but that exist after the execution of this Agreement.
- C. The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Section 21 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.
  - D. The District may, as appropriate, also issue a notice of violation.
19. In the event:
- A. The APCO has made a written determination pursuant to Section 18 that an exceedance of the federal standard, occurring after April 1, 2010,

resulted from a Control Area or portion of a Control Area treated with Moat and Row; and

- B. That Control Area or portion of a Control Area causing the exceedance was remediated by the City as provided in Section 21 below; and
- C. That Control Area or a portion of that Control Area is subsequently the sole cause of an exceedance of the federal standard at or above the historic shoreline, (*i.e.*, an exceedance occurred after the City attempted to remediate that area under Section 21);

then the City shall convert that Control Area, or that portion of that Control Area, from Moat and Row to MDCE-BACM or BACM, to address the exceedance described in Section 19.C., for all or the portion of that Control Area that caused the subsequent exceedance, under the time deadlines provided for in Section 24.

- 20. If the APCO determines that Moat and Row constitutes BACM or MDCE-BACM, then upon issuance of such written determination, the provisions of Section 19 that require the City to convert to BACM or MDCE-BACM may be satisfied by applying the BACM or MDCE-BACM approved under this Section 20.
- 21. A Remedial Action Plan prepared by the City pursuant to Section 18 will contain a description of:
  - A. Any and all needed changes, repairs or enhancements to DCMs, including one or some combination of the following:
    - (i) Maintenance of facilities (*e.g.*, berms, moats and rows);
    - (ii) Changes to Shallow Flood or Managed Vegetation facilities or operations (*e.g.*, increase in wetness cover extent, improved wetness cover distribution, enhancement of vegetation);
    - (iii) Augmentation (*e.g.*, more moats and rows) or enhancement (*e.g.*, addition of sand fences, surface wetting, armoring, vegetation, surface roughening) of Moat and Row areas;
    - (iv) Transition of Moat and Row areas to BACM, or MDCE-BACM.
  - B. Any and all needed expansion of DCMs, and specific plans for expanding the measures.
  - C. A schedule for the work to be performed to implement the changes, clearly indicating the point at which facilities will be operational and effective at design levels.

22. The Schedule of Contingency Measures attached to this Agreement as Exhibit 10 sets forth a non-exclusive list of items that shall be included by the City in its Remedial Action Plans, described in Section 21, and the timing required for their implementation.
23. Before any full-scale Moat and Row areas are operational, the City shall submit to the District a conceptual design and schedule for possible implementation of BACM or MDCE-BACM to each Moat and Row area consistent with Section 19. These designs and schedules are the potential contingency measures to be implemented by the City where a transition from Moat and Row to another DCM is needed, or where such transition is required pursuant to Section 19.
24. Areas to be transitioned from Moat and Row to BACM or MDCE-BACM will be operational within the times set forth in the Moat and Row Transition Schedule attached as Exhibit 11. DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule attached as Exhibit 12.

#### FALL AND SPRING SHALLOW FLOOD DCM COMPLIANCE

25. For the time period from October 16 of each year through May 15 of the next year, the Shallow Flood Control Areas shall be considered to be in compliance with this Agreement and applicable laws and regulations, if the areal wetness cover within each Shallow Flood Control Area in the TDCA meets the MDCE required in Exhibit 6 using the SFCE Curve in Exhibit 7.
26. The provisions set forth in this section shall apply to all Shallow Flood areas with target control efficiencies of 99 percent or more, except those which the City and the District may mutually agree to exclude.
  - A. Beginning on April 1, 2010, compliance of TDCA Control Areas with 99 percent control efficiency Shallow Flood requirements shall be as follows:
    - (i) Beginning May 16 and through May 31 of every year, Shallow Flood may be reduced to a minimum of 70 percent areal wetness cover.
    - (ii) Beginning June 1 and through June 15 of every year, Shallow Flood may be reduced to a minimum of 65 percent areal wetness cover.
    - (iii) Beginning June 16 and through June 30 of every year, Shallow Flood may be reduced to a minimum of 60 percent areal wetness cover.

- (iv) If for any Shallow Flood area, the percent of areal wetness cover in the periods specified in Sections 26A.(i), (ii) and (iii) is below the minimum percentages specified in those sections, and there were no monitored or modeled exceedances of the federal standard at the historic shoreline, that area will be deemed to be in compliance with this Agreement and applicable laws and regulations if the City demonstrates in writing and the APCO reasonably determines in writing that maximum mainline flow was maintained in the applicable period.
  - B. From July 1 through September 30 of each year, the City is not required by the 2003 SIP to apply water for dust control, but is required to maintain minimum areal wetness cover as required by applicable environmental documents and approvals.
  - C. Beginning on April 1, 2010, if modeled or monitoring data shows an exceedance or exceedances of the federal standard at the historic shoreline as a result of excessive dry areas on Shallow Flood Control Areas during the dust control periods for each year between May 16 through June 30, and October 1 through October 15, the provisions of Sections 17 and 18 shall apply.
27. The provisions of Sections 25 and 26 are subject to the results of air quality modeling, to be conducted by the City and approved by the APCO, that demonstrates attainment of the federal standard at the historic shoreline using the reduced areal wetness covers set forth in Section 26. The modeling shall be conducted as described in the 2003 SIP using data for the period July 2002 through June 2006. The control efficiency of the areal wetness covers shall be modeled using the SFCE Curve as provided in Section 5.

REVISION OF THE STATE IMPLEMENTATION PLAN (SIP)

- 28. A. The APCO will propose a District Board Order that will revise the 2003 SIP to incorporate all of the terms and conditions of this Agreement, except such terms and conditions, if any, that may not lawfully be included in the SIP. The APCO will propose the Board Order and SIP revision at a time sufficient to allow the proposed revisions to be considered and adopted by the District Board by July 1, 2008. The time for consideration and adoption shall take into account, without limitation, the time for legally required environmental review and public notice and hearing. The District Board will act on the proposed SIP revisions by July 1, 2008.
- B. If the District Board has the legal ability to act and fails to act by November 1, 2008 on a proposed District Board Order as described in Subsection 28.A, the City may terminate this Agreement by providing

written notice to the District, provided, however, that the City will not provide such notice prior to the conclusion of the Dispute Resolution Process pursuant to Section 32, which process may be initiated by either Party.

- C. The Parties have developed this Agreement with the intention that its provisions will be incorporated into a revision of the 2003 SIP and are consistent with applicable provisions of the Health and Safety Code, including Section 42316, and applicable provisions of federal law regarding attainment of the NAAQS.
- D. The APCO shall confer in good faith with the City to develop procedures to modify and authorize MDCE-BACM for incorporation into the revisions to the 2003 SIP.
- E. The District will be CEQA lead agency and will prepare, in consultation with the City, and will consider for certification on or before March 1, 2008 an environmental impact report (EIR) on the proposed SIP revisions.
- F. (i) In the event:
  - (a) the District Board adopts a District Board Order revising the 2003 SIP that does not incorporate all the terms and conditions of this Agreement, except such terms and conditions, if any that may not lawfully be included in the SIP; or
  - (b) the District Board adopts a District Board Order revising the 2003 SIP that incorporates all the terms and conditions of this Agreement except such terms and conditions, if any, that may not lawfully be included in the SIP, and subsequent judicial action causes the revised SIP to be materially inconsistent or materially in conflict with the terms and conditions of this Agreement,

the City may terminate this Agreement in the case of Section 28.F(i)(a), and either Party may terminate this Agreement in the case of Section 28.F(i)(b), within 30 days of such action by providing written notice to the other Party.

  - (ii) If the City does not elect to terminate this Agreement pursuant to Section 28.F(i) and any inconsistencies or conflicts exist between this Agreement that preclude compliance with both, the provisions of the District Board Order shall prevail.

- G. The City will support and will not appeal or in any other way challenge or oppose revisions to the 2003 SIP and resulting District Board Order that incorporate all of the terms and conditions of this Agreement, except such terms and conditions, if any, that may not lawfully be included in the SIP. After issuance of the District Board Order provided for in this Section, the City shall not challenge the order under CEQA to the extent that Order is consistent with this Agreement.
- H. In the event the District Board fails to certify the EIR by March 1, 2008 or to act on the proposed SIP revisions by July 1, 2008, the Parties shall meet and confer as provided in Section 33.A.
- I. Any provisions of this Agreement that are incorporated into the District Board Order as provided in Section 28.A. shall, upon adoption of that Order by the District Board, cease to have any further force and effect as part of this Agreement, and shall instead be effective as part of the District Board Order.
- J. Any provisions of this Agreement that are not incorporated into the District Board Order as provided in Section 28.A shall remain in full force and effect as part of this Agreement until May 1, 2012, at which time those provisions shall cease to be of any further force or effect as part of this Agreement, provided that the Parties may mutually agree in writing to extend this date.

#### COVER MEASUREMENT TECHNIQUES AND PERFORMANCE SPECIFICATIONS

- 29. The District and City will collaboratively develop wetness and vegetative cover measurement techniques, control efficiency relationships, and compliance specifications. Final acceptance of those cover measurement techniques and compliance specifications with regulatory impact will be at the sole discretion of the APCO.

#### KEELER DUNES

- 30. The Parties acknowledge that dust emissions from the area known as the Keeler Dunes may cause or contribute to exceedances of federal and state standards for PM<sub>10</sub>. The City hereby agrees to cooperate with the District and other federal, state and local agencies and experts as necessary to develop a plan to reduce dust emissions from the Keeler Dunes.

#### COOPERATION BETWEEN PARTIES AND DISPUTE RESOLUTION

- 31. In carrying out the terms of this Agreement, the Parties intend to cooperate fully and to consult with each other effectively and on a regular basis. The Parties will make good faith efforts to provide each other with relevant documents and

technical information in a timely manner, and they will keep each other informed of their respective progress in actions to implement the actions set forth in this Agreement, including, without limitation, progress in entering into consultant and construction contracts and in securing permits from agencies with permitting authority.

32. Notwithstanding the Parties' commitment to cooperate in implementing the terms of this Agreement, they recognize that differences may arise between them. To address this situation, the Parties agree that, in the event either Party believes that a dispute exists regarding implementation or interpretation of any provision of this Agreement, that Party may, by informing the other Party in writing within 21 days of the decision or determination, action or proposed action triggering the dispute, initiate non-binding mediation between the Parties. A party may not seek non-binding mediation for issues that were already the subject of mediation under this Section unless both Parties agree in writing.
- A. The mediator shall be a mediator mutually acceptable to the Parties. The Parties may also by mutual agreement include in the mediation, one or more of the technical experts selected pursuant to Section 9.C.(ii), or any other technical experts, such experts to be under contract to the District and jointly managed by the Parties. The City shall be responsible for the cost of the mediator and the technical experts pursuant to Health and Safety Code Section 42316. The mediation will be conducted and completed within 60 days of the notice initiating the Dispute Resolution Process unless that time period is extended by mutual agreement of the Parties. The mediation will be conducted under all applicable California laws regarding mediation, including but not limited to Cal. Evidence Code Sections 1115-1128.
- B. Neither Party will commence any litigation concerning the implementation of terms of this Agreement unless that Party has first initiated the mediation described in this Section, and the sooner of the following two events takes place:
- (i) Sixty (60) days has expired from the date that Party first sent written notice to commence the mediation; or
  - (ii) Both Parties agree, or the mediator(s) states, in writing that the mediation has been completed.
  - (iii) Notwithstanding the provisions of this Section 32.B, a Party may commence litigation at an earlier time if necessary to pursue a claim or cause of action that would otherwise be time barred under an applicable statute of limitations.

- C. If the Dispute Resolution Process pursuant to this Section 32 is initiated to address a dispute regarding a SCR determination issued by the APCO pursuant to Section 18.B, then that SCR determination shall not be deemed final until the conclusion of this process under Section 32.B.
- D. Nothing in this section is intended to or shall be construed to restrict or eliminate a Party's right to utilize available legal remedies following completion of the mediation process.

#### EXTENSIONS OF TIME

33. A. In the event that the District
- (i) Anticipates that it will fail to certify or fails to certify an environmental impact report on the proposed SIP revisions and related actions by March 1, 2008; or
  - (ii) Anticipates that it will fail to act on or fails to act on a proposed District Board Order pursuant to Section 28.A by July 1, 2008,
- the District shall promptly notify the City, and Parties shall meet and confer to determine what if any revisions to other dates contained in this Agreement may be appropriate. The Parties may mutually agree to the participation of a mediator in the meet and confer process.
- B. In the event the City
- (i) Anticipates that it will be unable to complete implementation or fails to complete implementation of moat and row controls pursuant to this Agreement by October 1, 2009; or
  - (ii) Anticipates that it will be unable to complete implementation or fails to complete implementation of all other controls by April 1, 2010,
- the City may seek relief for such failure or delay by obtaining a variance from the Hearing Board of the Great Basin Unified Air Pollution Control District pursuant to District Regulation VI and all applicable law for variance relief from a District Order, including but not limited to Health and Safety Code Section 42350 *et seq.* In such event, the District shall, at the request of the City, meet with the City, prior to or after the filing of a request for a variance, in order to ascertain whether the District will support the City's variance request. In the event the District will not support the City's variance request, the City may invoke the Dispute Resolution Process pursuant to Section 32.

- C. Nothing in this Section is intended to or shall limit the ability of the City to seek a variance from requirements not included in this Section.
  - D. Each Party will undertake to inform the other Party as early as practicable of the fact that it anticipates that it will not meet or has failed to meet any of the dates set out in this Section.
34. In the event either Party claims that the other Party is in material breach of the terms of this Agreement, including without limitation, a claim by the District that the City is in material breach under Section 11, the Party claiming the breach shall provide written notice of the claimed breach to the other Party. In the event the Party claimed to be in breach contests such claim, the issue shall be subject to the Dispute Resolution Process in Section 32.

#### LAWSUIT/APEAL SETTLEMENT CONDITIONS

- 35. Within 15 days of execution of this Agreement, the APCO shall issue a revised SCR determination that incorporates the terms of this Agreement and that supersedes all previous determinations.
- 36. Upon issuance by the APCO of the revised SCR determination as described in Section 35, the City shall immediately commence the process for implementing additional DCMs on the Owens Lake bed consistent with the terms of this Agreement.
- 37. Upon issuance by the APCO of the revised SCR determination as described in Section 35, the City shall within seven days dismiss with prejudice its CARB appeals and the litigation against the District as described in the Recitals at Paragraphs L, O. and P.

#### DEFINITIONS

- 38. Definitions of terms used in this Agreement are contained herein and in Exhibit 13. Where specifically identified in Exhibit 13, these terms as used in this Agreement and Exhibits shall have the meanings provided in this Exhibit 13. Where no definition is provided herein or in Exhibit 13, the words and terms shall have their meaning as provided in the federal Clean Air Act or state air pollution law in the Health and Safety Code, and where no definition is found there, shall have their ordinary meaning as read in the context of this Agreement and consistent with the expressed intent of the Parties.

#### NOTICES

- 39. Whenever, under the terms of this Agreement, written notice is required to be given or a report or other document is required to be sent by one Party to another, it shall be sent by overnight mail and directed to the individual at the address

specified below, unless that individual or his or her successor gives notice of a change to the other Party in writing.

As to the City:

Ronald F. Deaton  
General Manager  
Los Angeles Department of Water and Power  
111 North Hope Street, Room 1550  
Los Angeles, CA 90012

As to the District:

Theodore D. Schade  
Air Pollution Control Officer  
Great Basin Unified Air Pollution Control District  
157 Short Street  
Bishop, California 93514

ADDITIONAL PROVISIONS

40. By this Agreement, the City and the District intend to settle their disputes regarding methods to address air quality issues at Owens Lake, including disagreements over the SCR determination issued on December 21, 2005, and the Modified SCR determination issued on April 4, 2006.
41. This Agreement is the final integrated agreement between the Parties regarding the matters addressed herein, and may not be modified except in a writing signed by both Parties.
42. This Agreement shall be construed in accordance with the laws of the State of California.
43. In the event any provision of this Agreement is judicially determined to be unenforceable, the Parties shall meet and confer and following such meeting, the Parties may amend the Agreement, or continue the Agreement without amendment, or either Party may terminate the Agreement.
44. This Agreement shall not create any rights in any third party.

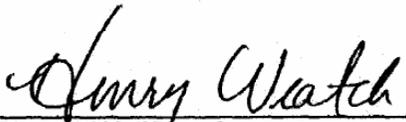
- 45. No failure by a Party to insist on strict performance of any term or condition of this Agreement shall constitute a waiver of such term or condition or a breach hereof.
- 46. Each Party represents that their respective signatories below have the authority to bind them to the terms of this Agreement.

REVIEWED AND AGREED TO:

Dated: November 30, 2006

Dated: December 4, 2006

  
 \_\_\_\_\_  
 Ronald F. Deaton  
 General Manager, Los Angeles Department of  
 Water and Power

  
 \_\_\_\_\_  
 Henry "Skip" Weatch  
 Board Chairman

The City of Los Angeles  
 By and Through the  
 Los Angeles Department of Water and Power

Great Basin Unified Air Pollution Control  
 District

APPROVED AS TO FORM AND LEGALITY  
 ROCKARD J. DELGADILLO, CITY ATTORNEY

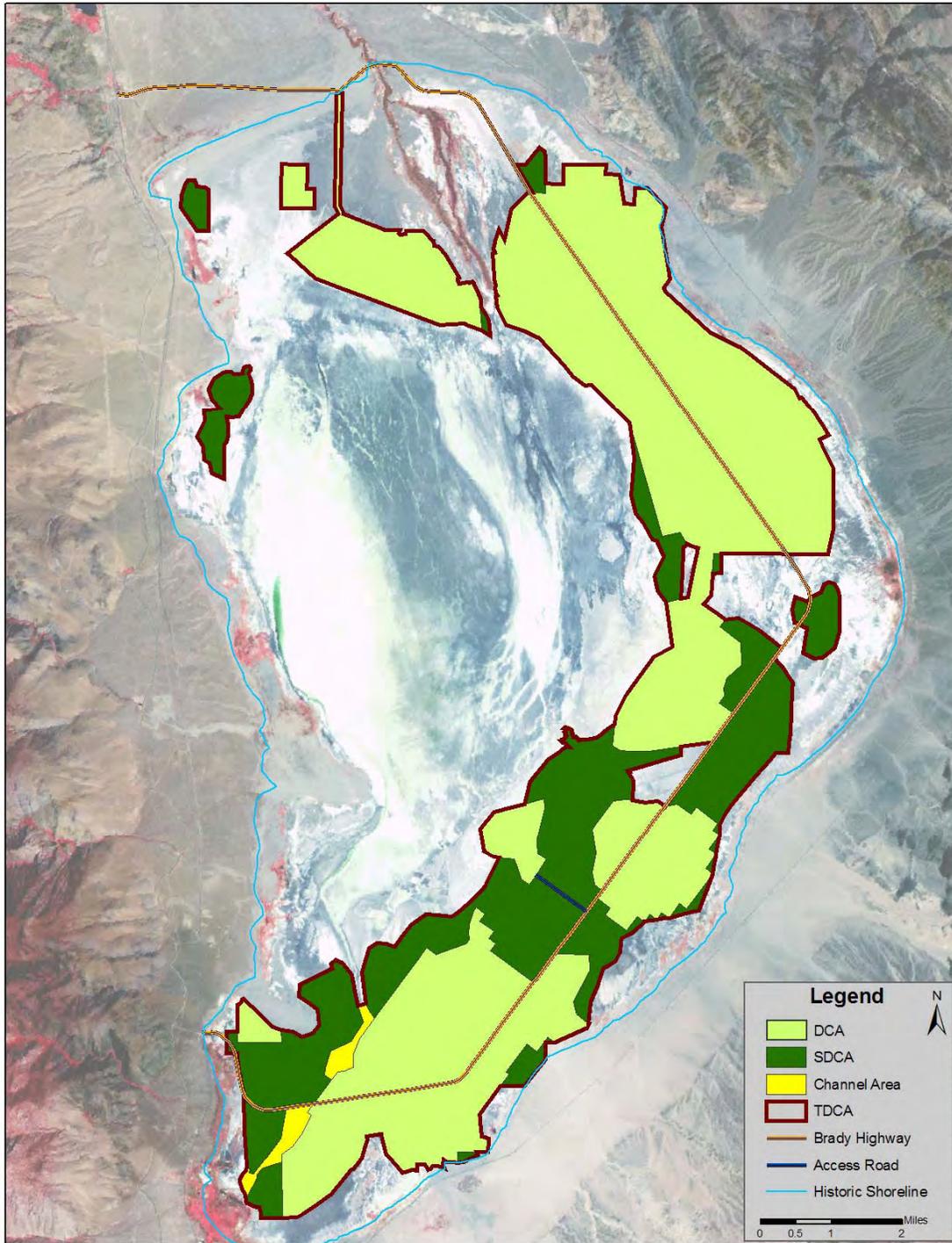
NOV 30 2006  
 BY   
 JULIE A. CONBOY  
 Deputy City Attorney

## List of Exhibits

1. Total Dust Control Area Map
2. 2006 Supplemental Dust Control Area Coordinate Description
3. Dust Control Measure Map
4. Dust Control Measures Description
5. Minimum Dust Control Efficiency Map
6. MDCE Selection Process Spreadsheet
7. Shallow Flood Control Efficiency Curve
8. Moat and Row Demonstration Project Location Map
9. Study Area Map
10. Schedule of Contingency Measures
11. Moat and Row Transition Schedule
12. DCM Operation Schedule
13. Definitions

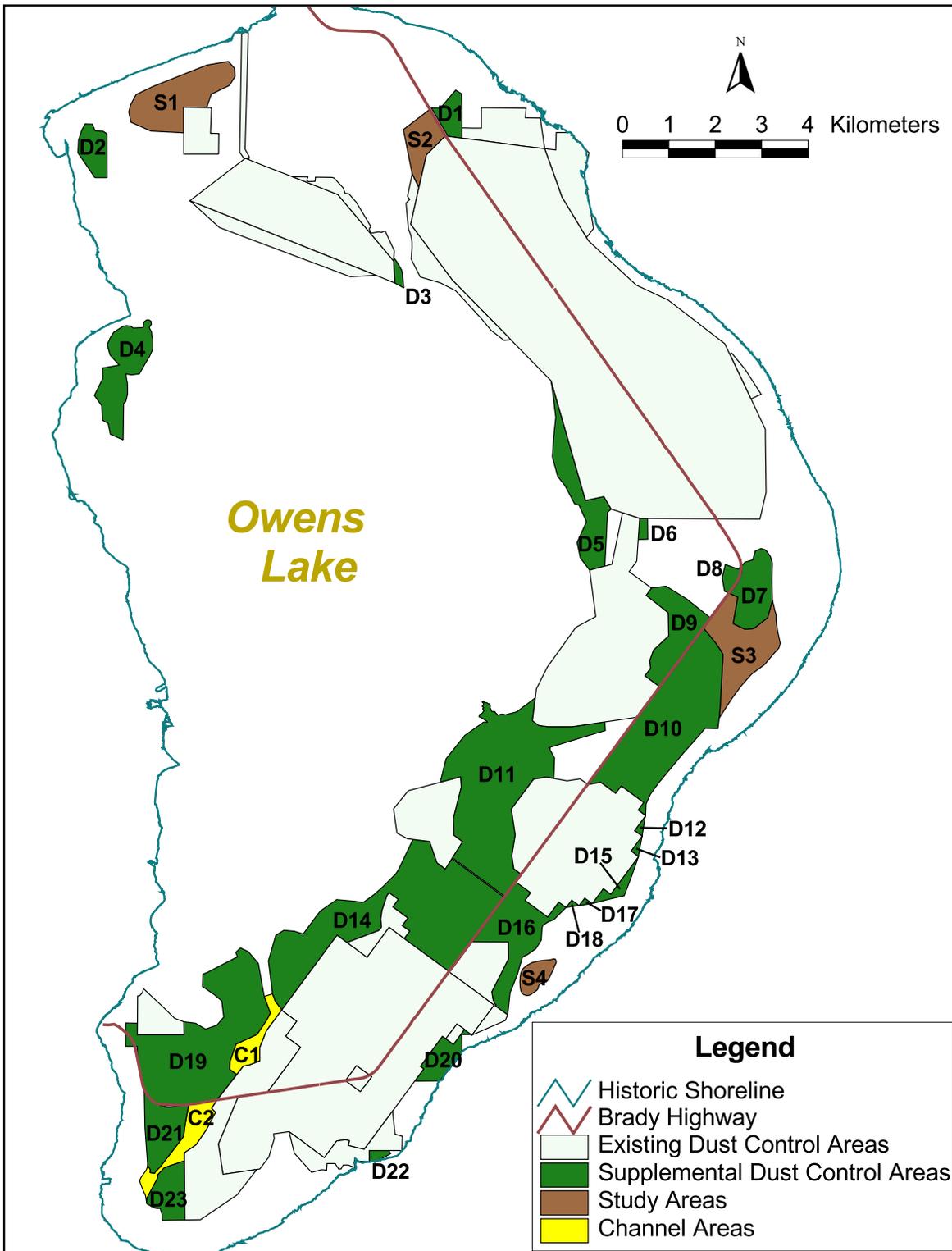
### EXHIBIT 1 -- TOTAL DUST CONTROL AREA MAP

The Total Dust Control Area (TDCA) is comprised of the 2006 Supplemental Dust Control Area (SDCA) and the 2003 Dust Control Area (DCA).



# EXHIBIT 2 -- 2006 SUPPLEMENTAL DUST CONTROL AREA COORDINATE DESCRIPTIONS

KEY MAP



## EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates
D1	0.16	SDCA	416,001.0310	4,042,347.3789	D5	0.57	SDCA	418754.0310	4033026.5000
			415,701.7500	4,042,385.7617				418552.9690	4033287.6914
			415,343.2810	4,042,999.8633				418484.0000	4033621.1133
			415,539.4060	4,042,999.0234				418689.0940	4034066.4102
			415,866.3750	4,043,383.8359				418529.0310	4034424.5078
			415,994.4060	4,043,304.2109				418434.8130	4034452.0664
			416,002.6250	4,042,981.9922				418325.1880	4034653.5234
			416,005.6250	4,042,568.5234				418224.7810	4034845.3438
			416,001.0310	4,042,347.3789				418067.7500	4035047.7852
								417953.1880	4035467.4961
D2	0.21	SDCA	408,085.5000	4,041,493.3164	417980.5000	4035865.3203			
			407,718.8130	4,042,027.7422	418027.9060	4036319.6094			
			407,731.5000	4,042,299.3945	417924.4060	4037110.5117			
			407,804.9060	4,042,524.2148	418666.3750	4034527.9844			
			407,873.2810	4,042,654.1211	419065.6880	4034610.9648			
			408,032.2500	4,042,647.6875	419223.4690	4034342.1406			
			408,089.5630	4,042,502.0625	419141.3750	4034271.8047			
			408,267.6560	4,042,491.4219	419084.1880	4033110.8086			
			408,347.0630	4,042,440.3203	418754.0310	4033026.5000			
			408,348.9690	4,041,492.4844					
D3	0.03	SDCA	414,747.2500	4,039,108.7500	D6	0.03	SDCA	419801.2810	4033687.7539
			414,550.5000	4,039,224.6641				419831.7500	4034141.1016
			414,528.0310	4,039,697.5156				420006.8130	4034139.3281
			414,532.5000	4,039,759.7891				420012.7190	4033690.4844
			414,583.3750	4,039,699.2617				419801.2810	4033687.7539
			414,643.3130	4,039,605.6250					
			414,700.5000	4,039,498.9766					
			414,718.6880	4,039,441.7188					
			414,729.1250	4,039,314.2500					
			414,747.2500	4,039,108.7500					
D4	0.59	SDCA	408,694.5000	4,035,836.9883	D7	0.43	SDCA	422105.2500	4031749.0176
			408,417.2190	4,035,957.7344				421854.9690	4031871.4102
			408,370.5940	4,036,191.9453				421952.1880	4032442.4199
			408,249.5940	4,036,258.3164				421827.1560	4032498.3555
			408,231.6880	4,036,571.0625				421778.4380	4032522.0762
			408,075.5000	4,036,791.1719				421882.0310	4032660.6934
			408,254.4060	4,037,157.2813				421931.3130	4032728.7031
			408,249.9060	4,037,387.3789				421954.3130	4032765.7129
			408,606.5630	4,037,448.5391				421966.3130	4032785.8828
			408,414.0000	4,037,664.3359				421992.7810	4032841.0703
			408,348.8750	4,037,888.7227				422013.5310	4032894.8164
			408,415.9060	4,038,042.2422				422030.0630	4032956.1914
			408,494.0000	4,038,156.0977				422039.5000	4033014.7422
			408,687.9380	4,038,284.6484				422042.1560	4033068.7461
			408,762.7190	4,038,303.7813				422042.4380	4033082.8008
			408,853.0940	4,038,290.2422				422040.7810	4033127.2188
			408,911.3130	4,038,246.2109				422103.3750	4033191.3320
			409,028.9380	4,038,251.5742				422274.9380	4033248.8359
			409,126.1560	4,038,258.7344				422331.4380	4033437.2383
			409,134.0630	4,038,309.6602				422451.9060	4033492.2617
			409,144.5940	4,038,382.5547				422530.2190	4033470.0195
			409,201.0630	4,038,424.0508				422579.0940	4033430.6797
			409,255.5940	4,038,422.9180				422659.7190	4033313.9453
			409,299.1250	4,038,391.3789				422698.6880	4033173.2383
			409,304.7190	4,038,329.9609				422688.0630	4032830.0469
			409,254.9380	4,038,259.1797				422701.7500	4032367.5195
			409,308.0940	4,038,163.0195				422592.2190	4031994.7988
			409,312.7190	4,038,061.7695				422299.6560	4031762.5020
			409,335.7190	4,038,017.0195				422105.2500	4031749.0176
			409,334.3750	4,037,792.3008					
409,260.5630	4,037,628.4492	D8	0.06	SDCA	421758.4690	4032529.3477			
409,184.9060	4,037,508.1055				421668.6250	4032569.9238			
409,044.0630	4,037,256.8359				421615.5310	4032859.4297			
408,869.9060	4,037,236.6055				421680.6250	4033146.5156			
408,755.8130	4,037,260.8867				421959.5000	4033044.5586			
408,768.2810	4,037,143.0156				422021.5000	4033108.1875			
408,784.9690	4,037,079.6914				422022.5630	4033079.4023			
408,789.7190	4,036,817.3555				422019.3130	4033018.7031			
408,751.4060	4,036,667.7344				422010.1880	4032960.1484			
408,706.5940	4,036,616.2422				421994.8130	4032902.9766			
408,694.5000	4,035,836.9883	421977.7500	4032858.2227						
		421948.4060	4032795.7422						
		421918.7190	4032746.2988						
		421884.3440	4032697.7148						
		421806.2810	4032593.7305						
		421758.4690	4032529.3477						

## EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates
D9	0.53	SDCA	420,265.8440	4,030,508.7188	D11 continued	2.32	SDCA	416481.0000	4029994.3359
			419,947.7500	4,030,741.5176				416483.2500	4030000.4590
			420,067.1880	4,030,907.7324				416476.4690	4030004.0684
			420,051.5940	4,031,073.7461				416464.6250	4030013.5332
			420,132.5000	4,031,300.5000				416452.1250	4030020.7266
			420,460.9690	4,031,604.7441				416447.3130	4030031.0762
			420,449.4060	4,032,103.9551				416454.8750	4030042.8809
			419,975.9690	4,032,480.4902				416467.7500	4030052.9766
			420,091.3750	4,032,635.9316				416466.0630	4030067.6035
			420,399.6560	4,032,679.1270				416454.5310	4030077.5586
			420,847.1880	4,032,406.2988				416440.6250	4030076.0938
			421,363.7810	4,031,994.1230				416437.6250	4030084.6914
			420,995.8750	4,031,495.0273				416445.8130	4030098.3496
			420,265.8440	4,030,508.7188				416459.0310	4030110.6875
								416465.9060	4030126.0488
			D10	1.75				SDCA	419,965.0000
419,803.2190	4,027,847.7363	416461.5310			4030157.1523				
419,922.8440	4,028,009.4902	416450.1560			4030168.0938				
419,437.5940	4,028,368.0176	416439.0940			4030177.2402				
419,317.9690	4,028,206.2617	416443.8750			4030188.7227				
418,994.5310	4,028,445.2656	416458.4380			4030192.3809				
418,730.3440	4,028,397.0371	416470.3130			4030190.8789				
419,406.8750	4,029,323.4316	416479.0310			4030177.9727				
421,010.9060	4,031,484.3145	416493.8130			4030171.2637				
421,216.1560	4,031,761.8594	416510.6250			4030166.2656				
421,439.0940	4,031,498.2363	416527.2190			4030165.8828				
421,631.0310	4,031,208.7773	416541.7810			4030161.9238				
421,571.8750	4,030,077.3184	416568.0630			4030143.3945				
421,548.9690	4,029,833.7383	416585.0000			4030137.3281				
421,523.2500	4,029,607.1328	416601.6250			4030130.7734				
421,241.1880	4,029,607.8887	416608.7190			4030112.7188				
421,116.0000	4,029,457.7559	416614.8750	4030093.7324						
420,776.0000	4,029,075.9551	416614.1560	4030081.1367						
420,233.7500	4,028,421.8027	416606.9690	4030057.0176						
420,070.9690	4,028,193.2832	416610.2810	4030041.6328						
419,973.2500	4,027,978.3457	416621.0310	4030029.7910						
419,965.0000	4,027,728.2520	416626.8440	4030016.4492						
		416634.6560	4030003.4863						
D11	2.32	SDCA	416,924.2190	4,025,991.8965	416639.6560	4029988.0273			
			416,906.7190	4,026,000.2598	416642.2500	4029973.2676			
			416,817.3750	4,026,065.2832	416656.7190	4029972.4727			
			415,808.9380	4,026,810.0977	416688.3750	4029977.5293			
			415,803.8440	4,026,822.5840	416704.9380	4029976.5762			
			415,810.1250	4,026,837.9219	416715.9690	4029964.5742			
			416,016.5310	4,027,163.7559	416723.1250	4029949.7949			
			415,829.9690	4,027,301.7383	416734.4690	4029937.7109			
			415,812.0000	4,027,654.7500	416747.7190	4029929.2070			
			415,987.3440	4,028,348.8008	416759.0310	4029916.4004			
			415,969.6880	4,028,562.7461	416768.4690	4029902.2207			
			415,530.3750	4,028,446.4922	416781.8130	4029898.3633			
			415,660.2500	4,028,955.4551	416790.3750	4029900.3945			
			416,062.8130	4,029,458.0664	416827.0940	4029907.2129			
			416,386.1560	4,029,683.9746	416838.2500	4029915.7813			
			416,436.9060	4,029,720.7148	416845.7500	4029917.9492			
			416,449.5000	4,029,732.7207	416852.5940	4029916.0938			
			416,468.5940	4,029,742.7246	416867.9690	4029916.1543			
			416,489.8750	4,029,746.4355	416880.3440	4029917.7637			
			416,529.4060	4,029,741.9941	416895.6880	4029914.7402			
			416,547.9690	4,029,741.4180	416925.9380	4029904.3965			
			416,541.4060	4,029,755.8789	416940.7190	4029903.4805			
			416,528.0940	4,029,767.9277	416954.8130	4029907.8730			
			416,515.2190	4,029,777.7969	416966.3750	4029914.2246			
			416,501.9690	4,029,786.2637	417119.3130	4029946.7070			
			416,489.6560	4,029,794.9004	417187.6250	4029971.9180			
			416,430.1250	4,029,834.6543	417582.2500	4030268.0078			
			416,415.3750	4,029,843.4570	417521.0310	4029772.5176			
			416,400.7190	4,029,849.4766	417701.5630	4029667.0430			
			416,387.3130	4,029,856.1563	417771.4380	4029656.0293			
			416,372.5940	4,029,860.3105	417852.7810	4029647.5566			
			416,368.5310	4,029,870.0703	418130.3750	4029643.4648			
416,375.7810	4,029,880.6270	418383.2810	4029647.0859						
416,384.4690	4,029,895.7617	419083.7810	4029748.1953						
416,385.5310	4,029,910.9023	419086.1880	4029746.9258						
416,395.3130	4,029,918.6621	419093.6560	4029564.0527						
416,406.0630	4,029,922.9727	417887.0630	4029198.4668						
416,419.9060	4,029,929.8086	417896.1560	4029182.4668						
416,435.1560	4,029,936.6543	417881.5000	4029187.7246						
416,449.2500	4,029,947.3340	418000.2190	4028968.8594						
416,459.1250	4,029,961.2246	417985.8130	4028531.7539						
416,462.9690	4,029,976.8418	417825.0940	4028556.4668						
416,471.5630	4,029,988.3965	417545.0000	4028513.0254						

## EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates
D11 continued	2.32	SDCA	417,068.6250	4,027,867.9766	D16	0.70	SDCA	416987.0630	4023427.0801
			417,152.6880	4,027,307.1758				416718.5630	4023625.5098
			417,077.1880	4,026,864.2910				416734.5310	4023647.0078
			417,117.7810	4,026,581.1016				416700.3440	4023672.5195
			417,277.7500	4,026,460.9707				416689.5630	4023734.1953
			416,924.2190	4,025,991.8965				416678.1560	4023741.8613
D12	0.02	SDCA	419,887.8440	4,027,285.2500	416644.1560	4023925.0195	417010.6880	4024645.2734	
			419,726.0310	4,027,404.7344	417000.8130	4024984.0566	417004.5630	4024995.9414	
			419,965.0000	4,027,728.2520	416997.8130	4025001.7578	416224.2500	4025007.0430	
			419,949.5310	4,027,659.1582	416932.7810	4025971.6777	417170.5000	4026294.0039	
			419,887.8440	4,027,285.2500	417483.0940	4026061.2461	417363.6250	4025899.4863	
			419,880.3750	4,027,234.3164	417848.8440	4025541.0000	418087.8130	4025864.5176	
D13	0.02	SDCA	419,832.8130	4,026,984.5820	418249.6250	4025744.9961	417981.1560	4025483.1621	
			419,810.5000	4,026,842.2539	417862.3130	4025432.8262	417742.6560	4025357.7832	
			419,648.7190	4,026,961.7383	417731.0940	4025299.8848	417711.4060	4025042.9023	
			419,772.4690	4,027,130.8359	417596.9060	4024857.0391	417427.9690	4024735.2051	
			419,887.8440	4,027,285.2500	417308.1560	4024673.9160	417192.2500	4024288.4082	
			419,880.3750	4,027,234.3164	417038.6560	4023907.3789	416987.0630	4023427.0801	
D14	2.46	SDCA	412,117.6560	4,023,538.0977	D17	0.01	SDCA	418812.6560	4025829.9941
			411,983.4060	4,023,714.6152				418722.7810	4025817.3457
			411,915.1560	4,023,883.7793				418531.3750	4025787.7188
			411,828.0940	4,024,594.2207				418650.8440	4025949.5527
			411,988.0310	4,025,141.2695				418812.6560	4025829.9941
			412,161.8440	4,025,254.5859				D18	0.01
412,387.4060	4,025,234.3184	418369.5630	4025907.3164						
412,577.3130	4,025,175.8184	418531.2190	4025787.8750						
412,752.9380	4,025,413.6777	418422.7500	4025775.2305						
412,942.5940	4,025,667.2090	418250.0940	4025745.5586						
413,298.0630	4,025,913.1816	D19	1.88	SDCA	410989.2810	4022251.9551			
413,700.7190	4,025,878.1113				411145.7810	4022140.5918			
413,843.4060	4,025,859.0313				410728.5630	4021605.7773			
413,892.3750	4,025,869.0625				410525.7190	4021575.8516			
414,103.4380	4,026,021.7207				410434.2500	4021553.4805			
414,294.0310	4,026,188.3672				410330.1560	4021538.0020			
414,574.5630	4,026,473.5742	410249.0940	4021523.9121						
414,628.3130	4,026,552.7695	410165.6880	4021513.8320						
414,946.8130	4,027,212.3789	410012.7810	4021489.0801						
415,303.7810	4,027,171.2480	409988.7810	4021485.5020						
415,463.6880	4,026,711.0117	409958.9380	4021487.3027						
415,639.0630	4,026,577.9492	409834.5940	4021472.0918						
415,777.6250	4,026,784.4590	409710.8750	4021458.8867						
415,787.8440	4,026,793.4668	409588.2190	4021468.2129						
415,793.6560	4,026,794.4512	409472.9060	4021506.2676						
416,290.3440	4,026,429.5527	409364.2190	4021564.2617						
416,545.3750	4,026,241.2695	409273.0310	4021648.9043						
416,908.5000	4,025,969.6309	409231.3750	4021698.0781						
416,207.2500	4,025,017.7598	409192.6560	4021749.2871						
415,765.2810	4,024,422.9277	409142.4380	4021863.0625						
415,712.3440	4,024,368.7461	409121.8750	4021936.3730						
414,755.6880	4,025,075.7559	409108.8130	4021989.7910						
414,875.1560	4,025,237.5156	409094.0000	4022070.1055						
414,715.5000	4,025,356.9941	409085.6880	4022117.5977						
414,832.8440	4,025,518.7598	409078.5310	4022146.7773						
414,509.4060	4,025,757.7637	409061.1250	4022247.9473						
414,628.8750	4,025,919.4863	409045.9690	4022310.3633						
414,432.8750	4,026,064.2539	409033.1250	4022381.5703						
414,383.9380	4,025,997.9883	409029.3750	4022398.8301						
414,274.7500	4,025,678.2109	409009.4380	4022518.7207						
414,249.7810	4,025,496.0098	409000.8440	4022749.8164						
414,266.4690	4,025,323.2305	408748.8130	4022752.2285						
414,210.4380	4,025,245.9863	408748.6880	4022994.9199						
413,519.9380	4,024,988.5723	408752.0000	4023250.6855						
413,307.2500	4,025,145.7637	409002.0630	4023249.9121						
413,144.4690	4,024,931.4102	408999.6250	4023000.2637						
412,117.6560	4,023,538.0977	410005.0940	4022997.9844						
D15	0.08	SDCA	418,812.6560	4,025,829.9941	410001.1880	4023280.3379			
			419,051.1560	4,026,152.9863	410254.3750	4023245.9746			
			419,213.4060	4,026,034.2168					
			419,810.5000	4,026,842.2539					
			419,655.1250	4,026,404.8789					
			419,499.9380	4,025,999.3496					
			419,182.9690	4,025,925.2813					
			418,812.6560	4,025,829.9941					

## EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates
D19 continued	1.88	SDCA	410,472.1880	4,023,123.1172	S1	0.71	Study	410001.6560	4042464.2656
			410,718.0630	4,023,206.8965				409290.7190	4042500.2383
			410,862.1250	4,023,378.8164				408861.2190	4042688.4688
			410,821.5940	4,023,731.0039				408813.8750	4042910.9609
			410,665.3750	4,023,862.7910				408859.4380	4043071.8984
			410,401.5000	4,024,041.8867				408972.0940	4043285.6914
			410,411.4380	4,024,308.5215				409337.5310	4043461.0000
			410,520.6560	4,024,349.3066				410500.6560	4043924.3945
			411,162.2810	4,024,681.8047				410962.4690	4044000.3555
			411,124.9690	4,024,778.6250				411096.8440	4043852.2109
			411,222.3440	4,024,873.7930				411108.0630	4043672.6836
			411,392.4060	4,024,792.1602				410984.4380	4043481.0273
			411,607.8130	4,024,539.2461				410592.0940	4043294.9219
			411,737.1560	4,023,825.0313				410496.6250	4043013.0352
			411,867.2500	4,023,463.2520				410003.5310	4043008.3594
			411,784.7500	4,023,306.3613				410001.6560	4042464.2656
			411,582.4060	4,023,006.9551					
			411,126.7810	4,022,795.5957					
			410,994.2500	4,022,416.6367					
			410,989.2810	4,022,251.9551					
D20	0.21	SDCA	414,982.2190	4,021,997.8164	S2	0.27	Study	415072.8130	4041278.8984
			415,176.7190	4,022,263.2852				414928.6560	4041572.7422
			415,103.2190	4,022,320.4727				414740.2500	4042529.6992
			415,581.2500	4,022,965.4922				415304.2190	4042966.9609
			415,817.9380	4,022,790.5078				415642.3130	4042393.3203
			416,056.9060	4,023,113.9902				415234.1250	4041986.6914
			416,207.6250	4,023,003.7656				415072.8130	4041278.8984
			415,998.3750	4,023,002.3203					
			416,002.5310	4,022,602.1270					
			415,526.5000	4,022,002.0215					
D21	0.39	SDCA	409,784.0630	4,021,446.5840	S3	0.72	Study	421548.9690	4029833.7383
			409,836.5940	4,021,452.1992				421571.8750	4030077.3184
			409,959.4380	4,021,467.4043				421631.0310	4031208.7773
			409,986.8440	4,021,465.6152				421439.0940	4031498.2363
			410,014.9380	4,021,469.1094				421216.1560	4031761.8594
			410,109.0000	4,021,484.2637				421260.3750	4031837.4414
			410,027.5940	4,021,036.2754				421371.5310	4031985.9238
			409,998.0310	4,020,801.4766				421398.8440	4032023.9863
			409,487.5940	4,020,143.3262				421454.5000	4032099.1406
			409,409.3130	4,020,065.3262				421509.5310	4032174.3066
			409,373.6560	4,020,006.3652				421645.9690	4032358.6465
			409,360.9380	4,020,010.4766				421725.3130	4032466.9844
			409,276.4690	4,020,023.0879				421769.8440	4032526.2539
			409,280.3750	4,020,086.8984				421827.1560	4032498.3555
			409,223.5310	4,020,182.5996				421952.1880	4032442.4199
			409,166.6250	4,020,986.3672				421854.9690	4031871.4102
			409,146.5630	4,021,804.0762				422105.2500	4031749.0176
			409,176.1250	4,021,738.1621				422299.6560	4031762.5020
			409,218.6880	4,021,681.9980				422592.2190	4031994.7988
			409,255.5940	4,021,639.3984				422701.7500	4032367.5195
			409,351.8750	4,021,549.4316				422732.5630	4032243.8984
			409,464.4690	4,021,488.9551				422746.8130	4032159.0254
			409,583.4380	4,021,449.5684				422779.7500	4032064.7734
			409,710.2810	4,021,438.8574				422779.7190	4031946.8984
			409,784.0630	4,021,446.5840				422793.9060	4031814.8984
								422817.5310	4031682.9316
								422840.9690	4031565.0645
								422869.3130	4031447.2109
								422836.2810	4031338.7852
								422713.7500	4031206.8086
		422529.9380	4030985.2422						
		422250.5940	4030779.7578						
		422000.0310	4030499.9922						
		422006.2810	4030500.0156						
		421836.9380	4030271.0234						
		421548.9690	4029833.7383						
D22	0.03	SDCA	414,001.2500	4,020,257.5078	S4	0.15	Study	417410.5630	4023845.5176
			414,001.4690	4,020,502.5137				417398.8440	4023845.8750
			414,426.0000	4,020,500.8262				417387.4380	4023846.9883
			414,464.0310	4,020,432.0313				417377.4060	4023848.7207
			414,293.7190	4,020,338.7207				417367.8440	4023851.0527
			414,135.9690	4,020,279.6660				417358.9380	4023853.9434
			414,001.2500	4,020,257.5078				417350.9380	4023857.4238
								417343.0940	4023861.6250
								417335.2810	4023866.7793
								417327.4690	4023872.8066
D23	0.29	SDCA	409,535.8130	4,018,994.6445				417319.6880	4023879.7500
			409,534.9380	4,019,112.7676			417310.5940	4023888.9688	
			409,493.8750	4,019,250.0898			417301.9690	4023899.1680	
			409,428.5630	4,019,253.1973			417293.6560	4023910.1230	
			409,374.7500	4,019,259.9512			417286.2810	4023921.5137	
			409,200.4380	4,019,355.6914			417281.1250	4023930.3848	
			409,208.0310	4,019,472.8008			417276.9060	4023939.6543	
			409,435.7810	4,019,902.2852			417273.1560	4023949.9414	
			409,445.4060	4,019,983.3887			417269.7190	4023961.3281	
			409,576.6880	4,020,126.1250			417266.5000	4023975.5664	
			410,016.9060	4,020,278.1445			417263.6560	4023992.3125	
			410,025.1560	4,019,002.0527					
			409,535.8130	4,018,994.6445					

**EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions**

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)				
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates			
S4 continued	0.15	Study	417,257.5630	4,024,036.4043	S4 continued	0.15	Study	417723.6250	4024112.4082			
			417,255.7810	4,024,053.0898				417716.8440	4024108.7773			
			417,254.3440	4,024,071.4844				417710.6880	4024104.8281			
			417,253.3440	4,024,112.0410				417693.1880	4024092.0859			
			417,253.6880	4,024,135.3887				417683.1250	4024084.1797			
			417,256.4690	4,024,211.2207				417674.4380	4024076.5137			
			417,258.9380	4,024,248.6602				417667.2810	4024069.1191			
			417,260.8130	4,024,266.7930				417661.4690	4024061.8086			
			417,266.0630	4,024,299.1426				417657.0630	4024054.5488			
			417,269.5630	4,024,313.8516				417654.5000	4024048.2773			
			417,274.6560	4,024,330.5859				417652.5000	4024040.8516			
			417,281.5940	4,024,349.5684				417647.9060	4024009.5918			
			417,289.7810	4,024,368.9414				417646.3750	4024002.8047			
			417,298.0630	4,024,386.4863				417644.5940	4023996.9746			
			417,306.2810	4,024,401.4785				417640.7500	4023988.9395			
			417,314.9690	4,024,415.0508				417636.0310	4023980.8086			
			417,324.0630	4,024,427.2441				417630.3750	4023972.9629			
			417,333.2500	4,024,437.8730				417623.6560	4023965.2930			
			417,341.8130	4,024,446.3809				417617.2810	4023958.7949			
			417,362.2810	4,024,463.6328				417609.9690	4023952.3184			
			417,374.6880	4,024,472.7871				417601.7810	4023945.7832			
			417,391.6880	4,024,484.4727				417592.6250	4023939.0781			
			417,422.5940	4,024,504.8984				417575.3440	4023927.6641			
			417,438.9380	4,024,515.1504				417540.5940	4023906.3262			
			417,454.8440	4,024,524.5742				417526.8440	4023897.4316			
			417,469.5000	4,024,532.6895				417515.0940	4023889.3320			
			417,483.8130	4,024,540.1250				417487.6880	4023868.7949			
			417,497.9690	4,024,546.9180				417472.0940	4023858.9844			
			417,525.0310	4,024,558.3184				417463.6560	4023854.8926			
			417,537.3130	4,024,562.7500				417455.1880	4023851.9063			
			417,550.9690	4,024,567.0371				417444.7810	4023849.1504			
			417,565.6880	4,024,571.1504				417433.6250	4023847.1348			
			417,595.7190	4,024,578.3379				417422.1560	4023845.9258			
			417,644.3750	4,024,588.4512				417410.5630	4023845.5176			
			417,671.1560	4,024,593.2676								
			417,699.5630	4,024,597.4395								
			417,729.9690	4,024,601.0371				C1	0.21	Channel	411145.9380	4022140.5117
			417,763.4060	4,024,604.2285							410989.3130	4022252.0020
			417,801.4380	4,024,607.2109							410994.2500	4022416.6367
			417,876.5000	4,024,612.3184							411126.7810	4022795.5957
			417,885.9690	4,024,613.4160							411582.4060	4023006.9551
			417,906.1880	4,024,617.6074							411784.7500	4023306.3613
			417,954.9060	4,024,630.4629							411867.2500	4023463.2520
			417,966.3750	4,024,632.8535							411737.1560	4023825.0313
			417,976.4690	4,024,634.2813							411915.1560	4023883.7793
			417,984.4060	4,024,634.8398							411983.4060	4023714.6152
			417,991.7190	4,024,634.7266							412117.6560	4023538.0977
417,998.0940	4,024,633.9082				411792.0630	4023094.1152						
418,004.0310	4,024,632.4531				411782.4060	4023076.2949						
418,009.1560	4,024,630.2891				411748.7190	4022994.3965						
418,013.8130	4,024,627.4102				411643.6250	4022726.7266						
418,017.8750	4,024,623.8594				411641.6880	4022435.3887						
418,021.4380	4,024,619.5566				411419.2190	4022347.2383						
418,027.1560	4,024,609.7598				411284.5000	4022318.9453						
418,032.4060	4,024,597.6895				411145.9380	4022140.5117						
418,034.6560	4,024,589.4512											
418,035.8750	4,024,580.7773				C2	0.30	Channel	409201.5000	4019370.5664			
418,035.6560	4,024,570.7617							409173.3130	4019532.8418			
418,034.0630	4,024,559.9766							409115.7190	4019657.4395			
418,031.0630	4,024,548.3418							409058.5940	4019813.5703			
418,026.3750	4,024,535.4473							409055.4380	4019859.0117			
418,020.4690	4,024,521.3984							409098.6560	4019944.7520			
418,000.5310	4,024,478.6465							409192.5940	4020079.2344			
417,984.5630	4,024,435.9668							409223.5310	4020182.5996			
417,970.9060	4,024,402.7227							409280.3750	4020086.8984			
417,957.8130	4,024,373.8125							409276.4690	4020023.0879			
417,943.3130	4,024,343.8242							409352.7190	4020011.6758			
417,931.2500	4,024,320.3027							409373.6560	4020006.3652			
417,918.0940	4,024,295.7734							409409.3130	4020065.3262			
417,880.1250	4,024,228.6719							409487.8750	4020143.3594			
417,859.5000	4,024,190.0117							409998.1880	4020801.4746			
417,854.1250	4,024,181.0176							410027.7500	4021036.2715			
417,848.9380	4,024,173.2773							410109.2810	4021484.2578			
417,843.6250	4,024,166.4160							410174.2810	4021494.7188			
417,838.3130	4,024,160.3535							410242.0940	4021502.6836			
417,832.0940	4,024,154.4258							410335.4060	4021518.5000			
417,825.1250	4,024,149.1992							410438.7190	4021533.8438			
417,816.9690	4,024,144.4160							410529.8750	4021556.1816			
417,807.5630	4,024,140.0762							410712.0940	4021583.1074			
417,799.1250	4,024,136.8242							410602.7500	4021411.3418			
417,789.4690	4,024,133.5957							410686.8440	4021328.9805			
417,744.3750	4,024,120.6641							410488.7190	4020946.7344			
417,733.3130	4,024,116.6641							410264.6250	4020620.0820			
								410015.6880	4020454.4902			

**EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions**

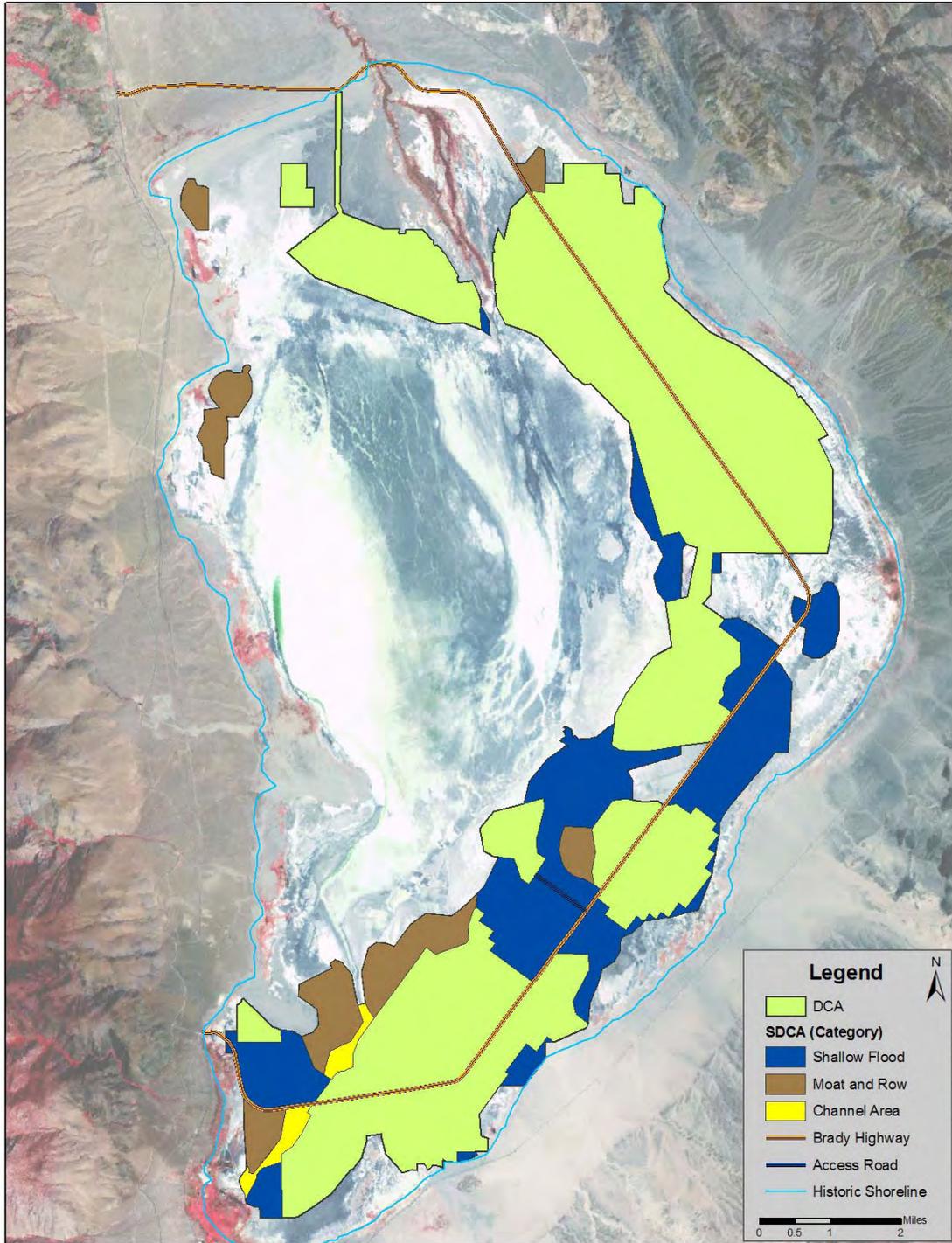
Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates
C2 continued	0.30	Channel	410,016.9060	4,020,278.1445
			409,576.6880	4,020,126.1250
			409,445.4060	4,019,983.3887
			409,435.7810	4,019,902.2852
			409,208.0310	4,019,472.8008
			409,201.5000	4,019,370.5664

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates

Total SDCA            12.77  
 Total Study            1.85  
 Total Channel         0.50

### EXHIBIT 3 -- DUST CONTROL MEASURE MAP

*Shown are dust control measures assigned to areas within the SDCA.*



## EXHIBIT 4 -- DUST CONTROL MEASURE DESCRIPTIONS

Brief descriptions of dust control measures for use on Owens Lake are given below. More detailed descriptions of the three BACM approved dust control methods (shallow flooding, managed vegetation and gravel) are provided in the 2003 SIP. Modifications to these measures as provided in the Settlement Agreement (Agreement) are noted. All references are to sections of the Agreement; section numbers of the Agreement are contained in square brackets.

### Shallow Flooding

The “shallow flooding” (SF) dust control measure involves wetting emissive lake bed surfaces to reduce dust emissions. Performance specifications and a detailed description of the SF measure are provided in the 2003 SIP for achieving 99 percent PM<sub>10</sub> control efficiency. Otherwise, water shall be applied in amounts sufficient to achieve the required wetness cover as specified in Sections 3 through 5, 25, 26, and 27, or as modified under the provisions of Sections 5, 14, 15, 18, and 29. Satellite imagery, aerial photography or other methods approved by the APCO under the provisions of Section 29 are used to measure wetness cover for compliance.

### Managed Vegetation

The “managed vegetation” (MV) dust control measure involves establishing a plant cover on emissive lake bed surfaces to protect them from the wind, thereby reducing dust emissions. Performance specifications and a detailed description of the MV control measure are provided in the 2003 SIP for achieving 99 percent PM<sub>10</sub> control efficiency. Vegetative cover on the MV site present on the lake bed on January 1, 2007 shall be as specified in Section 6. The performance specification of MV may be modified under the provisions of Section 29. Point-frame measurements satellite imagery or other methods approved by the APCO under the provisions of Section 29 are used to measure plant cover for compliance.

### Gravel Cover

The “gravel cover” (GC) dust control measure involves placing a layer of gravel on emissive lake bed surfaces to protect them from the wind, thereby reducing dust emissions. Performance specifications are described in the 2003 SIP.

### Moat and Row

The general form of the “moat and row” (MR) measure is an array (see Figure E4-1) of earthen berms (rows) about 5 feet high with sloping sides, flanked on either side by ditches (moats) about 4 feet deep (see Figure E4-2). Moats serve to capture moving soil particles, and rows physically shelter the downwind lake bed from the wind. The individual MR elements are constructed in a serpentine layout across the lake bed surface, generally parallel to one another, and spaced at variable intervals, so as to minimize the fetch between rows along the predominant wind directions. The serpentine layout of the MR array is intended to control emissions under the full range of principal wind directions (see Figure E4-1). Initial pre-test

modeling indicates that MR elements' spacing will generally vary from 250 to 1000 feet, depending on the surface soil type and the PM<sub>10</sub> control effectiveness required on the MR area.

The PM<sub>10</sub> control effectiveness of MR may be enhanced by combining it with other dust control methods such as vegetation, water, gravel, sand fences, or the addition of other features that enhance sand capture and sheltering or directly protect the lake bed surface from wind erosion. The effectiveness of the array can also be increased by adding moats and rows to the array, which reduces the distance between rows.

The final form of MR will largely be determined from the results of testing on the lake bed as provided in Sections 7 and 8. Final design is subject to test results, required PM<sub>10</sub> control effectiveness, environmental documentation and permitting, engineering, and monitoring considerations.

In areas where MR is used as a control measure, the City shall implement the measure in a manner consistent with the Agreement, particularly Sections 7 and 8, or as modified by actions pursuant to Sections 18 through 24.

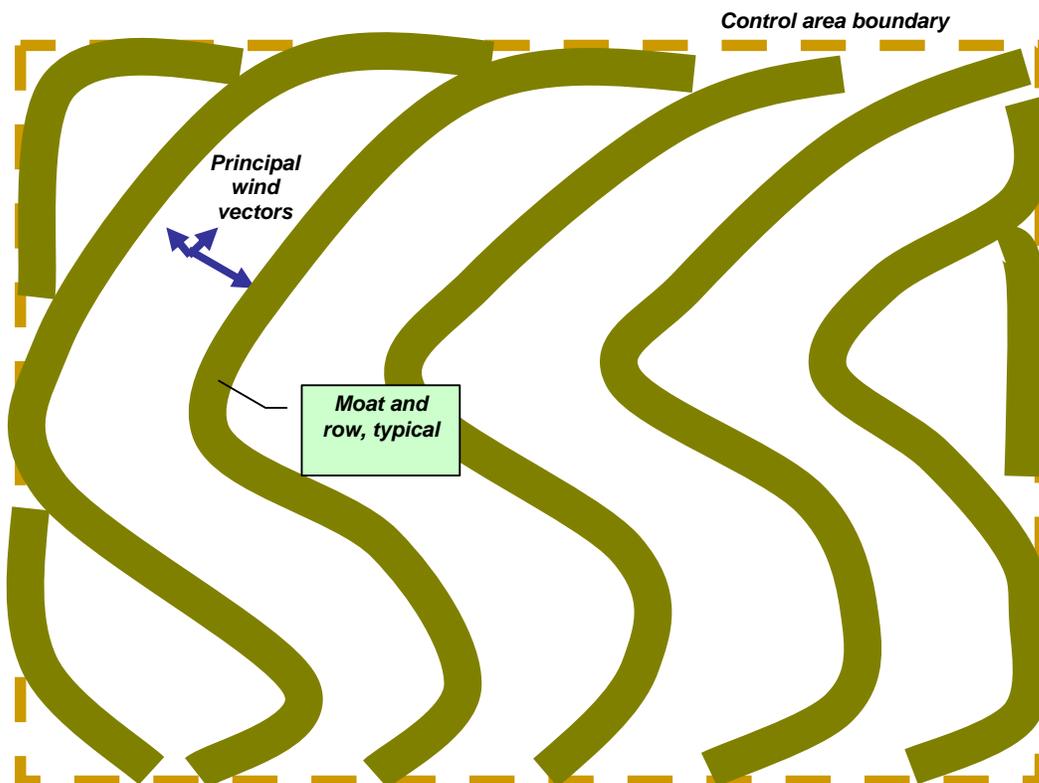


Figure E4-1. Moat and Row Array Plan View (schematic).

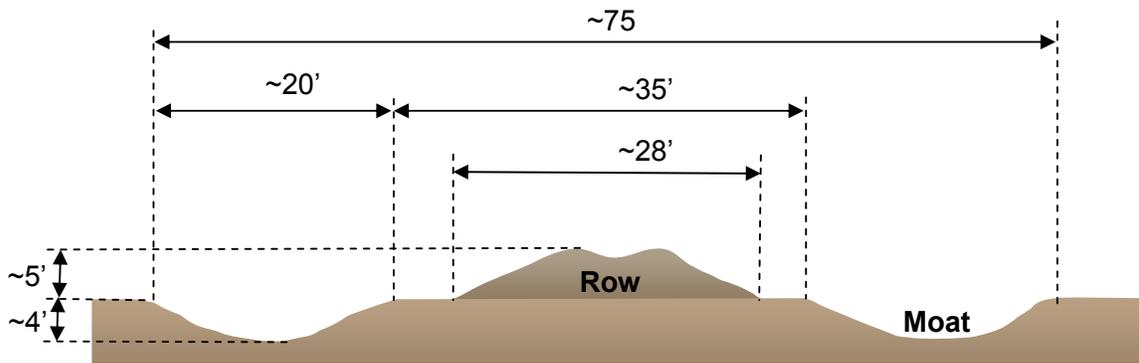
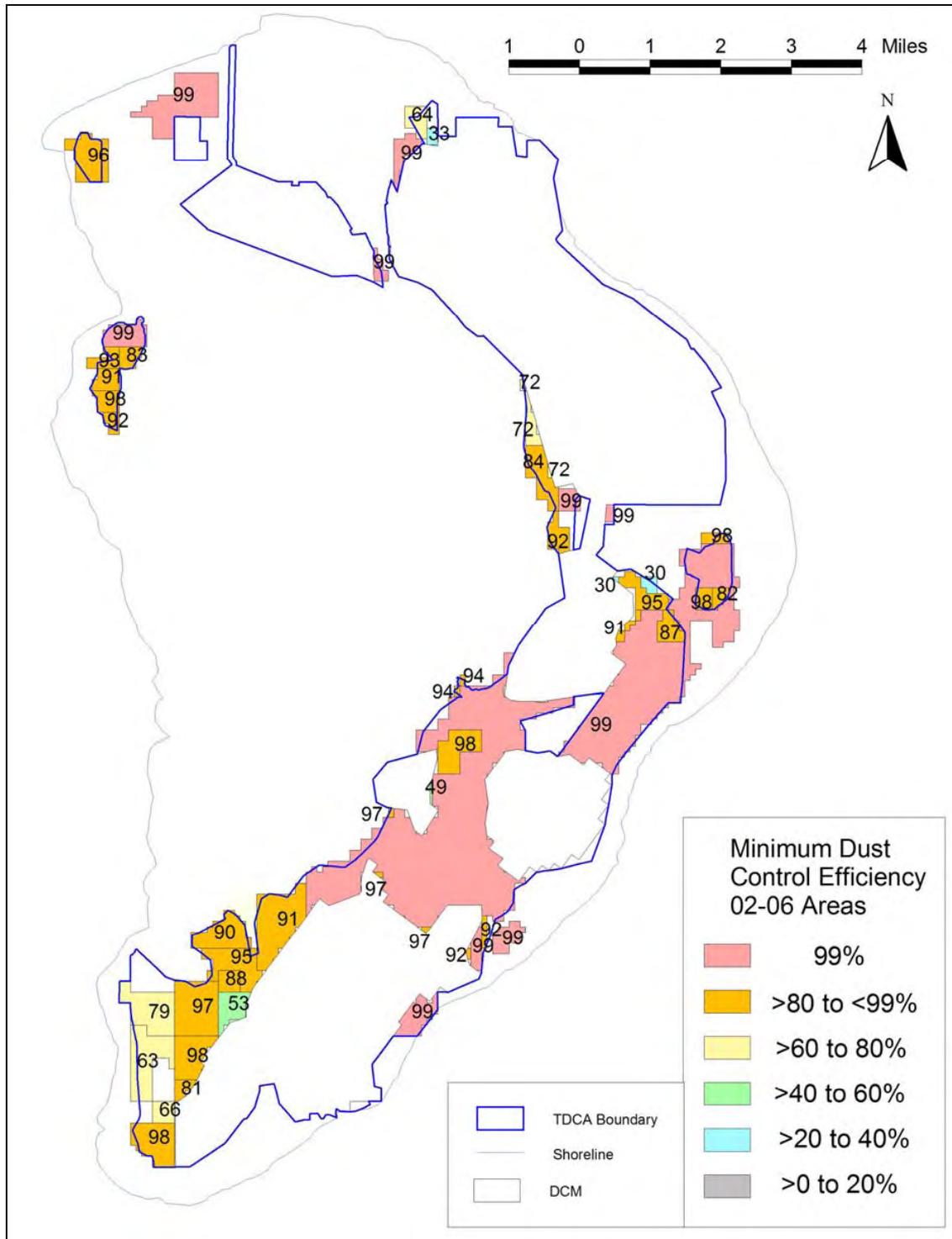


Figure E4-2. Profile of Moat and Row with Approximate Dimensions (schematic).

### EXHIBIT 5 -- TDCA MINIMUM DUST CONTROL EFFICIENCY MAP

*Shown are MDCEs calculated according to Sections 3 and 4 of the agreement.*



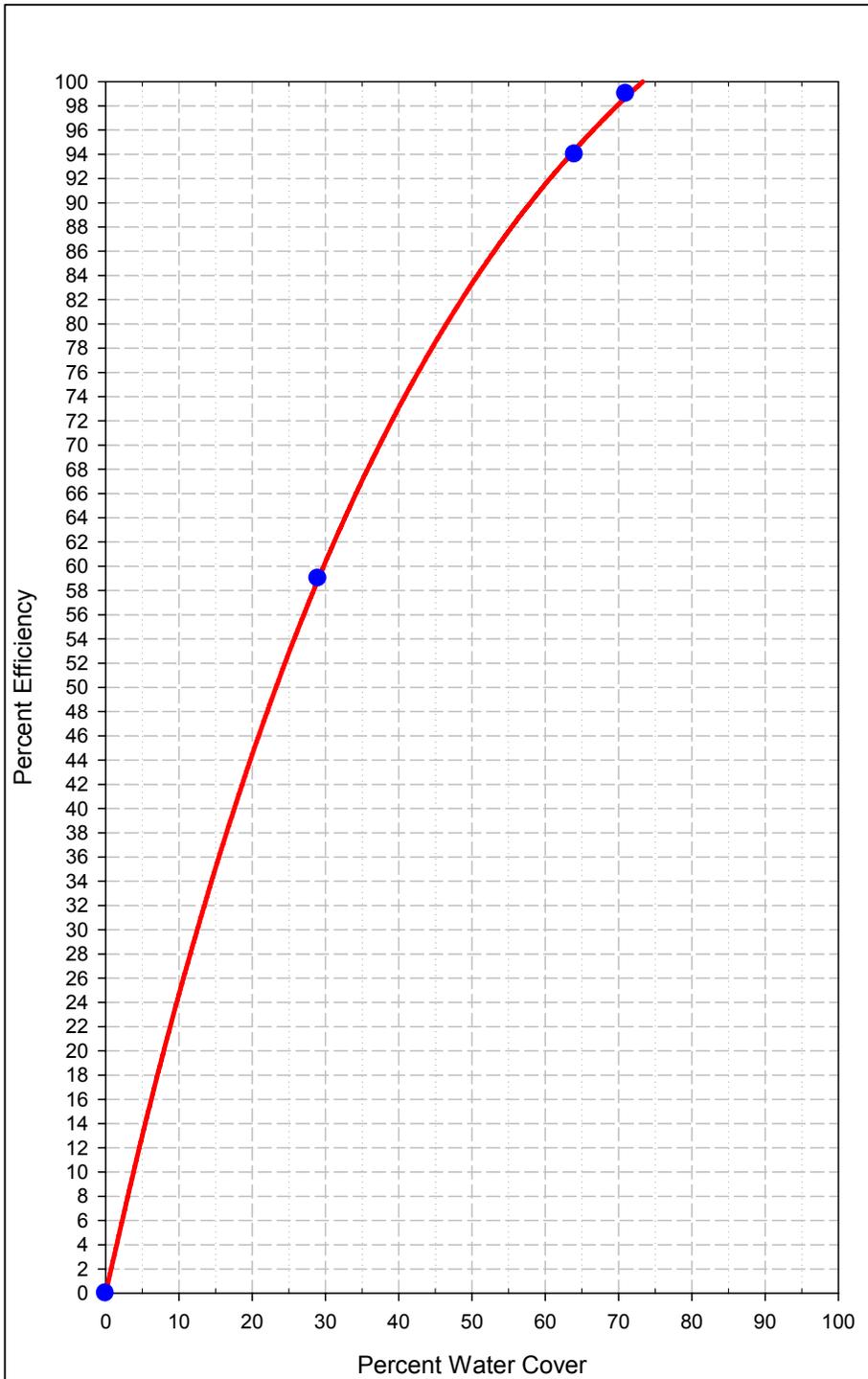
## EXHIBIT 6 -- MDCE SELECTION PROCESS

This exhibit summarizes the purpose of the MDCE Selection Process Spreadsheet. A copy of the Process Spreadsheet, which contains a description of the spreadsheet structure and operation, may be downloaded from the District's website at <http://www.gbuapcd.org/>.

The District developed the Dust ID Model as a tool for identifying dust control areas on the lake bed. The Dust ID Model computes the amount of dust being generated from each source area on the lake bed, but the results cannot be used without additional processing to identify the acceptable combinations of dust control required on each source area (that is, each area's minimum dust control efficiency or "MDCE") to achieve the federal 24-hour  $PM_{10}$  standard along the shoreline. There are many possible combinations of MDCEs that could produce the acceptable result of achieving the standard at the shoreline. For example, 50 percent control on hypothetical Area 1 and 99 percent control on Area 2 may produce the same modeled shoreline concentration as 99 percent control on Area 1 and 50 percent control on Area 2. However, the first combination might be more practical and less costly than the second, and for that reason it is important to have a process that can quickly and efficiently identify acceptable combinations. In all cases, the outcome of this process is some combination of area-by-area dust control efficiencies that produces a modeled attainment of the federal  $PM_{10}$  standard everywhere along the shoreline.

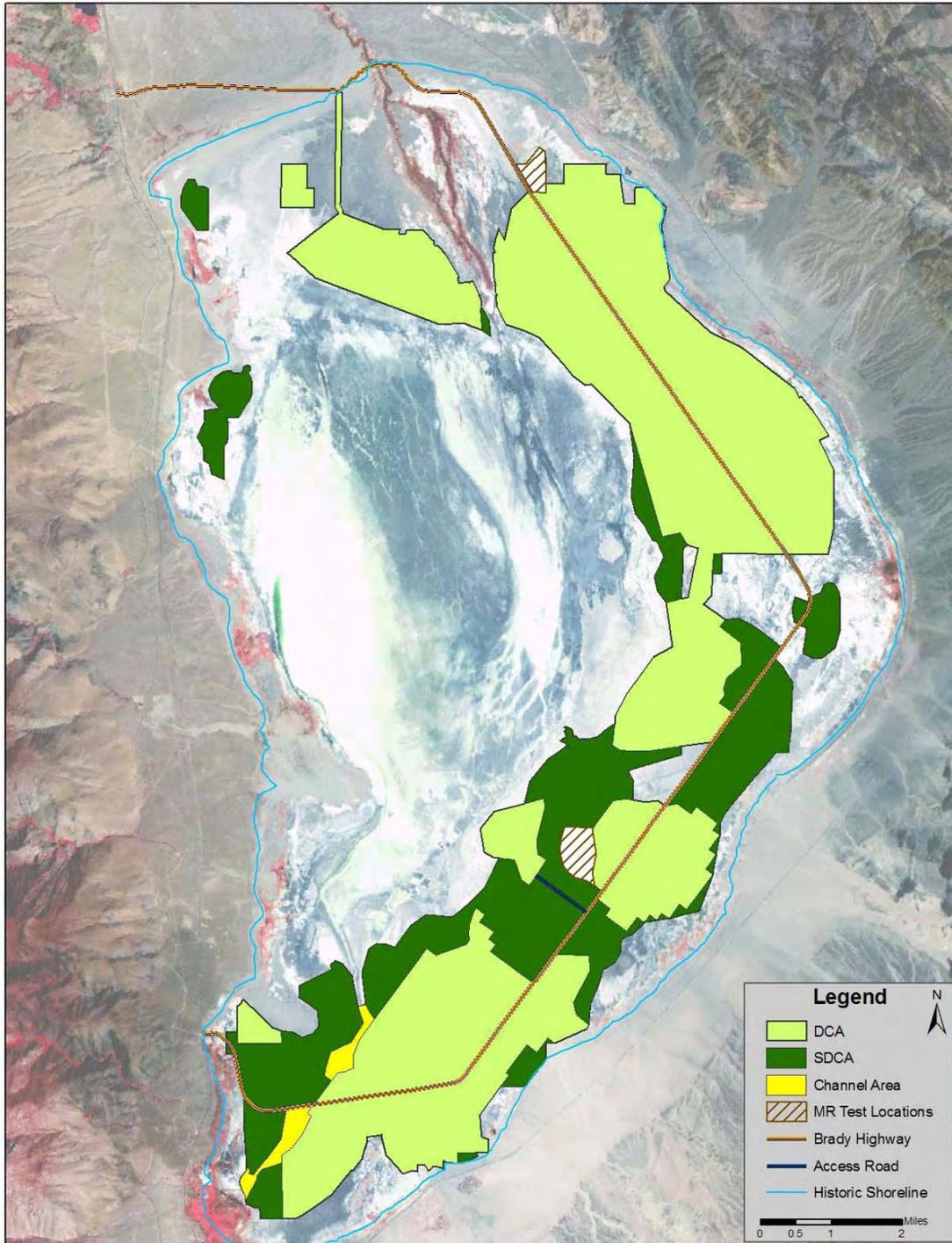
The process for selecting the acceptable combinations of dust control levels has been, heretofore, a manual process. The MDCE Selection Process Spreadsheet (Process Spreadsheet) was developed to more quickly and efficiently identify combinations of dust controls required to produce compliance with the federal 24-hour  $PM_{10}$  standard along the shoreline. The worksheet is set up so that MDCE calculations are automatic, yet it still allows manual adjustments to be made.

### EXHIBIT 7 -- SHALLOW FLOOD CONTROL EFFICIENCY CURVE



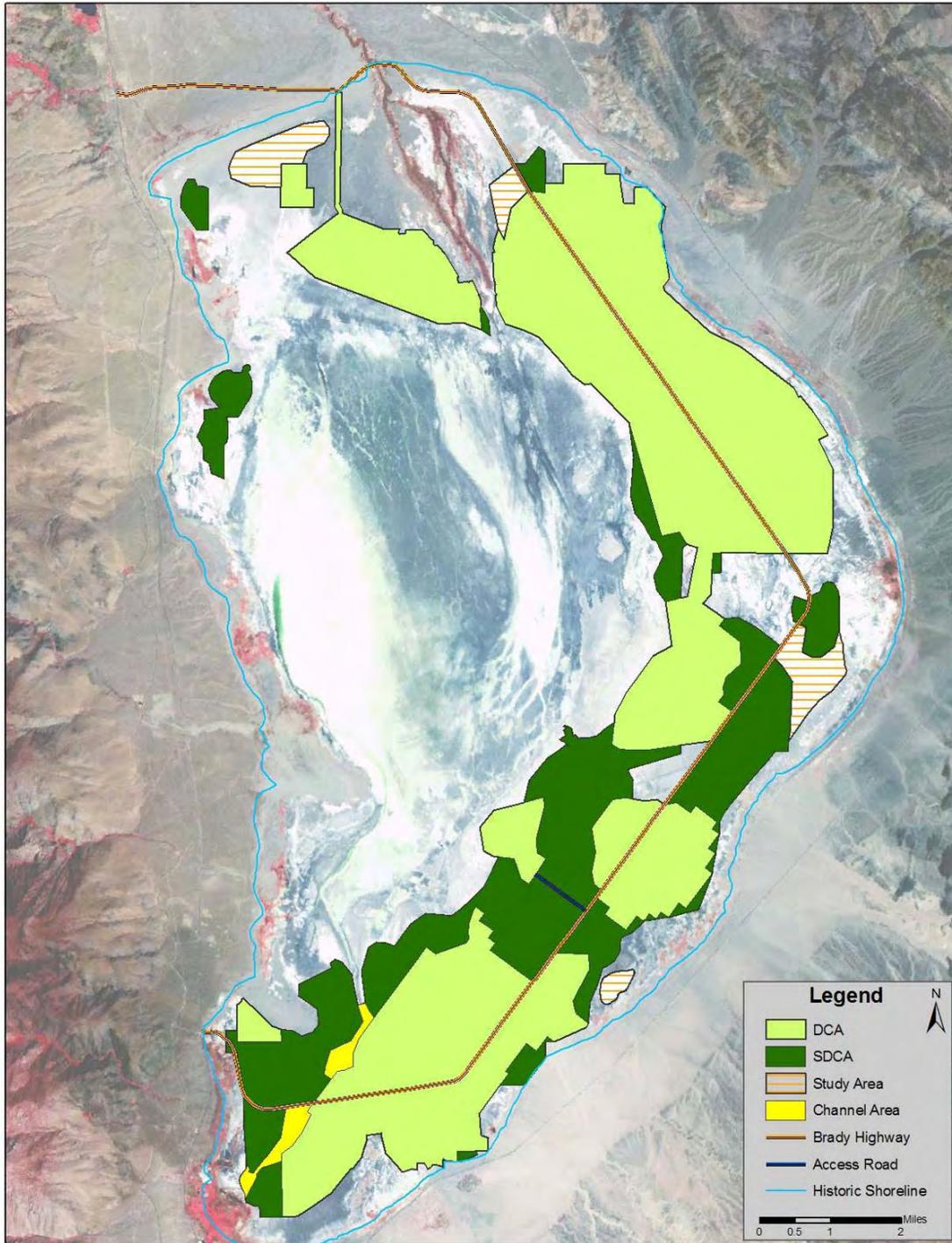
# EXHIBIT 8 -- MOAT AND ROW DEMONSTRATION PROJECT LOCATION MAP

*Two proposed moat and row demonstration project locations*



# EXHIBIT 9 -- STUDY AREA MAP

*Four proposed study area locations*



## EXHIBIT 10 -- SCHEDULE OF CONTINGENCY MEASURES

<i>Issue</i>	<i>Resolution</i>	<i>Duration</i>	<i>Units</i>
<b><i>Moat and Row</i></b>			
Eroded row	Install armoring to prevent further erosion	2	mo/mile
	Install sand fences to prevent further erosion	1	mo/mile
	Reconstruct row in place or adjacent	2	mo/mile
Filled moat	Re-excavate new moat outboard of filled moat, expand existing row onto filled moat	2	mo/mile
Filled sand fence	Clean out or flank with new sand fences	2	mo/mile
Collapsed sand fence	Repair or flank with new sand fences	1	mo/mile
Spacing too large	Pull in intervening sand fence	1	mo/mile
	Add intervening moat and row	3	mo/mile
	Enhance with vegetation and/or wetness	12 to 36	months
	Soil roughening	1 to 3	months/sq mi
	Conversion to reduced BACM/BACM	See Exhibit 11	
<b><i>Managed Vegetation</i></b>			
Emissions from bare areas	Enhance/restore vegetation	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Emissions from vegetated areas	Determine and establish necessary cover	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
<b><i>Gravel Patches</i></b>			
Infilling pore spaces	Supplement gravel depth	4	months/sq mi
	Stabilize by other means (e.g., vegetation, wetness, sand fences)	6 to 36	months
<b><i>Shallow Flood</i></b>			
Emissions from dry areas (insufficient uniformity of wetting )	Wet dry areas. May require land leveling and/or additional laterals.	12	months
Generally too dry	Increase water application rate relative to ET	1	month
<b><i>Other features</i></b>			
Gravel source	Open new or re-open existing quarry	4	months
Emissions from roads, berms, etc.	Increase watering frequency	1	month
	Stabilize by other means (e.g., gravel, stabilizing agents)	1 to 4	months/sq mi

## EXHIBIT 11 -- MOAT AND ROW TRANSITION SCHEDULE

Activity	Duration (years )
Shallow flood transition from moat & row	1.9
Managed vegetation transition from moat & row	5.9
Gravel cover transition from moat & row	1.8
<i>Mutually agreeable exceptions:</i>	<i>Increase over and above durations listed above (years)</i>
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0

## EXHIBIT 12 -- DCM OPERATION SCHEDULE

Activity	Duration (years )
New area shallow flood DCM <sup>a</sup>	2.9
New area managed vegetation DCM <sup>a</sup>	6.1
New area gravel cover DCM <sup>a</sup>	2.2
<i>Mutually agreeable exceptions:</i>	<i>Increase over and above durations listed above (years)</i>
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0
4. Expanded CEQA triggered	1.4
<sup>a</sup> Assumes that total new area <2 square miles per year	

**EXHIBIT 13. DEFINITIONS**

- A. “Background PM<sub>10</sub> concentration” shall mean the concentration of PM<sub>10</sub> caused by sources other than from wind blown dust emanating from the Owens Lake bed. For the purpose of modeling air quality impacts, the background concentration is assumed to be 20 µg/m<sup>3</sup> (micrograms per cubic meter) during every hour at all receptor locations. The monitored and modeled PM<sub>10</sub> emissions from the Keeler Dunes, which are located off the lake bed are treated as a separate dust source area and are not included in the background concentration.
- B. “Best Available Control Measures” or “BACM” shall have the same definition as in the federal Clean Air Act. Approved BACM in the 2003 SIP was associated with PM<sub>10</sub> emission reductions of at least 99 percent and includes managed vegetation, shallow flood, and gravel cover.
- C. “Contingency measures” shall mean dust control measures or modifications to the dust control measures that can be implemented to mitigate dust source areas that cause or contribute to an exceedance of the federal standard at the historic shoreline in the event that a previously approved control strategy was found to be insufficient.
- D. “Control Area” shall mean an area on the lake bed for which dust control is required.
- E. “Control efficiency” shall mean the relative reduction or percent reduction in PM<sub>10</sub> emissions resulting from the implementation of a control measure compared to the uncontrolled emissions.
- F. “Control measures” shall mean measures effective in reducing the PM<sub>10</sub> emissions from the lakebed surface over which they are implemented.
- G. “Dust control measure” or “DCM” shall mean measures designed to suppress sand motion and reduce dust emissions from the Owens Lake bed.
- H. “Dust ID Model” shall mean a computer-based air quality modeling approach developed as part of the 2003 SIP to identify emissive areas on the Owens Lake bed and to estimate the resulting PM<sub>10</sub> concentrations at the shoreline. See also “Dust ID Program.”
- I. “Dust ID Program” shall mean a long-term monitoring and modeling program that is used to identify dust source areas at Owens Lake that cause or contribute to exceedances and violations of the federal PM<sub>10</sub> standard. The current protocol for conducting the Dust ID Program is

included in the 2003 SIP (Exhibit 2 – Attachment 4). See also “Dust ID Model.”

- J. “Emission rate” shall mean the rate (expressed as mass per unit area per unit time) at which an air constituent (PM<sub>10</sub>, for example) is transported away from the surface of the lake bed.
- K. “Exceedance of the federal standard” or “exceedance” shall mean any single-day PM<sub>10</sub> concentration that is monitored or modeled to be above 150 µg/m<sup>3</sup> (24-hour average from midnight to midnight) at any location at or above the historic shoreline.
- L. “Historic shoreline” or “shoreline” shall mean the elevation contour line of 3,600 feet above mean sea level at Owens Lake, California.
- M. “Lake bed” or “Owens Lake bed” or “playa” shall mean the exposed surface within and below the historic shoreline.
- N. “Managed Vegetation” is a Dust Control Measure consisting of lakebed surfaces planted with protective vegetation.
- O. “May not lawfully be included in the SIP” shall mean that inclusion of the provision in question in the revisions to the 2003 SIP has been determined by binding judicial order to be unlawful.
- P. “MCDE-BACM” shall mean Dust Control Measures that achieve Minimum Dust Control Efficiency and are found to be appropriate for the area of application.
- Q. “Minimum Dust Control Efficiency” or “MDCE” shall mean the lowest dust control efficiency, as determined by the Dust ID model, in the Supplemental Dust Control Area necessary to meet the federal standard at the historic shoreline.
- R. “Moat and Row” shall mean a Dust Control Measure consisting of arrays of sand breaks that arrest sand motion.
- S. “PM<sub>10</sub>” or “particulate matter” shall mean atmospheric particulate matter less than 10 micrometers in nominal aerodynamic diameter.
- T. “PM<sub>10</sub> monitor” shall mean an instrument used to detect the concentrations of PM<sub>10</sub> in the air.
- U. “Sand flux monitor” shall mean a device used to measure the amount and/or rate of moving or saltating sand and sand-sized particles caused by wind erosion.

- V. “Shallow Flood” is a Dust Control Measure consisting of lakebed areas wetted to a specified proportion of surface coverage.
- W. “2003 SIP” or “2003 Owens Valley PM<sub>10</sub> State Implementation Plan” shall mean the Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State Implementation Plan 2003 Revision – Adopted November 13, 2003.
- X. “Supplemental Control Requirements” or “SCR” shall mean Dust Control Measures required by the District on areas outside of the DCA that cause or contribute to an exceedance of the federal PM<sub>10</sub> standard at the historic shoreline of Owens Lake.

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## **Board Order 080128-01 Attachment B**

### **2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure**

#### **BACKGROUND**

The State Implementation Plan (SIP) adopted by the Great Basin Unified Air Pollution Control District (District) in 2003 required the City of Los Angeles (City) to install and operate PM<sub>10</sub> controls on a total of 29.8 square miles of the dried Owens Lake bed by the end of 2006. The 2003 SIP also contained a provision and procedures for an annual review of air quality monitoring data by the District's Air Pollution Control Officer (APCO) in order to determine if controls were needed on additional areas beyond the 29.8 square miles in order for the Owens Valley Planning Area to attain or maintain the federal 24-hour PM<sub>10</sub> National Ambient Air Quality Standard (NAAQS). If additional controls were needed, the 2003 SIP provided for the APCO to require the City to implement the necessary controls. This annual review and possible requirement for additional controls is known as the Supplemental Control Requirements (SCR) determination. The 2003 SIP required that SCR determinations use data collected starting July 1, 2002.

In December 2005, after analyzing data collected from July 2002 through June 2004, the District's APCO made the first SCR determination under the provisions of the 2003 SIP. The City objected to the APCO's analysis and submitted an alternative analysis of the data. After reviewing the City's analysis, the APCO revised the SCR determination in April 2006. The City also objected to the revised determination and filed a lawsuit against the District in May 2006. In June 2006 the City and the District entered into settlement negotiations in an attempt to resolve their disputes.

In December 2006 a final Settlement Agreement was approved by the District and the City. This agreement is Attachment A to Board Order 080128-01. Among other issues, the Settlement Agreement provides for modifications to be made to the 2003 SIP's SCR determination procedure. These modifications are incorporated into this revised 2008 SCR determination procedure.

#### **CONDITIONS**

The 2008 Owens Lake Dust Source Identification Program Protocol (Protocol) (Attachment C) contains the procedures to collect, screen, analyze and model the data used by the District's APCO to determine if exceedances of the 24-hour PM<sub>10</sub> NAAQS have occurred and additional Supplemental Controls are necessary on the Owens Lake bed. The following actions may be taken by the APCO and will not be considered a change to the Protocol:

- Add, remove or move PM<sub>10</sub> monitors and meteorological stations
- Replace TEOMs with any other USEPA-approved Reference or Equivalent Method monitors that collect hourly concentration data
- Replace Sensits with any other sand flux monitor (SFM) that collects hourly data
- Replace Cox Sand Catchers with any other SFM

- Add, remove or move SFMs as long as the maximum grid cell size for modeling remains at one square kilometer
- Calculate “from-the-lake” wind directions for new PM<sub>10</sub> monitor sites
- Determine default K-factors for new source areas

The Protocol and these Supplemental Control Requirements (SCR) specify many assumptions and decision trees to be followed that may need to be changed in the future. The following changes to the Protocol and the SCR may be made by written agreement of the APCO and the General Manager of the City of Los Angeles (City) Department of Water and Power:

- The background value of 20 µg/m<sup>3</sup> may be changed to another value or a procedure may be established to calculate the background from upwind/downwind lake bed monitors
- The default K-factors may be updated
- The default seasonal cut points may be updated
- The CalPUFF modeling system may be changed to another USEPA guideline model
- The procedure for determining the sand flux from a Dust Control Measure (DCM) area may be updated
- The K-factor screening criteria may be updated
- From-the-lake wind directions in Attachment B, Table 1 may be changed to avoid including off-lake sources
- Non-reference or non-equivalent method special purpose PM<sub>10</sub> monitors may be added
- Procedures for determining source area boundaries may be updated
- Methods for directly measuring source area emission rates may be implemented

## **DEFINITIONS**

A ***shoreline or near-shore PM<sub>10</sub> monitor*** is a fixed or portable USEPA-approved Federal Reference Method or Equivalent Method PM<sub>10</sub> Monitor located approximately on the 3600-foot elevation (historic shoreline) contour, or within the Owens Valley Non-Attainment Area above the 3600-foot elevation. The existing shoreline or near-shore PM<sub>10</sub> monitors are at Keeler, Flat Rock, Shell Cut, Dirty Socks, Olanca, Bill Stanley and Lone Pine (see Attachment B, Map 1).

A ***special purpose PM<sub>10</sub> monitor*** is a fixed or portable USEPA-approved Federal Reference Method or Equivalent Method PM<sub>10</sub> monitor installed upwind of or near potential dust source areas on the lake bed below the 3600-foot elevation. These lake bed PM<sub>10</sub> monitors will be used to monitor new dust sources areas to generate new K-factors and to evaluate model predictions at the PM<sub>10</sub> sites. They shall not be used to monitor compliance with the NAAQS and the data will not be submitted to USEPA’s Aerometric Information and Retrieval System (AIRS).

An ***exceedance*** is a midnight to midnight Pacific Standard Time 24-hour average PM<sub>10</sub> concentration greater than 150 µg/m<sup>3</sup> measured by a shoreline or near-shore PM<sub>10</sub> monitor.

***From-the-lake wind directions*** are determined by extending two straight lines from the PM<sub>10</sub> monitor site to the points on the 3600-foot contour of the Owens Lake bed that maximize the angle in the direction of the lake bed between the two straight lines. From-the-lake and non-lake wind directions for the existing PM<sub>10</sub> monitor sites are shown in Attachment B, Table 1.

**Physical evidence** of a source area boundary consists of Global Positioning System (GPS) data, visual observations, photographic observations, video observations, or any other method described for this purpose in the Dust ID Protocol.

**BACM** are Best Available Control Measures/Most Stringent Measures (MSM) defined as the dust controls determined to be BACM/MSM for Owens Lake in Paragraphs 15, 16 and 17 of Board Order 080128-01. If, in the future, the District changes or deletes existing BACM or adds new BACM, then the dust controls are those as revised by the latest District action.

**Implements BACM control measures** means BACM are constructed and meeting the performance standards outlined Paragraphs 15, 16 and 17 of Board Order 080128-01.

**Extreme violators** are areas currently required to implement BACM, but BACM are found to be insufficient to adequately control emissions.

**Environmental analysis document complete** means that a project level environmental document has been certified covering the location and the BACM/MSM selected for implementation by the City.

#### **GENERAL SCR DETERMINATION PROCEDURE**

1. If the City is in compliance with Paragraphs 1 and 3 of Board Order 08128-01 regarding the amount, timing and operation of existing and future dust controls, the APCO will not issue additional written SCR determinations until after May 1, 2010 and will not use data collected prior to April 1, 2010 for new determinations, except for Study Areas as provided in Paragraph 2, below. This will allow the City time to complete construction and implementation of the additional PM<sub>10</sub> controls within the 2008 Total Dust Control Area.
2. After May 1, 2010, the APCO will recommence written SCR determinations using the latest SCR procedure. Recommended determinations will use data collected only after April 1, 2010, except in those areas delineated as Study Areas. SCR determinations for Study Areas shall use data collected after July 1, 2006. The APCO shall make SCR determinations at least once in every calendar year. SCR determinations shall make reasonable efforts to account for impacts caused by Dust Control Measure construction activities.
3. If, pursuant to Paragraph 2, herein, the APCO determines that a monitored or modeled exceedance of the federal 24-hour PM<sub>10</sub> NAAQS caused by emissions from the lake bed has occurred at or above the historic shoreline:
  - A. The APCO, based on all available information, including, visual observation, physical evidence, monitoring and modeling, and in consultation with the City, will identify the need for additional controls, monitoring, or both.
    - (i) If the APCO identifies the need for additional controls and/or increased MDCE on existing controls, the APCO shall issue a written SCR determination to the City.

- (ii) If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an alternative analysis of the data used by the APCO to make the determination.
  - (iii) If the City submits an alternative analysis, the APCO shall consider the City's analysis and has full and sole discretion to withdraw, modify or confirm the SCR determination. If the APCO takes action to withdraw or modify the SCR determination, he shall do so within 60 days of the City's submittal of the alternative analysis.
  - (iv) If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's action, the City may initiate the Dispute Resolution Process pursuant to Paragraph 32 of the 2006 Settlement Agreement between the District and the City (Attachment A to Board Order 080128-01). The APCO may modify the SCR determination based on the outcome of the Dispute Resolution Process.
  - (v) In the event the Parties are unable to resolve disagreements over the APCO's SCR determinations through the Dispute Resolution Process, the City may appeal the APCO's SCR determinations to the California Air Resources Board (CARB) under the provisions of Health and Safety Code Section 42316. The CARB will act within 90 days on the City's appeal.
  - (vi) The implementation of additional control measures under the SCR determination process will be considered contingency measures under Section 172(c)(9) of the federal Clean Air Act and will be implemented automatically upon final action of the SCR determination.
- B. The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Paragraph 6 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.
- C. If the City proposes in their Remedial Action Plan to decrease the control efficiency in any previously controlled dust source area, the City must demonstrate that the proposed strategy will control dust sources to the extent that there are no modeled exceedances at the shoreline based on:
- (i) new dust event(s) that caused or contributed to a modeled or monitored exceedance,
  - (ii) dust events that took place from July 2002 through June 2006 based on the results of the MDCE Selection Process Spreadsheet as set forth in the 2006 Settlement Agreement, and
  - (iii) that previously determined control efficiency levels are maintained in (a) all areas that are required to have 99% control efficiency or higher in the 2003 SIP Dust Control Area and (b) new dust source areas that are not included in the MDCE Selection Process Spreadsheet.

D. The District may, as appropriate, also issue Notices of Violation.

4. In the event:

- A. The APCO has made a written determination pursuant to Paragraph 3 that an exceedance of the federal standard, occurring after April 1, 2010, resulted from a Control Area or portion of a Control Area treated with the Moat & Row PM<sub>10</sub> control measure; and
- B. That Control Area or portion of a Control Area causing the exceedance was remediated by the City as provided in Paragraph 6 below; and
- C. That Control Area or a portion of that Control Area is subsequently the sole cause of an exceedance of the federal standard at or above the historic shoreline, (i.e., an exceedance occurred after the City's initial attempt to remediate that area under Paragraph 6);

then the City shall convert that Control Area, or that portion of that Control Area, from Moat & Row to MDCE-BACM or BACM as described in Paragraphs 15, 16 and 17 of Board Order 080128-01, to address the exceedance described in Paragraph 4.C., for all or the portion of that Control Area that caused the subsequent exceedance, under the time deadlines provided for in Paragraph 9.

- 5. If the APCO determines that Moat & Row constitutes BACM or MDCE-BACM as provided for in Attachment D of Board Order 080128-01, "2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area," then upon issuance of such written determination, the provisions of Paragraph 4 that require the City to convert to BACM or MDCE-BACM may be satisfied by applying the BACM or MDCE-BACM approved under this Paragraph 5.
- 6. A Remedial Action Plan prepared by the City pursuant to Paragraph 3.B will contain a description of:
  - A. Any and all needed changes, repairs or enhancements to DCMs, including one or some combination of the following:
    - (i) Maintenance of facilities (*e.g.*, berms, moats and rows);
    - (ii) Changes to Shallow Flood or Managed Vegetation facilities or operations (*e.g.*, increase in wetness cover extent, improved wetness cover distribution, enhancement of vegetation);
    - (iii) Augmentation (*e.g.*, more moats and rows) or enhancement (*e.g.*, surface-protecting elements) of Moat & Row areas;
    - (iv) Transition of Moat & Row areas to BACM, or MDCE-BACM.

- B. Any and all needed expansion of DCMs, and specific plans for expanding the measures.
  - C. A schedule for the work to be performed to implement the changes, clearly indicating the point at which facilities will be operational and effective at design levels.
7. The Schedule of Contingency Measures incorporated as part of this Procedure as Attachment B, Exhibit 1 sets forth a non-exclusive list of items that shall be included by the City in its Remedial Action Plans, described in Paragraph 6, and the timing required for their implementation.
  8. Before any full-scale Moat & Row areas are operational, the City shall submit to the District a conceptual design and schedule for possible implementation of BACM or MDCE-BACM to each Moat & Row area consistent with Paragraph 4. These designs and schedules are the potential contingency measures to be implemented by the City where a transition from Moat & Row to another DCM is needed, or where such transition is required pursuant to Paragraph 4.
  9. Areas to be transitioned from Moat & Row to BACM or MDCE-BACM will be operational within the times set forth in the Moat & Row Transition Schedule incorporated as Attachment B, Exhibit 2. DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule incorporated as Attachment B, Exhibit 3. In all cases, the time allowed for implementation of control measures shall not include any time between the City's appeal to the California Air Resources Board under the provisions of Health and Safety Code Section 42316 and resolution of such an appeal.

### **DETAILED SCR DETERMINATION PROCEDURE**

Exceedances of the federal 24-hour PM<sub>10</sub> National Ambient Air Quality Standard of 150 µg/m<sup>3</sup> at or above the historic shoreline of Owens Lake (elevation 3600 feet above mean sea level) can either be measured directly via a PM<sub>10</sub> monitor or they can be modeled using the procedures set forth in the latest Owens Lake Dust Source Identification Program Protocol. Set forth below are the two procedures to be used by the APCO in making SCR determinations: the first uses directly monitored exceedances and the second uses modeled exceedances.

#### **A. MONITORED EXCEEDANCES**

##### **A.1 – Do lake bed source areas cause or contribute to a monitored 24-hour average PM<sub>10</sub> concentration greater than 150 µg/m<sup>3</sup> at an historic shoreline PM<sub>10</sub> monitor or at a near-shore PM<sub>10</sub> monitor?**

Any event that causes a monitored 24-hour average PM<sub>10</sub> concentration greater than 150 µg/m<sup>3</sup> at a shoreline or near-shore PM<sub>10</sub> monitor will be evaluated to determine if lake bed dust source areas caused or contributed to the exceedance. The following steps will be used to screen hourly PM<sub>10</sub> concentrations to determine if a lake bed source area caused or contributed to a monitored exceedance:

- 1) For hourly average from-the-lake wind directions, use the recorded hourly PM<sub>10</sub> concentration.
- 2) For hourly average non-lake wind directions or missing data, replace the recorded hourly PM<sub>10</sub> concentration with the background concentration of 20 µg/m<sup>3</sup>.

- 3) Average the adjusted hourly concentrations from steps 1 and 2 for the 24-hour period from midnight to midnight, Pacific Standard Time.

If the 24-hour average of the adjusted hourly PM<sub>10</sub> concentrations exceeds 150 µg/m<sup>3</sup> at the monitor site, go to A.2. If not, go to B.1.

A.2 – Is there physical evidence of lake bed emissions and/or air quality modeling sufficient to define boundaries for the area to be controlled?

Source Delineation.

If possible, the boundary of a dust source area will be delineated by a GPS survey. Under certain circumstances, the surveyed boundary of the dust source area will not result in a closed polygon. If the GPS survey yields a partial boundary and not a closed polygon, then the polygon area may be closed, if the length of the closure is equal to or less than one-half kilometer or is less than 20 percent of the surveyed source area perimeter, whichever is smaller. The ends of the partial surveyed area boundary will be completed with a straight line, unless survey notes or visual observations indicate that a different shaped boundary should be used. If the surveyed source area boundary has a complex shape, then the partial boundary to be closed will use the best available field and visual data to connect the two ends and form the polygon. Boundaries of existing controlled areas or other previously located boundaries will be used in place of a GPS survey boundary, if the survey notes or visual observations indicate the erosion area extends to that boundary.

If the GPS boundary described above is not available, the area will be defined by any one or a combination of GPS surveying, visual observations, and video observations or any other method described in the Dust ID Protocol (Attachment C).

If neither the GPS boundary nor other physical evidence, as described above, is available, the default area size will be one square kilometer centered on the sand flux monitor (SFM), or one grid cell if the SFMs are in a closer array.

If there is physical evidence, as described above, to define the boundaries for the area to be controlled, and no K-factor for that area or no sand catch data above one gram for the sampling period from a sand flux sampler located within a 30 degree upwind cone centered on the wind direction of the defined source, then modeling cannot be performed. Go to A.3.

Modeling.

If sand flux data is available for the exceedance identified in A.1, the District will model the event. Modeling will be performed following the latest Dust ID Modeling Protocol using the source area determined above.

The order of priority for applying K-factors in the model will be:

- 1) When available, the District will use event specific storm-average K-factors to model dust events at the PM<sub>10</sub> monitor if there are three or more hours of screened hourly K-factors for a 48-hour period. If not,

- 2) The District will use the most recent temporal and spatial 75-percentile hourly K-factors to model events, if there are nine or more screened hourly K-factors for a period and they are determined by the methods described in the most current Dust ID Protocol. If not,
- 3) The District will use the default K-factors in Attachment B, Table 2 to model events, based on the month of the event being investigated and the K-factor area.

Only those on-lake and off-lake dust sources with sand flux data will be included in the model. All data collected by the District pursuant to this Section shall be shared with the City within 30 days of final data review.

The modeling results will be used to prioritize multiple upwind source areas for control, or to determine the fraction of a single upwind source area that needs to be controlled.

Go to A.3

If neither physical evidence nor model results are available, go to A.5.

#### A.3 – District directs City to implement dust controls.

Source areas in A.2 that cause or contribute to an exceedance may be new source areas, or may be emissions from areas with existing dust controls. The APCO will determine, in writing, that conditions specified in Section A.1 were met for a specified area determined by A.2. For emissions from areas with existing dust controls, the City will have the choice of increasing the controls in the existing dust control areas or controlling other contributing sources that will result in lowering the monitored impact below the 150  $\mu\text{g}/\text{m}^3$  exceedance threshold, if such areas exist. If the APCO identifies the need for additional controls, the APCO shall issue a written SCR determination to the City.

If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an alternative analysis of the data used by the APCO to make the determination. If the City submits an alternative analysis, the APCO shall consider the City's analysis and may withdraw, modify or confirm the SCR determination. If the APCO takes action to withdraw or modify the SCR determination, he shall do so within 60 days of the City's submittal of the alternative analysis.

If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's final action, the City may initiate the Dispute Resolution Process pursuant to Paragraph 32 of the 2006 Settlement Agreement between the District and the City (Attachment A to Board Order 080128-01). The APCO may modify the SCR determination based on the Dispute Resolution Process.

In the event the Parties are unable to resolve disagreements over the APCO's SCR determinations through the Dispute Resolution Process, the City may appeal the APCO's SCR determinations to the California Air Resources Board (CARB) under the provisions of Health and Safety Code Section 42316 (Section 42316). The CARB will act within 90 days on the City's appeal.

The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Paragraph 6 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

Go to A.4.

A.4 – City implements dust controls.

DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule incorporated as Attachment B, Exhibit 3. The City is solely responsible for all environmental impact analyses required by the California Environmental Quality Act and for all required permits and leases.

A.5– District collects additional physical evidence and installs sand flux monitors in suspected areas.

If there is insufficient physical evidence and no sand flux monitor data to determine the emissive area on the lake bed that caused the monitored or modeled exceedance, the District will install Sensits and Cox Sand Catchers (CSC) sand flux monitors in the suspected area in a sampling array with a maximum spacing of one kilometer. The District will also continue to collect other physical evidence.

**B. MODELED EXCEEDANCES**

B.1 – Does the Dust ID model predict a 24-hour shoreline concentration greater than 150  $\mu\text{g}/\text{m}^3$ , including background?

Dispersion Modeling Analysis.

At least once a year, the District will examine the Dust ID information and dispersion model to determine if there have been any modeled shoreline exceedances since the period included in the last model run. Modeling will be performed following the 2008 Owens Lake Dust Source Identification Program (Dust ID) Protocol (Attachment C).

K-factors.

New K-factors may be generated from  $\text{PM}_{10}$  concentrations measured at any shoreline or near-shore  $\text{PM}_{10}$  monitor using the methods described in the Dust ID Protocol. The order of priority for applying K-factors in the model will be:

- 1) The current temporal and spatial 75th percentile hourly K-factors. The District will use the current modeling period temporal and spatial 75th percentile hourly K-factors to model events, if there are nine or more hourly K-factors for an agreed upon seasonal period and area determined by the methods described in the most current Dust ID Protocol.
- 2) If there is no agreement on seasonal cut-points, the default cut points, as shown in Attachment B, Table 2, will be used with number 1, above.
- 3) If there is no agreement on area, the default areas, as shown in Attachment B, Map 1, will be used with number 1, above.

- 4) If there are fewer than nine hourly K-factors for any area and period, go to 5), below.
- 5) Default K-factors from Attachment B, Table 2. The District will use the K-factors in Attachment B, Table 2 to model events, based on the month of the event being investigated and the K-factor area. If the new dust source area is not within a K-factor area shown in Attachment B, Table 2, the APCO shall determine the default K-factor for the new source area based on the default K-factors of areas with similar soil characteristics.

Source Area Size, Location and Sand Flux.

The boundary of a dust source area will be delineated by a GPS survey. Under certain circumstances, the surveyed boundary of the dust source area will not result in a closed polygon. If the GPS survey yields a partial boundary and not a closed polygon, then the polygon area may be closed, if the length of the closure is equal to or less than one-half kilometer or is less than 20 percent of the surveyed source area perimeter, whichever is smaller. The ends of the partial surveyed area boundary will be completed with a straight line, unless survey notes or visual observations indicate that a different shaped boundary should be used. If the surveyed source area boundary has a complex shape, then the partial boundary to be closed will use the best available field and visual data to connect the two ends and form the polygon. Boundaries of existing controlled areas or other previously located boundaries will be used in place of a GPS survey boundary, if the survey notes or visual observations indicate the erosion area extends to that boundary.

If the GPS boundary described above is not available, the area will be defined by any one or a combination of GPS surveying, visual observations, and video observations or any other method described in the Dust ID Protocol.

The details of how to delineate source area boundaries are contained in the Dust ID Protocol.

If neither the GPS boundary nor the other physical evidence as described above is available, the default area size will be one square kilometer centered on the SFM, or one grid cell if the SFM are in a closer array.

All data collected by the District pursuant to this Section shall be shared with the City within 30 days of final data review. If the modeling shows that lake bed source areas have caused or contributed to any modeled shoreline PM<sub>10</sub> impact greater than 150 µg/m<sup>3</sup> for a 24-hour average, go to B.7. If not, go to B.2.

B.2 – Is the modeled concentration less than 100 µg/m<sup>3</sup>?

This refers to the modeled concentration calculated in B.1 and includes the background PM<sub>10</sub> level of 20 µg/m<sup>3</sup>. If yes, go to B.6. If no, go to B.3.

B.3 – District directs the City to commence environmental impact analysis, design and permitting.

The APCO will direct the City in writing to choose the BACM it wishes to implement in the area identified in B.1.

The City will develop a scope of work for the identified potential source areas, including: (1) a summary of the sites pertinent conditions, features, and location, (2) appropriate control alternatives and approach, including a conceptual layout of dust control and integration into the TDCA (roads, water supply, drainage, and power), (3) standard and site-specific permitting considerations, (4) anticipated environmental documentation considerations and approach, and (5) an approximate timetable for implementation beginning at an undefined start date that might coincide with a future SCR determination. City shall complete these steps within 180 days of the date of the written direction from the APCO. Go to B.4.

B.4 – District deploys reference and/or non-reference method Special Purpose PM<sub>10</sub> monitor(s) to confirm model (if not already deployed).

The District will deploy reference and/or non-reference method Special Purpose PM<sub>10</sub> monitor(s) on the lake bed upwind and downwind of the identified emissive area, if there are no existing monitors at locations that can be used in Section B.5 to refine the model predictions. Monitors will be sited between 250 and 5000 meters outside of any GPS'd or observed source area boundaries. These PM<sub>10</sub> monitoring sites may be removed after the model confirmation procedure described in B.5. Shoreline and near-shore PM<sub>10</sub> monitors that are sited to confirm the model may be used for NAAQS compliance, if an exceedance is monitored. Go to B.5.

B.5 – Is the refined model prediction greater than 150 µg/m<sup>3</sup>?

For each event measured under Section B.4 that results in a 24-hour monitored concentration of greater than 100 µg/m<sup>3</sup>, the event-specific K-factor (defined in the Dust ID Protocol) will be used to model the concentration at the shoreline receptors. If the event-specific K-factor was derived for the same year and season as the original event modeled in B.1, the Section B.1 event will be remodeled using the new K-factor. If either that remodeled concentration for the Section B.1 event, or the new modeled concentration for the on-lake monitored event, is greater than 150 µg/m<sup>3</sup> at a shoreline receptor, go to B.7. If not, go to B.6.

The District will make a determination if any currently modeled event within the same season and K-factor area using the appropriate K-factors as determined by this procedure causes a shoreline receptor to exceed 150 µg/m<sup>3</sup>. If yes, go to B.7.

B.6 – No action required.

No action is required of the City at this time. Data collected during this period can be used in conjunction with data collected at a later time to define emissive areas on the lake bed according to this protocol and to develop K-factors for emissive areas.

B.7 – District directs the City to implement dust controls.

Source areas in B.1 and B.5 that cause or contribute to an exceedance may be new source areas or existing source areas with less than the required level of control (MDCE not high enough to prevent exceedances).

The APCO will determine, in writing, that conditions specified in Sections B.1 or B.5 were met for the specified area. Within 30 days of that determination by the APCO, the City will be notified of that determination in writing. If possible, the City will have the choice of increasing

the control efficiencies on existing dust control areas and/or controlling other contributing sources that will result in lowering the modeled impact below the 150  $\mu\text{g}/\text{m}^3$  exceedance threshold. If the APCO identifies the need for additional controls, the APCO shall issue a written SCR determination to the City.

If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an alternative analysis of the data used by the APCO to make the determination. If the City submits an alternative analysis, the APCO shall consider the City's analysis and may withdraw, modify or confirm the SCR determination. If the APCO takes action to withdraw or modify the SCR determination, he shall do so within 60 days of the City's submittal of the alternative analysis.

If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's final action, the City may initiate the Dispute Resolution Process pursuant to Paragraph 32 of the 2006 Settlement Agreement between the District and the City (Attachment A to Board Order 080128-01). The APCO may modify the SCR determination based on the Dispute Resolution Process.

In the event the Parties are unable to resolve disagreements over the APCO's SCR determinations through the Dispute Resolution Process, the City may appeal the APCO's SCR determinations to the California Air Resources Board (CARB) under the provisions of Health and Safety Code Section 42316 (Section 42316). The CARB will act within 90 days on the City's appeal.

The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Paragraph 6, above, to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

Go to B.8.

#### B.8 – City implements BACM.

DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule incorporated as Attachment B, Exhibit 3. The City is solely responsible for all environmental impact analyses required by the California Environmental Quality Act and for all required permits and leases.

For source areas that arrive at B.7 from B.5, all time periods in the above referenced implementation schedule in B.8 shall apply but be reduced by the time period elapsed since the date of the written direction from the APCO described in Section B.3, or one year, whichever is less.

Attachment B Enclosures

Map 1: Owens Lake Dust ID Monitoring Map

Table 1: From-the-lake and Non-lake Wind Directions for PM<sub>10</sub> Monitor Sites

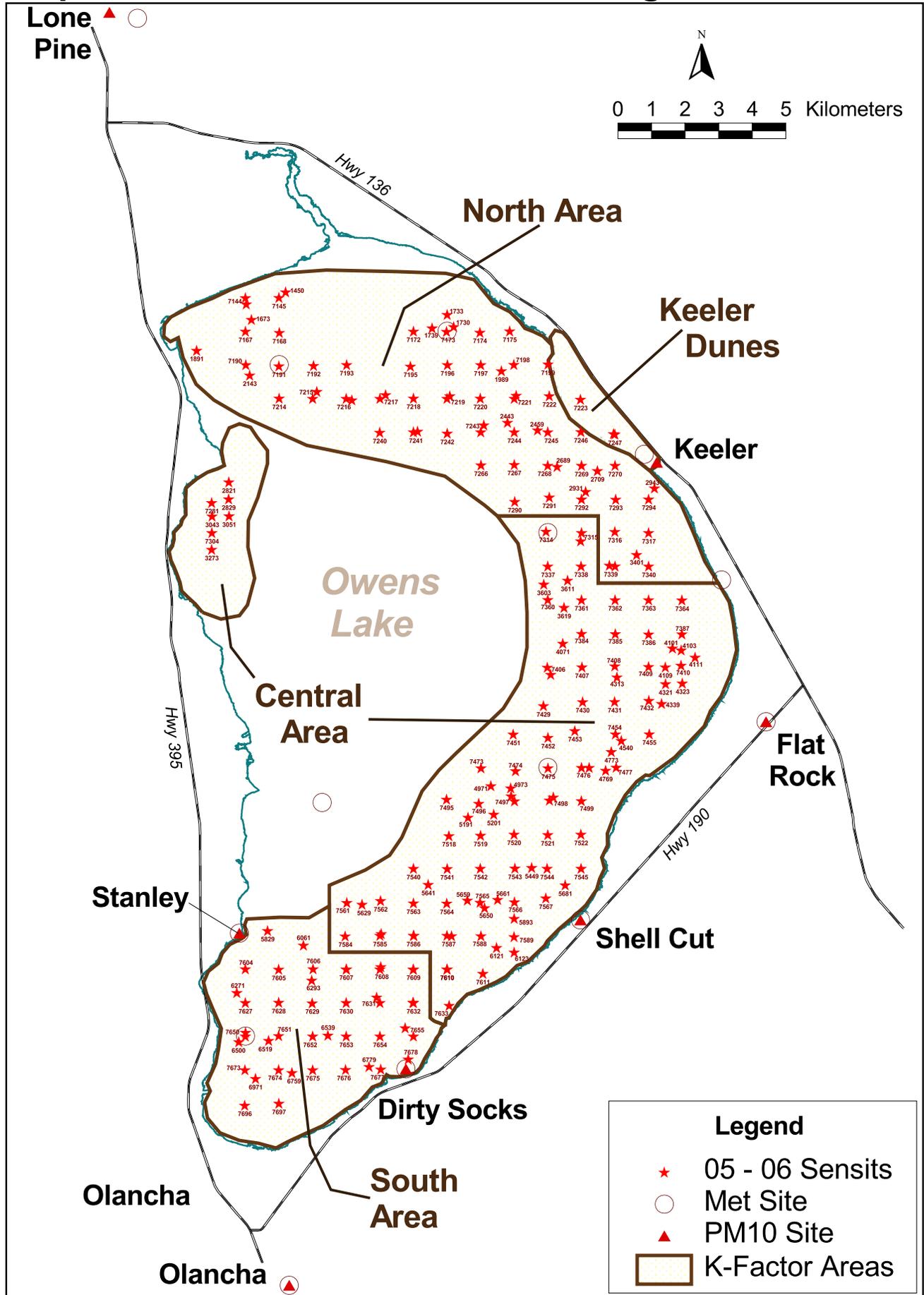
Table 2: Default Spatial and Temporal K-factors for the Dust ID Model

Exhibit 1: Schedule of Contingency Measures

Exhibit 2: Moat & Row Transition Schedule

Exhibit 3: DCM Operation Schedule

# Map 1 - Owens Lake Dust ID monitoring network



**Attachment B - Table 1****From-the-Lake and Non-Lake Wind Directions for PM<sub>10</sub> Monitor Sites**

PM <sub>10</sub>	From-the-Lake	Non-lake	
<u>Monitor Site</u>	<u>Wind Dir. (Deg.)</u>	<u>Wind Dir. (Deg.)</u>	<u>Met Tower</u>
Lone Pine	126≤WD≤176	WD<126 or WD>176	Lone Pine
Keeler	147≤WD≤290	WD<147 or WD>290	Keeler
Flat Rock	224≤WD≤345	WD<224 or WD>345	Flat Rock
Shell Cut	WD≥227 or WD≤33	33<WD<227	Shell Cut
Dirty Socks	WD≥234 or WD≤50	50<WD<234	Dirty Socks
Olancha	WD≥333 or WD≤39	39<WD<333	Olancha
Bill Stanley	WD≥349 or WD≤230	WD<349 or WD>230	Bill Stanley
New Sites	TBD	TBD	TBD

TBD – From-the-lake and non-lake wind directions will be determined for new sites by the APCO when sites are selected.

**Attachment B - Table 2****Default Spatial and Temporal K-factors for the Dust ID Model**

<b><u>AREA</u></b>	<b>K-factor</b>	
	<b><u>Jan.– Apr. &amp; Dec.</u></b>	<b><u>May–Nov. (These are the default cutpoints.)</u></b>
Keeler Dunes	7.4 x 10 <sup>-5</sup>	6.0 x 10 <sup>-5</sup>
North Area	3.9 x 10 <sup>-5</sup>	1.5 x 10 <sup>-5</sup>
Central Area	12.0 x 10 <sup>-5</sup>	6.9 x 10 <sup>-5</sup>
South Area	4.0 x 10 <sup>-5</sup>	1.9 x 10 <sup>-5</sup>

## Attachment B - Exhibit 1: Schedule of Contingency Measures

From 2006 Settlement Agreement

**EXHIBIT 10 -- SCHEDULE OF CONTINGENCY MEASURES**

<i>Issue</i>	<i>Resolution</i>	<i>Duration</i>	<i>Units</i>
<b>Moat and Row</b>			
Eroded row	Install armoring to prevent further erosion	2	mo/mile
	Install sand fences to prevent further erosion	1	mo/mile
	Reconstruct row in place or adjacent	2	mo/mile
Filled moat	Re-excavate new moat outboard of filled moat, expand existing row onto filled moat	2	mo/mile
Filled sand fence	Clean out or flank with new sand fences	2	mo/mile
Collapsed sand fence	Repair or flank with new sand fences	1	mo/mile
Spacing too large	Pull in intervening sand fence	1	mo/mile
	Add intervening moat and row	3	mo/mile
	Enhance with vegetation and/or wetness	12 to 36	months
	Soil roughening	1 to 3	months/sq mi
	Conversion to reduced BACM/BACM	See Exhibit 11	
<b>Managed Vegetation</b>			
Emissions from bare areas	Enhance/restore vegetation	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Emissions from vegetated areas	Determine and establish necessary cover	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
<b>Gravel Patches</b>			
Infilling pore spaces	Supplement gravel depth	4	months/sq mi
	Stabilize by other means (e.g., vegetation, wetness, sand fences)	6 to 36	months
<b>Shallow Flood</b>			
Emissions from dry areas (insufficient uniformity of wetting )	Wet dry areas. May require land leveling and/or additional laterals.	12	months
Generally too dry	Increase water application rate relative to ET	1	month
<b>Other features</b>			
Gravel source	Open new or re-open existing quarry	4	months
Emissions from roads, berms, etc.	Increase watering frequency	1	month
	Stabilize by other means (e.g., gravel, stabilizing agents)	1 to 4	months/sq mi

## Attachment B - Exhibit 2

From 2006 Settlement Agreement

**EXHIBIT 11 -- MOAT AND ROW TRANSITION SCHEDULE**

<b>Activity</b>	<b>Duration (years )</b>
Shallow flood transition from moat & row	1.9
Managed vegetation transition from moat & row	5.9
Gravel cover transition from moat & row	1.8
<i>Mutually agreeable exceptions:</i>	<i>Increase over and above durations listed above (years)</i>
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0

## Attachment B - Exhibit 3

From 2006 Settlement Agreement

**EXHIBIT 12 -- DCM OPERATION SCHEDULE**

<b>Activity</b>	<b>Duration (years )</b>
New area shallow flood DCM <sup>a</sup>	2.9
New area managed vegetation DCM <sup>a</sup>	6.1
New area gravel cover DCM <sup>a</sup>	2.2
<i>Mutually agreeable exceptions:</i>	<i>Increase over and above durations listed above (years)</i>
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0
4. Expanded CEQA triggered	1.4
<sup>a</sup> Assumes that total new area <2 square miles per year	

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**Board Order 080128-01  
Attachment C**

**2008 Owens Lake Dust  
Source Identification  
Program Protocol**



**Great Basin Unified Air Pollution Control District**

157 Short Street, Bishop, California 93514  
Telephone (760) 872-8211

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# 2008 Owens Lake Dust Source Identification Program Protocol

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### Glossary of Terms and Symbols

AIRS	US Environmental Protection Agency's Aerometric Information and Retrieval System
ATV	All-Terrain Vehicle
APCO	Air Pollution Control Officer
BACM	Best Available Control Measure
BACT	Best Available Control Technology
CAAA	Clean Air Act Amendments of 1990
CALMET	A meteorological preprocessor program for CALPUFF.
CALPUFF	An air pollution model
CARB	California Air Resources Board
CSC	Cox Sand Catcher, a passive sand flux measurement device.
DCA	Dust Control Area
DCM	Dust Control Measure
Dust ID Program	Owens Lake Dust Source Identification Program
EIR	Environmental Impact Report
Event-specific $K_f$	Weighted-average of hourly K-factors for a dust event, weighted by the hourly $PM_{10}$ concentration
Exceedance	Modeled or monitored $PM_{10} > 150 \mu g/m^3$ at the shoreline
FTEE	Full-time equivalent employee
GBUAPCD	Great Basin Unified Air Pollution Control District
GIS	Geographic Information System
GPS	Global Positioning System
KE	Kinetic energy
K-factor	Proportionality constant for sand flux and $PM_{10}$ emissions, $K_f$
LADWP	City of Los Angeles Department of Water and Power (also City)
$m^3$	cubic meter
met	meteorological
mg	milligram
MSM	Most Stringent Measure
NAAQS	National Ambient Air Quality Standards
NEAP	Natural Events Action Plan
OVPA	Owens Valley $PM_{10}$ Planning Area
PC	Particle count
$PM_{10}$	Particulate matter less than 10 microns aerodynamic diameter
QA	Quality Assurance
RASS	Radio Acoustic Sounding System
RSIP	Great Basin APCD 2003 Owens Valley $PM_{10}$ Planning Area Revised State Implementation Plan

Sensit	An electronic sand motion detector.
Settlement Agreement	2006 Settlement Agreement between LADWP and GBUAPCD
Storm-average $K_f$	Arithmetic average of hourly K-factors for a dust event
SCR	Supplemental Control Requirements of the 2003 SIP
SFM	Sand flux monitor
TEOM	Tapered-Element Oscillating Microbalance, measures PM <sub>10</sub> .
USEPA	United States Environmental Protection Agency
USGS	US Geological Survey
WD	Wind direction
2003 SIP	Great Basin APCD 2003 Owens Valley PM <sub>10</sub> Planning Area Revised State Implementation Plan
µg	microgram

# 2008 Owens Lake Dust Source Identification Program Protocol

## 1. Program Overview

### 1.1 Introduction

The objective of the Owens Lake Dust Source Identification (Dust ID) Program is to identify dust source areas at Owens Lake that can cause or contribute to violations of the National Ambient Air Quality Standards (NAAQS) for PM<sub>10</sub>. The Dust ID Program is a long-term monitoring program that is intended to identify dust source areas for control under the provisions of the Supplemental Control Requirements (SCR) in the 2003 revised Owens Valley PM<sub>10</sub> State Implementation Plan (RSIP) and the 2006 Owens Lake Settlement Agreement (Settlement Agreement). The text of the Settlement Agreement and SCR provisions is included in the appendices to this document.

The RSIP and Settlement Agreement require the City of Los Angeles Department of Water & Power (City) to control all sources of wind blown dust from the lake bed of Owens Lake that cause or contribute to an exceedance of the PM<sub>10</sub> NAAQS at the historic shoreline (3,600-foot contour line). Based on dust events that occurred between January 2000 and July 2006, 43 square miles of the lake bed were found to cause or contribute to NAAQS violations. Dust controls are required to be implemented on 29.8 square miles of the lake bed by December 31, 2006, and an additional 13.2 square miles by April 1, 2010.

Provided that these control measures are implemented in accordance with the RSIP and Settlement Agreement, the District will suspend making determinations to control additional dust source areas from December 4, 2006 until May 1, 2010. During this period, all monitoring, modeling and observations will continue as described in this Dust ID Program Protocol. Data and information collected during this period will be used to determine any control requirements for Study Areas as described in the Settlement Agreement, and to advise the City on any monitored dust emissions from the lake bed and surrounding areas. If any new lake bed dust source areas are identified from data collected after April 1, 2010, they will be subject to dust control requirements as provided for in the Settlement Agreement and any future revisions to the Owens Valley PM<sub>10</sub> State Implementation Plan. SCR determinations shall make reasonable efforts to account for impacts caused by Dust Control Measure (DCM) construction activities.

### 1.2 Locating Dust Source Areas

A network of sand flux samplers, PM<sub>10</sub> monitors, meteorological towers and remote camera sites will be used to monitor and locate dust source areas at Owens Lake. Figure 1.1 shows a map of the Dust ID network at Owens Lake. As configured in 2003, the Dust ID network included: sand flux monitors at 136 lake bed sites at 1-km spacing, 7 PM<sub>10</sub> monitors, 13 met towers, 8 observation sites, and 10 time-lapse cameras at 7 sites. At the discretion of the Air Pollution Control Officer, additional sand flux, PM<sub>10</sub> and met sites will be added as necessary to collect

information that can be used to monitor and model the impact from new areas that may become emissive on the lake bed.

The automated monitoring network will be augmented with information from observers who will map dust source locations from off-lake sites when dust events take place during normal work hours. These maps will be used to help document source areas that may be outside the sand flux network or that may be within the network, but missed by the samplers. Field personnel will inspect active source areas and map the source area boundaries using a GPS (Global Positioning System) as conditions allow. Data collected from the sand flux network, visual mapping and GPS surveys will be included in a Geographic Information System (GIS) database for mapping and analysis. Maps generated using these different methods will be compared qualitatively to help delineate source area boundaries.

### **1.3 Monitored Exceedances**

Analysis of hourly PM<sub>10</sub> concentrations at shoreline and off-lake monitoring sites may show that lake bed source areas cause or contribute to PM<sub>10</sub> exceedances. Monitoring of PM<sub>10</sub> concentrations will be done using US EPA-approved monitors. Currently, hourly PM<sub>10</sub> readings are obtained using TEOM (Tapered-Element Oscillating Microbalance) PM<sub>10</sub> monitors manufactured by R&P, Inc. If a PM<sub>10</sub> exceedance is monitored, PM<sub>10</sub> concentrations will be paired with the local wind direction for each hour of that event to determine if lake bed source areas caused or contributed to the exceedance.

Twenty-four hour average PM<sub>10</sub> monitor concentrations will be adjusted for winds coming from the direction of the lake to the monitor (from-the-lake) and from directions not from the lake to the monitor (non-lake). PM<sub>10</sub> concentrations during any hour with winds from a non-lake wind direction will be assumed to have an average background concentration of 20 µg/m<sup>3</sup> and from-the-lake wind directions will be given their hourly value. If the adjusted 24-hour average is greater than 150 µg/m<sup>3</sup>, then an exceedance will have been monitored from a lake bed source or sources.

If a lake bed source area causes or contributes to an exceedance, hourly PM<sub>10</sub> concentrations and wind directions will be reviewed to see if a new source area (or areas) is associated with that exceedance. If sand flux data are available that show erosion activity in the direction of a new source area, this event will also be modeled as described in the air quality modeling protocol. If the PM<sub>10</sub> monitor data indicate that a new source area caused or contributed to an exceedance, DCMs may be required under the provisions of the Settlement Agreement or current SIP.

### **1.4 Modeled Exceedances**

Air quality modeling will be performed with the CALPUFF modeling system or other United States Environmental Protection Agency (USEPA) approved modeling method. At least once a year, the Dust ID information will be examined and the model will be run to determine if there were any modeled shoreline exceedances since the period covered by the last model run. PM<sub>10</sub> emissions for the model will be based on hourly sand flux measured at lake bed sites and spatial and temporal factors derived using the empirical relationship between sand motion on the lake

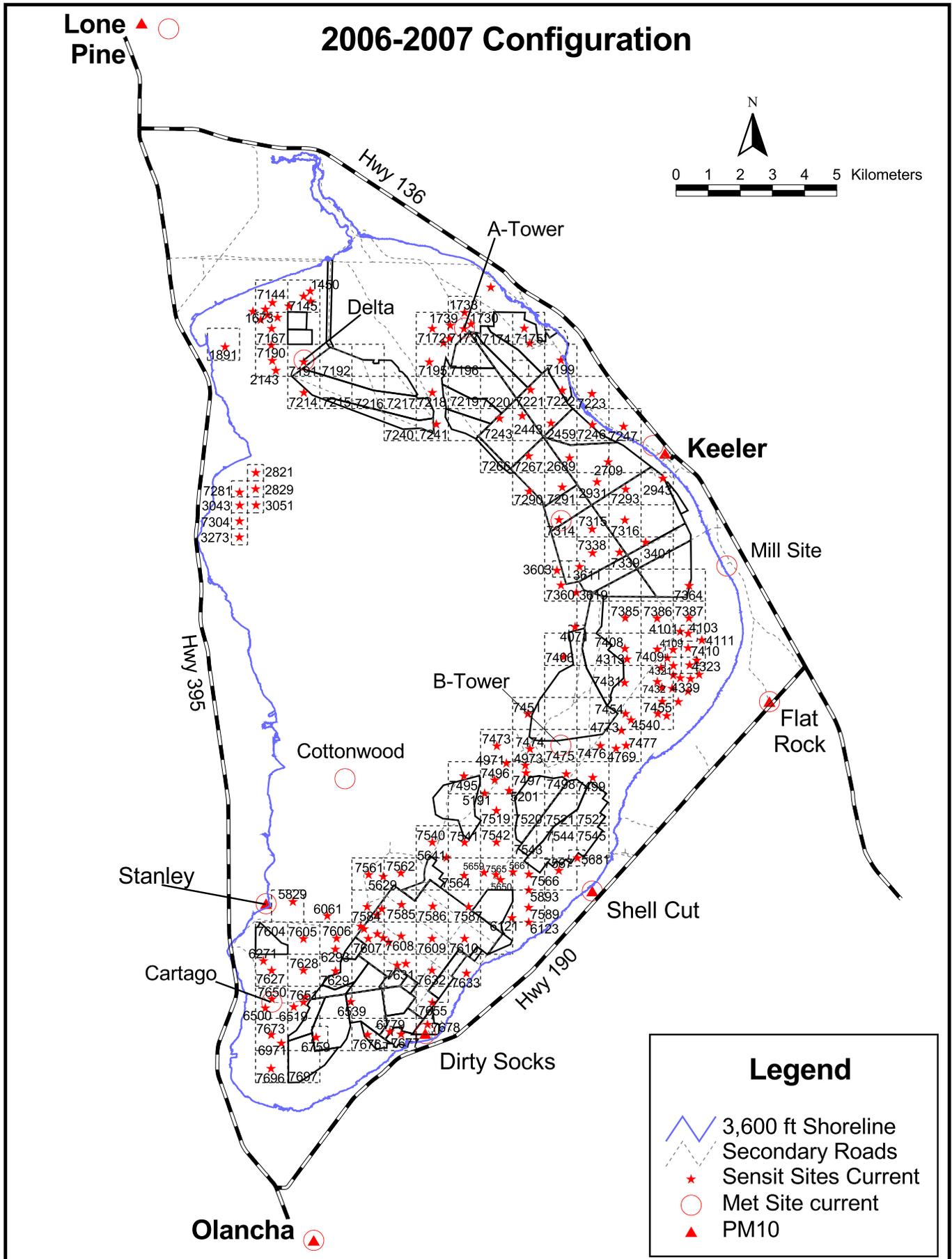


Figure 1.1 - Owens Lake Dust ID monitoring network

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bed and measured  $PM_{10}$  values. CALPUFF will be run using the following equation to estimate emissions and to model  $PM_{10}$  impacts at the shoreline:

Equation 1.1

$$PM_{10} = K_f \times q$$

where,

- $q$  = Sand flux measured at 15 cm above the surface [ $g/cm^2/hr$ ]
- $K_f$  = K-factor, empirically-derived ratio of the  $PM_{10}$  emission flux to the sand flux at 15 cm.

The ratio of  $PM_{10}$  to sand flux ( $K_f$ ) is referred to as the K-factor. The initial Dust ID program results showed that K-factors could be derived empirically by comparing model predictions to monitored  $PM_{10}$  concentrations. Initial studies also showed that average K-factors can vary spatially and seasonally at Owens Lake. Default K-factors will be used with Equation 1.1 to estimate hourly  $PM_{10}$  emissions unless new K-factors are generated from future dust events following the modeling procedures in this program protocol. If the CALPUFF model results indicate that a new lake bed source area caused or contributed to an exceedance at a shoreline location, dust controls may be required under the provisions of the 2006 Settlement Agreement or the current SIP.

### 1.5 Sand Flux Measurements

Sand flux is measured using a combination of Cox Sand Catchers (CSC) and Sensits. CSCs are sand collection devices that provide a mass collection amount for a certain time period (about 1 to 3 months), and Sensits are electronic sand motion detectors used to time-resolve the collected mass to estimate hourly sand flux rates. The sand flux rate is applied to the area represented by the sand flux sampling site, which may vary in size and shape depending on the source area delineated by field observations.

### 1.6 Dust ID Program Protocol Content

Section 2 of the Dust ID Program Protocol describes the methods and instrumentation that will be used to monitor sand flux with Sensits and CSCs on the lake bed. Section 3 provides a brief description of the  $PM_{10}$  and meteorological monitoring network that will be used to monitor  $PM_{10}$  exceedances, develop K-factors and to call public health advisories. Section 4 describes methods that will be used by visual observers and field personnel to map lake bed dust source areas and delineate boundaries using GPS. Section 5 explains the procedures for developing K-factors using air quality modeling and monitoring data. Section 6 provides the protocol for dispersion modeling.

## **2. Protocol for Measuring Sand Flux Rates and Operation of the Sensit and Cox Sand Catcher Network**

### **2.1 Objective**

Sand flux measurements will be used as a surrogate to estimate PM<sub>10</sub> emissions coming off the lake bed. The objective of the sand flux measurements is to provide an hourly emissions estimate for all active source areas on the lake bed.

### **2.2 Methods and Instrumentation**

Sand flux will be measured with Sensits and Cox Sand Catchers (CSCs). Collocated Sensits and CSCs are used to measure hourly sand flux rates at different locations on the lake bed. The 2006-2007 Sensit/CSC network locations are shown in Figure 1.1. The instruments are placed with their sensors or inlets positioned 15 cm above the surface. Sensits are electronic sensors that measure the kinetic energy or the particle counts of sand-sized particles as they saltate, or bounce, across the surface. Sensits are used to time-resolve the CSC mass to provide hourly sand flux rates.

Figure 2.1 shows a Sensit suspended above the ground on the right, and a CSC in the ground to the left. The photo was taken at a site that was used to test the accuracy of Sensits and CSCs before the Dust ID Program began. The battery powered Sensits are augmented with a solar charging system. A datalogger records 5-minute Sensit data during active saltation periods. Data collection is triggered by particle count activity and continues until particle counts are zero for an hourly period. Each datalogger has a radio transmitter that sends Sensit data to the District's Keeler field office once a day to provide updates on erosion activity at each site. These daily updates are used to alert field personnel to active source areas for possible Global Positioning System (GPS) mapping and inspection. Daily transmission of the data may be temporarily suspended if the solar battery power is low due to extended days of cloud cover.

CSCs are passive collection instruments that capture windblown, sand-sized particles. These instruments were designed and built by the District as a reliable instrument that could withstand the harsh conditions at Owens Lake. CSCs have no moving parts and can collect sand for a month or more at Owens Lake without overloading the collectors. Field personnel visit CSC sites to measure the mass of the collected sand catch. A diagram of the CSC is shown in Figure 2.2. Not shown in the diagram is an internal sampling tube that can be seen in the photo in Figure 2.3. The internal sampling tube is removed from the PVC casing to measure the sand catch sample. The lengths of the sampling tubes and casings are adjusted during construction to accommodate the amount of sand flux in each area and to avoid overloading the CSC. The CSC length ranges from about one to three feet. Because the PVC casing is buried in the ground, an adjustment sleeve is used to keep the inlet height at 15 cm to compensate for surface erosion and deposition. Field techs use a standardized measuring device to check or adjust the sampling inlets to 15 cm after collecting each sample.

Figure 2.4 shows an example of the linear relationship between the CSC collected sand mass and the kinetic energy measured with a co-located Sensit. Sensits measure saltation in terms of

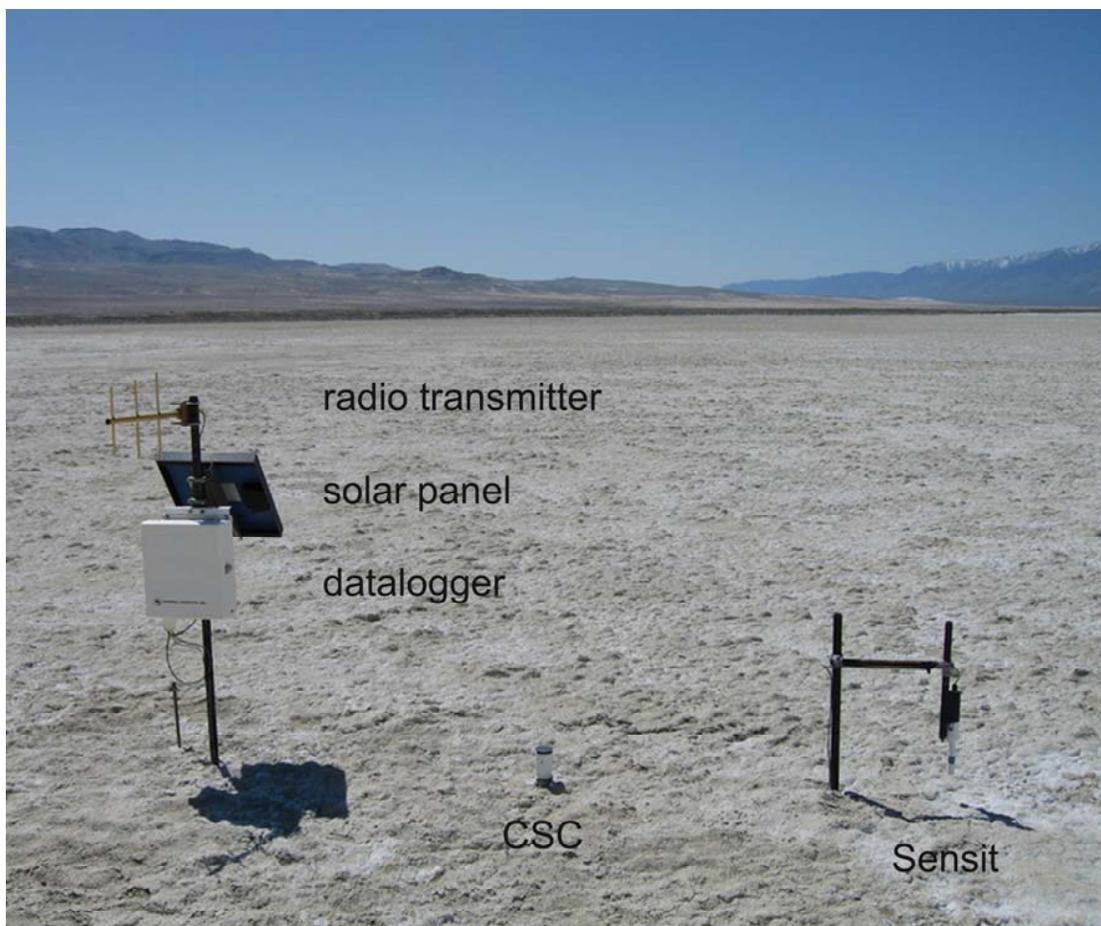


Figure 2.1 - Dust ID sand flux monitor sites measure wind erosion activity using CSCs to collect sand-sized particles and Sensits that electronically detect moving particles. Sensit data are recorded on dataloggers and transmitted by radio from each site to the District's office in Keeler.

Figure 2.2 - Diagram of the Cox Sand Catcher (CSC) used to measure sand flux at Owens Lake.

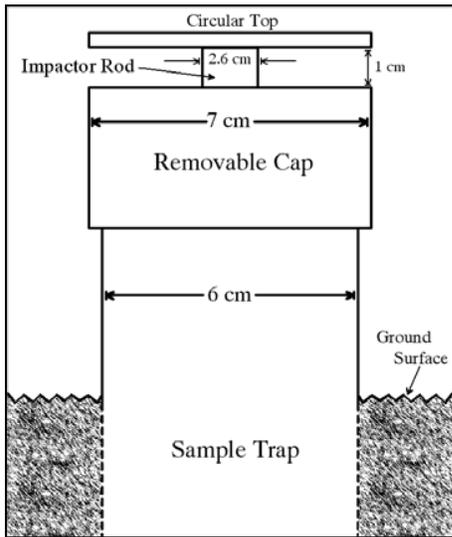


Figure 2.3 - Example of a Cox Sand Catcher (CSC) with the inner sampling collection tube removed.

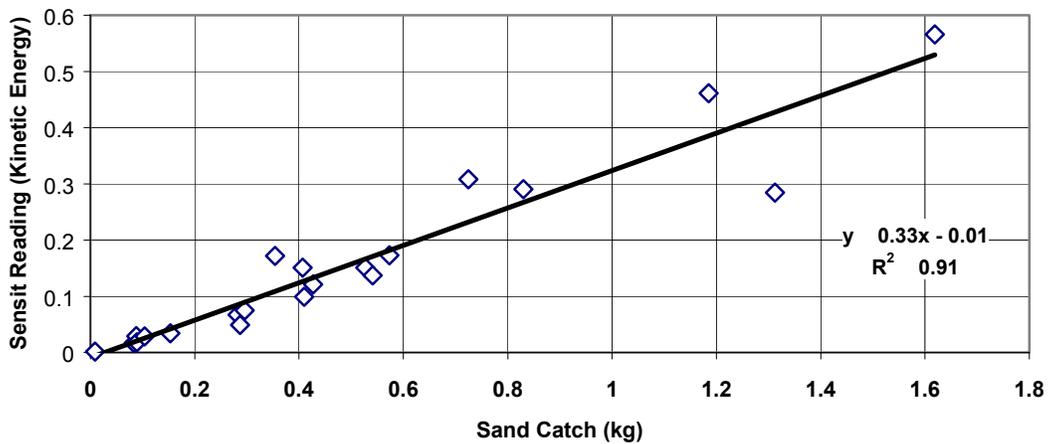


Figure 2.4 - Example of the linearity between CSC mass and a Sensit reading using kinetic energy reading (Sensit No. 7291).

kinetic energy (KE) and particle count (PC). The District uses the output (KE or PC) that provides the best precision and accuracy for the range of saltation activity expected at each site.

Because the electronic Sensit response to the saltation flux can vary, Sensits were used in combination with CSCs to determine hourly sand flux rates. This combination takes advantage of the good precision and accuracy of the CSC sand catch data, and the ability of Sensits to time-resolve the sand flux for each hour of the CSC sampling period. In this way, the sum of the hourly sand catches always matches the CSC sand catch for each sampling period, and it minimizes the error in the hourly sand flux.

Changes to the sand flux monitoring network are made as necessary to improve the characterization of dust source areas on the lake bed. Sand flux sampler sites are added to the network to monitor new source areas or to improve the sand flux estimates for known dust source areas. Although the sand flux network was originally designed in a fixed grid pattern with 1 km site spacing, the current practice is to place the samplers at sites that represent smaller source areas. Some sites may be less than 250 m apart, and their locations may be off the regular grid pattern to better represent sand flux activity in the dust source area. In addition, many of the original sampling sites that are now in flooded portions of the shallow flood DCM were removed, since PM<sub>10</sub> emissions from the flooded sites can be assumed to be zero in the Dust ID model.

### 2.3 Operating Procedures

Sand captured in the CSCs will be weighed in the Keeler lab to the nearest tenth of a gram. A field technician will visit each site every one to three months to collect the sample tubes. The following procedures will be used when collecting the CSC samples and downloading Sensit data:

- 1) Park field vehicle 10 meters or more east of the site and walk the remaining distance to the sampling site. Field personnel will access all Sensit and CSC sites from an easterly approach to minimize upwind surface impacts near the sampling sites.
- 2) Measure and record the inlet height above the surface to the middle of the inlet.
- 3) Remove the sample collection tube from the CSC.
- 4) Verify collection tube number corresponds to site number on the field form.
- 5) Weigh and record the gross weight of the collection tube and sample to the nearest 1 gram using a field scale.
- 6) If any soil material is visible in the tube, seal the collection tube and place it in the tube rack for transport to the lab. If no soil material is visible, note this on the collection form and reuse the collection tube for the next sampling period.
- 7) Place a clean collection tube in the CSC and record the collection tube number.
- 8) Replace the CSC inlet and adjust the height to 15 cm ( $\pm 1$  cm).
- 9) Download Sensit data from the datalogger to a storage module.
- 10) Measure and record the Sensit sensor height above the surface to the center of the sensor using the Height Adjustment Tool, and adjust if necessary to 15 cm. See Figure 2.5.
- 11) Inspect the sensor and radio transmitter wiring and clean or repair, if needed.

- 12) A field operational response test on the Sensit will be completed during each visit and the Sensit will be replaced, if it fails the test.
- 13) CSC samples will be removed from the sample collection tubes and weighed on a calibrated bench-top scale in the Keeler lab to the nearest 0.1 gram.
- 14) Wet samples will be removed from the collection tubes and oven dried before weighing in the lab.

## **2.4 Data Collection**

A field form will be used to document the information for the CSC and Sensit (see example in Figure 2.6). The form will have the site number, date and time of measurement (Pacific Standard Time), “as is” CSC inlet and Sensit sensor height ( $\pm 1$  cm), tube tare weight prior to sand catch ( $\pm 0.001$  kg), total sand catch weight ( $\pm 0.001$  kg), and post-catch tube weight ( $\pm 0.001$  kg), Sensit response test (particle counts or kinetic energy), operator’s initials, and a comments section where the condition of the sampler and any other relevant factors, such as surface condition will be documented. The Data Processing Department will calculate the net sand catch weight from the CSC during data analysis. CSC lab weights, measured to the nearest 0.1 g will be recorded on the Lab Form shown in Figure 2.7. After completion of the forms, the field technician will make a copy of the completed forms and file the copies at the Keeler office. The original forms will be sent to Data Processing in the Bishop office. Data Processing will enter the data into an electronic file. The original hard copy forms will be filed in the Bishop office.

Each day, dataloggers for all Sensit sites will be downloaded by radio transmission to the Keeler Field office. Data from the storage modules will be downloaded to the computer at the Keeler office by the field technician at the end of a collection period. The radio transmitted Sensit data will be used as the data of record. Storage module data will be collected at least quarterly and will serve as a back-up file.

Technicians will keep a log of all the repairs, maintenance, or replacement of Sensits or CSCs, radio transmitters, and datalogger equipment. This log will be kept in a field notebook and the field forms sent to Data Processing as they are completed. It is the technician’s or operator’s responsibility to review the data and notify the Air Monitoring Specialist and Data Processing who will decide whether any data should be edited or deleted and why.

## **2.5 Chain of Custody**

Each field form will be initialed and dated by the field technician during each site visit. The form will be signed and dated by the person receiving the data when delivered to the Bishop office. If no person is available to sign the form in the Bishop office, the delivery person will sign and date the form and place it in the Data Processor’s box.

## **2.6 Quality Assurance**

All field and lab scales will be checked at least every two months using Class F weights. Field scales will also be checked with a 100-gram weight at each sample site before weighing the sand catch and the weight recorded on the field form. The bench-top scale in the Keeler office will be



Figure 2.5 - A Height Adjustment Tool is used to measure the height of Sensits and CSCs and to adjust the sensor and inlet height to 15 cm above the soil surface.





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checked with the Class F weights before each set of sand catches are weighed. The test weights will be recorded on the scale log sheet in the laboratory. Both scales will be calibrated and certified at least once every year. Ten percent of the CSC sand catch samples will be stored for at least one year from the date of collection before discarding.

## 2.7 Calculating Hourly Sand Flux

For modeling purposes discussed in Section 6, hourly sand flux is calculated for each Sensit/CSC site using the sand catch to Sensit reading ratio for each collection period and apportioning the sand catch to the hourly Sensit reading. The hourly sand flux is divided by 1.2 cm<sup>2</sup>, which is the equivalent inlet opening size of the CSC for flux calculation purposes.

For Sensits using kinetic energy,

### Equation 2.1

$$q_{n,t} = (S_{n,t} - S_{n,bg}) \times \frac{CSC_{n,p}}{\sum_{t=1}^N (S_{n,t} - S_{n,bg})} \times \frac{1}{1.2} \quad [\text{g/cm}^2/\text{hr}]$$

Where,

- $q_{n,t}$  = hourly sand flux at site n, for hour t [g/cm<sup>2</sup>/hr]
- $CSC_{n,p}$  = CSC mass for site n, for collection period p [g]
- $S_{n,t}$  = Sensit total KE reading for site n, for hour t [non-dimensional]
- $S_{n,bg}$  = Sensit KE background reading for site n, [non-dimensional]
- N = Total number of hours in CSC collection period p.

For Sensits using particle count,

### Equation 2.2

$$q_{n,t} = S'_{n,t} \times \frac{CSC_{n,p}}{\sum_{t=1}^N S'_{n,t}} \times \frac{1}{1.2} \quad [\text{g/cm}^2/\text{hr}]$$

Where,

- $S'_{n,t}$  = Sensit total PC reading for site n, for hour t [non-dimensional]

## 2.8 Sensit Calibration and Data Analysis

### 2.8.1 Sensit Calibration Check

Data Processing will track Sensits by their serial number. After each sample collection period, Sensit and CSC data will be added to data from other sample collections. Data Processing will determine the average sand catch to Sensit ratio for each Sensit. Sensit readings will be collected

for particle counts and kinetic energy for each Sensit. Due to differences in individual Sensit responses, some Sensits have a more consistent sand flux to Sensit reading ratio using particle count rather than kinetic energy. This normally depends on the manufacturer's electronic design. At high sand flux sites, kinetic energy provides a more linear response for most Sensits. If KE is used, a background KE is subtracted from the reading if it is not zero. A background KE is determined from the KE reading when the PC reading is zero.

The ratio of the Sensit response to the collected mass will be compared for each collection period to previous ratios for the same instrument to ensure that the Sensit is responding consistently. As seen in Figure 2.4 this ratio can vary, especially at low collection masses, so large deviations in the ratio should only be used as an indicator for a possible problem. Sensits will be replaced if they show no readings with significant sand associated CSC collection, have significant readings during calm wind periods, have an erratic response as compared to previous collection periods, or if they fail the field operational response test.

### 2.8.2 Replacing Missing Sand Catch Data

Sand catch data can be lost if the CSC collector tube is full, or damaged, or if the sample is spilled during weighing. The lost sand catch data will be estimated using Sensit data. A cumulative sand catch to Sensit ratio is calculated by adding all of the valid sand catches and all of the corresponding Sensit data for that particular Sensit/CSC pair, and then dividing them to obtain the total ratio. The cumulative ratio is applied to the Sensit data to estimate the hourly sand flux. If there was a Sensit change, only data generated after the Sensit change is used to calculate the cumulative sand catch to Sensit ratio.

CSC collection tubes will be weighed and reset at the same time as any Sensit change at a site in order to maintain the time correlation between the two devices.

### 2.8.3 Replacing Missing Sensit Data

Sensit data can be lost when the datalogger or Sensit fails. In such cases, the sand catch data will be time resolved using a neighboring site. The historical hourly sand flux data are compared to determine which neighboring site behaves most similarly to the site with the lost data. The correlation coefficients between the data sets will be used to determine which site behaves most similarly. If no adjacent sites were active during the period of lost Sensit data, then the nearest active sites will be used for comparison.

## 3. Protocol for Measuring Ambient $PM_{10}$ and Meteorological Conditions

### 3.1 Objective

Ambient  $PM_{10}$  monitors will be placed at locations generally around the shoreline of Owens Lake and in local communities to monitor the ambient air for exceedances of the  $PM_{10}$  NAAQS and to develop K-factors for modeling  $PM_{10}$  emissions from lake bed sources.  $PM_{10}$  monitors may be placed on the lake bed for short-term special-purpose monitoring studies.

### **3.2 Methods and Instrumentation for PM<sub>10</sub> and Meteorological Data**

PM<sub>10</sub> monitoring will be performed using USEPA-approved reference or equivalent method monitors. The current monitoring network shown in Figure 1.1 includes seven PM<sub>10</sub> monitor sites – Keeler, Lone Pine, Olancho, Dirty Socks, Shell Cut, Bill Stanley and Flat Rock. Each PM<sub>10</sub> site is equipped with a Tapered Element Oscillating Microbalance (TEOM) PM<sub>10</sub> monitor. TEOM monitors are capable of measuring hourly PM<sub>10</sub> concentrations. The Dust ID Program will rely on the TEOM to determine if an exceedance is caused by a lake bed source, since the data can be correlated with hourly wind directions to determine dust source directions. TEOM data will also be used to generate K-factors to model the PM<sub>10</sub> emissions from lake bed sources.

Ten-meter meteorological towers will be located near each PM<sub>10</sub> monitor site and at other locations around the lakeshore and on the lake bed. The current met sites are shown in Figure 1.1. The met data are used to create wind fields with the CALMET model that are used with CALPUFF to model air quality impacts. All met towers include instrumentation to measure wind speed and wind direction. Two lake bed met sites (A & B Towers) measure wind speed at different heights (0.5, 1, 2, 5 and 10 m) to determine surface roughness and vertical wind speed profiles. Some met sites also measure temperature, relative humidity, barometric pressure, and/or precipitation.

### **3.3 Operating Procedures, Instrument Calibration and Quality Assurance**

PM<sub>10</sub> monitoring will be performed in accordance with USEPA monitoring guidelines found in 40 CFR, Part 58 and meteorological monitoring will be performed in accordance with USEPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volumes I, II, and IV.

### **3.4 Data Handling and Data Access via Modem**

TEOM PM<sub>10</sub> data will be delivered to Data Processing on a routine monthly schedule. After the data pass the proper data review and QA checks they will be submitted to the USEPA's AIRS database. PM<sub>10</sub> data from special-purpose monitors that may be located on the lake bed will not be submitted to the AIRS database.

All the PM<sub>10</sub> sites and some met sites are equipped with modem links that allow for access to the hourly concentrations. These data are useful for alerting field personnel to possible new sources of PM<sub>10</sub>, and for alerting the public in case of high concentrations. For hourly concentrations above 400 µg/m<sup>3</sup> the District will issue public health advisories when the communities of Keeler, Lone Pine or Olancho are affected. The public can view real-time wind speed, direction and PM<sub>10</sub> data from the Dust ID monitoring network on the District's website at [www.gbupcd.org/data](http://www.gbupcd.org/data).

## 4. Protocol for Observing and Mapping Source Areas and Dust Plume Paths

### 4.1 Objective

The objective for source area mapping is to use the best available information from visual observations, GPS mapping, and sand flux measurements to delineate the boundaries of dust source areas for as many events as possible. This information will be used to help delineate the control area boundaries for new sources.

### 4.2 Methods and Instrumentation

The Dust ID Program includes four methods to help locate dust source areas and to delineate the source area boundaries. The methods are: 1) visual mapping by trained observers, 2) time-lapse cameras, 3) surface inspections with GPS mapping, and 4) sand flux activity (as measured with Sensits and CSCs).

#### 4.2.1 Mapping Dust Source Areas from Off-Lake Observation Sites

One or more trained observers will complete observations from viewpoints to best observe the active dust source areas. For instance, two observers may be at viewpoints on the east side of the dust plume in the Inyo and Coso Mountains and a third may be on the west side in the Sierra. The observers will create hourly maps of the visible boundaries of any dust source areas, their plume direction and note if the visible plume crosses the shoreline. To the extent practicable, all lake bed and off-lake dust sources will be included in the observations. Figure 4.1 shows an example of sand flux measurements and the cumulative information that can be collected by observers mapping the dust plumes from different locations.

#### 4.2.2 Video Cameras

Remote time-lapse video cameras will record dust events during daylight hours. This information will be reviewed to help identify source areas that may have been missed by observers, or to help confirm source area activity detected by PM<sub>10</sub> monitors or the sand flux network. Remote time-lapse video can also be used to help verify modeled impacts that were not monitored by the PM<sub>10</sub> network, to check compliance of dust control areas, and to identify off-lake sources not measured by any of the other methods.

#### 4.2.3 Mapping Using GPS

##### 4.2.3.1 “Trigger” Levels for Initiating Field Inspections and GPS Surveys

Dust observations, Sensit activity, elevated PM<sub>10</sub> concentrations and video will be used as “trigger data” to determine the time and location for a Dust Source Area Survey (survey). Sensit and PM<sub>10</sub> data will be automatically collected via radio transmission every workday. A technician will summarize and review the data each workday. The summary will list all Sensit activity greater than background output levels, and hourly TEOM PM<sub>10</sub> concentrations over

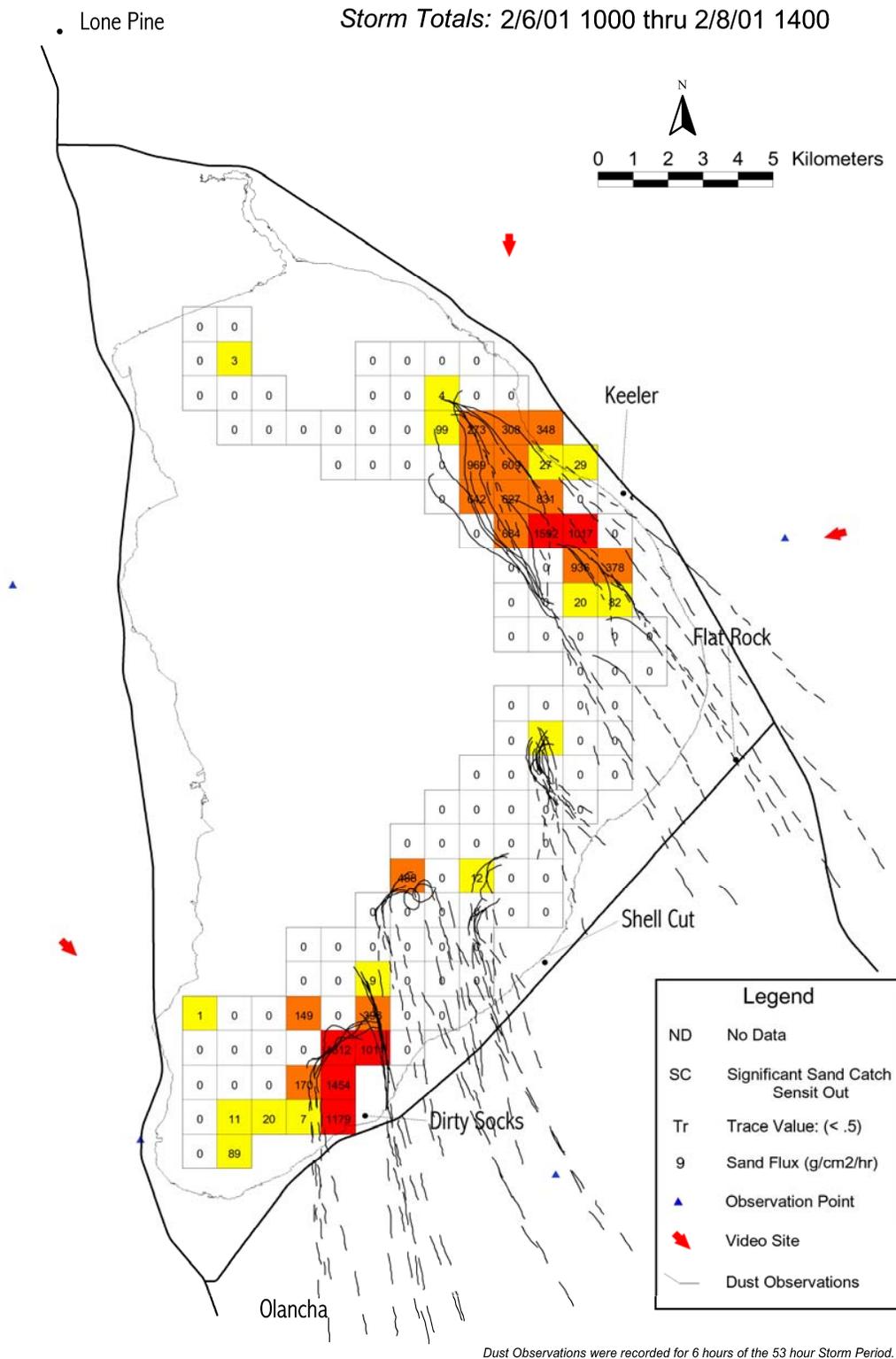


Figure 4.1 - Example of dust plume maps drawn by observers during daylight hours and total sand flux for a dust event on February 6-8, 2001.

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50  $\mu\text{g}/\text{m}^3$  with corresponding wind speed and direction data. If dust observations are available from a recent dust storm, they will be used to confirm the location of the dust source(s) that correspond with the Sensit activity and elevated  $\text{PM}_{10}$  concentration. Video will be used to identify a source or sources that were not identified by observations, Sensit data or  $\text{PM}_{10}$  information. Wind speed and wind direction data will be used to help determine if a lake bed dust source could have caused elevated  $\text{PM}_{10}$  concentrations. All of the trigger information will be used to identify any lake bed dust source area to initiate a dust source survey and/or surface inspection. The survey should be completed the same day if weather conditions are favorable. For larger areas, surveying may continue for several days or until precipitation obscures the boundaries of the source area.

In addition to the above process, general field inspections will be completed after dust storms to verify lake bed emission activity and the need for a survey. A survey will be completed if the trigger data and /or field inspections indicate emissive conditions in an area that has not been previously surveyed during the current dust period (Section 4.3) or in an area that has been previously surveyed but has increased in size since its last survey. The priorities for completing a survey are:

- 1) new lake bed source areas outside the instrumented Sensit network;
- 2) new lake bed source areas that have not been surveyed within the instrumented Sensit network; and
- 3) lake bed source areas that have previously been surveyed.

#### 4.2.3.2 GPS Mapping Procedures

After a dust source is identified by dust observation, Sensit data, sand catch data, video,  $\text{PM}_{10}$  concentration or inspection of the lake bed surface, District staff will map the exterior boundary of as many of the source areas identified as possible during daylight hours, as weather conditions allow. The mapping will begin as soon as possible after a dust storm and continue until all the identified areas are mapped or precipitation occurs. The boundary of the emissive area(s) will be mapped using a Global Positioning System (GPS). Surveyors conducting the mapping will ride an ATV or walk around the outer boundary of the wind-damaged surface surveying a line with the GPS. A wind-damaged surface is defined as a soil surface with wind erosion evidence and/or aeolian deposition that has not been modified to an unrecognizable point by precipitation since the last identified dust storm.

GPS line data should be collected at an interval of one record every 10 seconds or less. Data should be collected in NAD83 UTM Zone 11 coordinates. Only GPS units capable of continuously recording line data will be used. Data should be processed and corrected using base station data (either from a commercial correction service or using data from the District's Keeler base station) to ensure positional accuracy.

Before beginning a survey, the edge of the source area is determined by a visual review of the surface conditions within a representative one square meter area along the edge of the source area. An undamaged surface is evident if there is no visible evidence of a disturbed lake bed surface due to wind damage. As an aid to calibrate the level of disturbed surface, a surveyor will

begin each survey by estimating the percentage of surface that is undamaged by the wind. The surveyor visually determines where a surface with 70 to 80 percent of undisturbed surface is located. The surveyor completes the survey by following a line of travel that closely represents the initial one-meter calibration. The following defined list, Boundary Conditions and Survey Procedures (see below), can be used to determine how to map the source boundary under differing surface boundary conditions.

#### Boundary Conditions and Survey Procedures:

- Distinct Boundary:** A visibly sharp transition, 25 feet or less in width, between a wind-damaged lake bed surface and an undamaged lake bed surface. The surveyor should travel directly along this distinct outside edge, if possible, and may deviate 25 feet to the inside or outside on occasion. Small (25-foot wide or less) channels, boundary indentations, roads, mounds, and other obstacles may be directly crossed if the continuation of the main source boundary is clearly visible on the opposite side.
- Diffuse Boundary:** A visibly distinct transition, 25 to 100 feet in width, between a wind-damaged lake bed surface and an undamaged lake bed surface. Every effort should be made to travel along the outermost edge of the visible distinction.
- Indistinct Boundary:** A boundary that is not obvious to the surveyor where the edge of the source is located. Mapping would be stopped at this point until a Distinct or Diffuse Boundary can be located.

Generally the surveyor will maintain a constant course of travel following the Distinct Boundary of the wind-damaged area. As the boundary becomes less distinct, it is recommended to move the course of travel further into or outside the source to maintain recognition of surface damage. It is acceptable to travel within approximately 50 feet of the outer or inner edge of the larger more noticeable active area if the boundary is Diffuse. When encountering an Indistinct Boundary condition, the surveyor should note if the boundary can be found or if the boundary cannot be mapped during the existing survey and why. If the boundary cannot be mapped, the survey shall end at that point leaving an unclosed source area polygon.

It is possible for the surveyor to find himself or herself greater than 50 feet within or outside of the source area boundary. When this happens, the surveyor should turn perpendicular to the direction they were traveling and travel in the direction where the distinct edge should be located. For example, if the surveyor were inside the source area, they would turn in the direction where erosion evidence was not observed earlier along their path. If the surveyor were outside the source area, they would turn toward the side where they previously observed the source. Boundary loss may occur because of an Indistinct Boundary or unfavorable lighting conditions. The time and coordinates should always be noted when it is necessary to relocate the boundary during a survey.

Another alternative for relocating a source area edge is to pause the GPS unit from recording data until the boundary is located and then resume with data collection. This allows the surveyor to travel in any direction until the edge is relocated or end the survey if an edge cannot be located. The line produced between the point where the GPS unit was paused and then restarted would be deleted and considered un-surveyed during post processing.

The presence of Indistinct Boundaries or conditions that cause the ending of a survey must be annotated on the GPS data or explained in the field notes, including point coordinates. Examples would include dust storm, precipitation, lightning, mud, and channel with flowing water, pond, and time constraint or equipment malfunction.

#### 4.2.4 Using Sand Flux Monitors to Map Source Area Boundaries

Dust source area boundaries can be delineated or refined using default cell boundaries represented by active sand flux monitors. The area represented by the active SFM site may be shaped to exclude known non-emissive areas, such as; DCM areas, wetlands, or areas with different soil texture where there is evidence that it is non-emissive.

### 4.3 Composite Dust Source Map Development

Data Processing will compile the cumulative mapping information from the visual observers and field inspections using the GPS into a GIS database for two periods each year, December through June and July through November. A new composite map will be developed for each period containing only those data collected during that period. Hand drawn observation maps will be scanned and translated into the GIS database. Observation maps will be compared with source area locations from other methods through the GIS generated layers. Overlays of the maps generated from sand flux monitors, video cameras, visual observers and GPS'd source areas will be compared qualitatively, considering the information may have been collected at different times.

## 5. Protocol for Determining K-factors and PM<sub>10</sub> Emission Rates from Sand Flux Data

### 5.1 Objective

The objective of this portion of the Dust ID Program is to estimate the PM<sub>10</sub> emission flux for each cell or source area using the relationship  $PM_{10} \text{ emission flux} = \text{sand flux} \times K\text{-factor}$ . PM<sub>10</sub> emissions for each area will be used with the CALPUFF modeling system or other USEPA approved model to determine if the PM<sub>10</sub> emissions will cause or contribute to a NAAQS violation at the shoreline.

### 5.2 Method for Determining PM<sub>10</sub> Emissions and New K-factors

#### 5.2.1 PM<sub>10</sub> Emission Flux = Sand Flux x K-factor

PM<sub>10</sub> emissions will be estimated using the sand flux for each area represented by a Sensit and CSC and an appropriate K-factor for the area and period. The sand flux values will come from

the Sensit and CSC data as discussed in Section 2. New K-factors for each area and period will be developed as discussed in this section, and default K-factors will be used to model dust events unless newer K-factors are determined.

#### 5.2.2 Default Temporal and Spatial Storm-average K-factors

PM<sub>10</sub> emissions may be estimated from default K-factors that were developed from previous dust events that occurred in the same area and the same range of calendar months in previous years.

The areas for K-factor groupings are shown in Figure 1.1: North Area, Central Area, Keeler dunes, and the South Area. Any new source area within the depicted boundaries will be associated with that area for the spatial grouping of new K-factor values. If a new source area and K-factor is developed for an area outside these boundaries, the area and default K-factor will be associated with the K-factor for an existing area with the most similar surface soil texture. The determination of the most similar existing area will be made by the Air Pollution Control Officer.

#### 5.2.3 Method to Determine Sand Flux from Areas with Implemented Dust Control Measures (DCM)

Sand flux will be measured at sites within the shallow flood and managed vegetation DCM areas. Sensits and CSCs will be sited on dry areas within the shallow flood DCM to represent dry areas near the site. DCM areas covered with standing water will be assumed to have zero sand flux. For the Managed Vegetation DCM, sand flux sites will be placed in spatially representative areas and in areas within the DCM where wind blown dust may have been previously observed.

#### 5.2.4 New K-factors Seasonal Cut-points

The APCO will review the K-factor data and propose seasonal cut-points to the LADWP. LADWP will respond to the proposed cut-points within 30 days. If no agreement can be reached within 60 days, the default periods will be used.

The two default periods to be used are: the winter/spring period that includes the months of December, January, February, March and April, and the summer/fall period that includes May through November. These same calendar months will be used to generate new temporal K-factors for each area and to generate new 75-percentile hourly K-factor values for modeling PM<sub>10</sub> emissions.

#### 5.2.5 Using CALPUFF Modeling System to Generate New K-factors

New hourly K-factors can be inferred from the CALPUFF model by using hourly sand flux as a surrogate for PM<sub>10</sub> emissions. Modeled PM<sub>10</sub> predictions can then be compared to monitored concentrations at PM<sub>10</sub> monitor sites to determine the K-factor that would correctly predict the monitored concentration for each hour. More information on the modeling procedures is included in Section 6.

A K-factor of  $5 \times 10^{-5}$  will be used initially to run the CALPUFF model and to generate concentration values that are close to the monitored concentrations. Hourly K-factor values will then be adjusted in a post-processing step to determine the K-factor value that would make the modeled concentration match the monitored concentration at the PM<sub>10</sub> monitor site. The initial K-factor will then be adjusted using Equation 5.2.

Equation 5.2

$$K_f = K_i \left( \frac{C_{obs.} - C_{bac.}}{C_{mod.}} \right)$$

Where,

$K_i$  = Initial K-factor ( $5 \times 10^{-5}$ )

$C_{obs.}$  = Observed hourly PM<sub>10</sub> concentration. [ $\mu\text{g}/\text{m}^3$ ]

$C_{bac.}$  = Background PM<sub>10</sub> concentration

$C_{mod.}$  = Model-predicted hourly PM<sub>10</sub> concentration. [ $\mu\text{g}/\text{m}^3$ ]

#### 5.2.6 Screening Hourly K-factors

K-factors will be calculated for every hour that has active sand flux in cells upwind from a PM<sub>10</sub> monitor. These hourly K-factors will be screened to remove hours that did not have strong source-receptor relationships between the active source area (target area) and the downwind PM<sub>10</sub> monitor. For example, the screening criteria will exclude hours when a PM<sub>10</sub> monitor site is located on the edge of a dust plume. Because the edge of a dust plume has a very high concentration gradient, a few degrees error in the plume direction could greatly affect the calculated K-factor.

The following criteria will be used to screen the hourly K-factors:

##### Initial K-factor Screen

- 1) Wind speed is greater than 5 m/s at 10 m height at any network site.
- 2) Hourly modeled and monitored PM<sub>10</sub> concentrations were both greater than  $150 \mu\text{g}/\text{m}^3$  at the same monitor-receptor site.
- 3) Hourly wind direction as listed in Table 5.1 for each monitor site.
- 4) The mean sand flux for all sites with non-zero sand flux is greater than  $0.5 \text{ g}/\text{cm}^2/\text{hr}$ .

##### Final K-factor Screen

- 5) At least one sand flux site located within the target area and within a 30-degree upwind cone has sand flux greater than  $2 \text{ g}/\text{cm}^2/\text{hr}$ .

- 6) All sources are within a distance of 15 km of the receptor.
- 7) More than 65 percent of the PM<sub>10</sub> contribution at a monitor site came from the target source area (North Area, South Area, Central Area or Keeler dunes).
- 8) Eliminate hours when sand flux data are missing from one or more cells that are located within a 30-degree upwind cone and within 10 km of the shoreline monitor. For Olancha and Lone Pine, which are both located 5 to 10 km from the lake bed, the distance limitation is changed to 10 km upwind of the shoreline.

**Table 5.1 Wind Directions for the Initial K-factor Screen**

<b>PM<sub>10</sub> Monitor Site</b>	<b>From-the-Lake Wind Dir. (Deg.)</b>	<b>Met Tower</b>
Lone Pine	110 $\leq$ WD $\leq$ 190	Lone Pine
Keeler	130 $\leq$ WD $\leq$ 330	Keeler
Flat Rock	210 $\leq$ WD $\leq$ 360	Flat Rock
Shell Cut	WD $\geq$ 210 or WD $\leq$ 50	Shell Cut
Dirty Socks	WD $\geq$ 220 or WD $\leq$ 65	Dirty Socks
Olancha	WD $\geq$ 320 or WD $\leq$ 55	Olancha
Bill Stanley	50 $\leq$ WD $\leq$ 190	Bill Stanley
New Sites	TBD	TBD

The from-the-lake wind directions for the initial K-factor screening criterion 3) are shown in Table 5.1. From-the-lake wind directions for any new PM<sub>10</sub> sites will be determined by the APCO as needed for the initial K-factor screen. Note that 'From-the-Lake' wind directions for assessing the lake bed impacts at PM<sub>10</sub> monitor sites (see 2008 SIP) are different from these K-factor screening wind directions.

Hourly K-factors that pass through the screening criteria will be used to develop new event-specific spatial K-factors, and new 75-percentile hourly average temporal and spatial K-factors, if enough K-factors are available.

### **5.3 Temporal and Spatial Event-specific K-factors**

#### **5.3.1 Event-Specific K-factors**

Screened hourly K-factors will be used to generate event-specific K-factors for the active source areas. The event-specific K-factor will be calculated as the arithmetic average using all the hours when the hourly K-factor passes the screening criteria for the target area.

### 5.3.2 Temporal & Spatial 75-Percentile K-factors

The statistical 75-percentile value will be determined from the distribution of the hourly K-factors that pass the screening criteria for that area and period, whenever there are nine or more hourly K-factors. The 75<sup>th</sup> percentile will be calculated using the Microsoft Excel PERCENTILE function. The Microsoft Excel PERCENTILE function works by sorting values from lowest to highest, then assigns the 0<sup>th</sup> percentile is the lowest value, the 100<sup>th</sup> percentile is the largest value, and the values in between as  $(k-1)/(n-1)$  where n is the number of data values in the list and k is index of the k<sup>th</sup> lowest value in the list. Thus, each value is placed  $1/(n-1)$  apart. If a requested percentile does not lie on a  $1/(n-1)$  step, then the PERCENTILE function linearly interpolates between the neighboring values.

### 5.3.3 Default K-factors

Table 5.2 shows the default K-factors for each of the K-factor areas and periods. These K-factors are derived for the temporal and spatial 75-percentile values from the screened hourly K-factors for the 30-month Dust ID period used for the RSIP. Each of the two temporal periods combines hourly K-factors from the same calendar periods for 2 or 3 years.

**Table 5.2 - Default Spatial and Temporal K-factors for the Dust ID Model**

<b>AREA</b>	<b>K-factor Jan.– Apr. &amp; Dec.</b>	<b>K-factor May-Nov.</b>
Keeler Dunes	$7.4 \times 10^{-5}$	$6.0 \times 10^{-5}$
North Area	$3.9 \times 10^{-5}$	$1.5 \times 10^{-5}$
Central Area	$12. \times 10^{-5}$	$6.9 \times 10^{-5}$
South Area	$4.0 \times 10^{-5}$	$1.9 \times 10^{-5}$

## 6. Protocol For Dispersion Modeling

This section of the *Protocol* discusses the dispersion model methods planned for the simulation of wind blown dust at Owens Lake using data from the Dust ID Program. The modeling procedures follow the methods used in the RSIP, with refinements based on experience and modifications to support the provisions of the SCR. The modeling techniques will be used both diagnostically to infer emission rates for source areas and prognostically to predict PM<sub>10</sub> concentrations at the historic shoreline. Following an overview of the modeling approach, the remainder of this section discusses construction of the meteorological data set, dispersion model options, background concentrations and source area characterization.

### 6.1 Overview of Modeling Procedures and Rationale for Model Selection

The CALPUFF modeling system was used in the RSIP and has been selected for continuing studies in the Dust ID Program. CALPUFF is the USEPA recommended modeling approach for long-range transport studies and USEPA has proposed CALPUFF as a *Guideline Model* to be

included in the *Guideline on Air Quality Models* (40 CFR Part 51, Appendix W). Recently the modeling system is also being applied to near-field dispersion problems where the three-dimensional qualities of the wind field are important and for stagnation episodes when pollutants remain within the modeling domain over periods of several hours or more. Dust events on Owen Lake are sometimes influenced by complex wind patterns, with plumes from the North Sand Sheet traveling in different directions than plumes from the South Sand Sheet.

The proposed model domain shown in Figure 6.1 includes a 34 km-by-48 km area centered on Owens Lake. The meteorological and computational grid will use a one-kilometer horizontal mesh size with ten vertical levels extending from the surface to four kilometers aloft. The extent of the model domain was selected to include the “data rich” Dust ID Program study area, terrain features that act to channel winds, and receptor areas of interest. This same model domain and mesh size were used in the simulations supporting the RSIP.

## 6.2 Meteorological Data Set Construction

Three-dimensional wind fields for CALPUFF will be constructed from surface and upper air observations using the CALMET meteorological preprocessor program and the procedures employed in the RSIP. CALMET combines surface observations, upper air observations, terrain elevations, and land use data into the format required by CALPUFF. Winds are adjusted objectively using combinations of both surface and upper air observations according to options specified by the user. In addition to specifying the three-dimensional wind field, CALMET also estimates the boundary layer parameters used to characterize diffusion and deposition by the CALPUFF dispersion model.

## 6.3 CALPUFF Options and Application

**Surface Observations.** The necessary surface meteorological data will come from the District’s network of ten-meter towers shown in Figure 1.1. The District may also install additional stations to better characterize winds near suspect source areas not currently near an existing site. Very few periods of missing data are typically contained in the District’s database. Periods of missing data will be flagged and CALMET will construct the wind fields using the data from the remaining stations. In addition to the District’s network, surface data from other field programs at Owens Lake will be used when available.

**Cloud Cover Data.** The current version of CALMET also requires cloud cover and ceiling height observations. Cloud cover is a variable used by CALMET to estimate the surface energy fluxes and, along with ceiling height, is used to calculate the Pasquill stability class. Hourly cloud cover and ceiling height observations are being collected from the surrounding surface airways observations at China Lake and Bishop Airport. During dust event conditions, the sensitivity of the CALPUFF modeling system to these variables is reduced, as the stability class becomes neutral under moderate to high winds. Algorithms within the modeling system that depend on the surface energy fluxes are dominated by the momentum flux and tend to be insensitive to cloud cover under high winds. For these reasons, the absence of local cloud cover and ceiling height measurements are not expected to significantly affect the results of the modeling study.

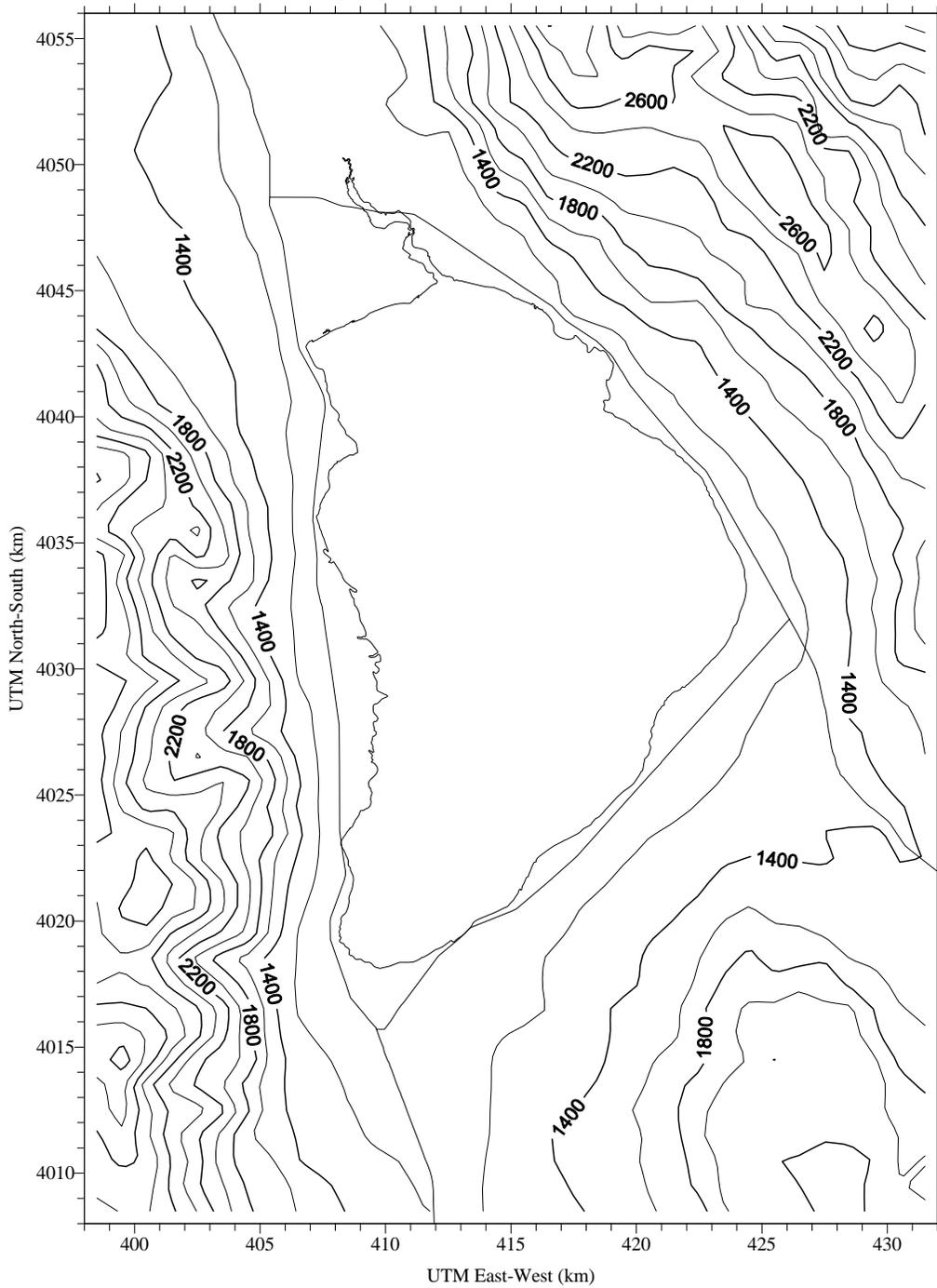


Figure 6.1 - Model Domain, elevation contours and UTM coordinates for the Dust ID Model

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**Surface Characteristics and Terrain.** The CALPUFF modeling system requires land use and terrain data. These data are used by CALMET to adjust the wind field and affect the calculations performed by the CALPUFF dispersion model. CALPUFF considers spatial changes in land use, including the surface roughness, and the input data are specified on a horizontal grid. The terrain data influence the constructed wind fields and plume trajectories in regions of sparse observations. Land use and terrain data have been obtained from the U.S. Geological Survey (USGS) data sets on the Internet. The resolution of these land use and terrain data sets are 200 m and about 30 m, respectively. The District has prepared these data sets using the pre-processing software provided with the CALPUFF modeling system. The resulting grids have been plotted and checked against data from the District's GIS database where the modeling domain overlaps the District's data. The 1-km mesh size terrain used by CALMET and CALPUFF is shown in Figure 6.1.

**Upper air data.** Upper air data will be collected from a number of different sources for construction of the wind fields and estimation of mixing heights with CALMET. In the RSIP, both local and regional data were collected as follows:

- A 915 MHz Radar Wind Profiler and Radio Acoustic Sounding System (RASS) were used to collect upper level wind and temperature measurements. The Wind Profiler was initially located at Dirty Socks then moved to the Mill Site during the 4<sup>th</sup> quarter of 2001. The District discontinued measurements with the Wind Profiler on June 30, 2003. The Wind Profiler with RASS samples wind and temperature from 100 m, up to 5000 m with a vertical resolution as low as 60 m depending on the clutter environment, atmospheric scattering conditions, and pulse length. Experience at Owens Lake indicates wind data recovery is sometimes poor above 1000 m due to the dry environment and the RASS data are limited to the lower levels during windy conditions.
- Regional twice-daily upper air soundings from Desert Rock Airport (Mercury, Nevada) and China Lake Naval Air Station.

During high wind events, observations from the Wind Profiler at both the Mill Site and Dirty Socks indicate very little wind speed or wind direction shear with height. Previous CALPUFF simulations suggest concentrations predicted at PM<sub>10</sub> monitoring sites and at the historical shoreline are not usually influenced by upper level winds because the sources are ground based. The highest impacts occur close to the source areas, and there is very little wind shear during high winds.

Following removal of the Wind Profiler, soundings from China Lake and Desert Rock will be used to construct the data set. The China Lake and Desert Rock sounding will primarily be used for upper level temperature lapse rates. Winds aloft will be based on extrapolation of the surface wind measurements. The default algorithms employed by CALMET based on Similarity Theory often adjust the winds in the wrong direction and predict too much increase in wind speed with height even for very small surface roughness lengths. As an alternative, wind speeds aloft will be adjusted using the empirical results suggested by the previous Wind Profiler measurements. No wind direction turning with height will be assumed except near the Wind Profiler site where the actual data will be used until this program is discontinued.

**CALMET options.** The options employed for the application of CALMET to construct the wind fields were provided in the “Modeling Protocol” (MFG, 2001). The majority of the selected model options are based on the defaults incorporated in the code by the model author. Notable model options include:

- Ten vertical levels varying geometrically from the surface to 4000 m. The geometric spacing provides better resolution near the surface and the upper limit is high enough to be above the boundary layer height.
- Vertical extrapolation of surface winds aloft using the results of the Wind Profiler studies.
- Less than default smoothing of wind fields. LADWP contractors Air Sciences and Environ suggested less smoothing of the wind fields by CALMET after review of the *Owens Valley PM<sub>10</sub> Attainment Demonstration Modeling Protocol*.

Wind fields constructed with CALMET will be randomly checked by plotting the resultant fields and the surface observations on a base map. The CALDESK<sup>TM</sup> software package will also be used to view the CALMET wind fields.

The application of CALPUFF involves the selection of options controlling dispersion. Although the simulations are primarily driven by the meteorological data, emission fluxes, and source characterization, the dispersion options also affect predicted PM<sub>10</sub> concentrations. The model options used in the RSIP will continue to be used for the Dust ID Program. In this study, the following options will be used for the simulations:

- Dispersion according to the conventional Pasquill-Gifford dispersion curves. Sensitivity tests were also performed by applying CALPUFF with dispersion routines based on Similarity Theory and estimated surface energy fluxes. These tests did not indicate improved performance over the Pasquill-Gifford based simulations.
- Near-field puffs modeled as Gaussian puffs, not elongated “slugs.” CALPUFF contains a computation intensive “slug” algorithm for improved representation of plumes when wind directions vary rapidly in time. This option was tested, but did not significantly influence the CALPUFF predictions.
- Consideration of dry deposition and depletion of mass from the plume. The particle size data used will be based on measurements taken within dust plumes on Owens Lake as discussed below.

Dry deposition and subsequent depletion of mass from the dust plumes depend on the particle size distribution. Several field studies have collected particle size distributions within dust plumes at Owens Lake. Based on results from Niemeyer, *et al.* (1999), the CALPUFF simulations will assume a lognormal distribution with a geometric mean diameter of 3.5  $\mu\text{m}$  and a geometric standard deviation of 2.2.

## 6.4 Background PM<sub>10</sub> Concentrations

The dispersion model simulations include only wind blown emissions from the source areas with sand flux activity measurements. During high wind events other local and regional sources of fugitive dust can contribute to the PM<sub>10</sub> concentrations observed at the monitoring locations. In the RSIP a constant background concentration of 20 µg/m<sup>3</sup> was added to all predictions to account for background sources. The constant background was calculated from the average of the lowest observed PM<sub>10</sub> concentrations for each dust event when 24-hour PM<sub>10</sub> concentrations at any of the sites were above 150 µg/m<sup>3</sup>. To avoid including impacts from lake bed dust source areas in the background estimate, the procedures used a simple wind direction filter to exclude hours when the lake bed may have directly influenced observed PM<sub>10</sub> concentrations. Such hours were removed and daily average background concentrations were recalculated based on the remaining data.

Additional PM<sub>10</sub> monitors are proposed for installation at Owens Lake. These monitors can be used to measure hourly PM<sub>10</sub> concentrations upwind from lake bed source areas. Some of these monitors may be representative of regional PM<sub>10</sub> concentrations and others may be influenced by local sources that may indicate a higher PM<sub>10</sub> concentration than the regional background level. A method to calculate background concentrations based on upwind monitor concentrations for each modeled-event approved by both the APCO and the General Manager of the LADWP may be developed in the future. Meanwhile, a default background of 20 µg/m<sup>3</sup> will be added to the model prediction for each receptor location.

## 6.5 Area Source Characterization

CALPUFF simulations at Owens Lake are sensitive to source configuration. Emissions will be varied hourly according to the methods described in Section 6.6 and dust sources represented as rectangular area sources. CALPUFF contains an area source algorithm that provides numerically precise calculations within and near the area source location. The area source configuration used for the Dust ID model run for the period from July 2002 through June 2003 is shown in Figure 6.2. The paired Sensit and CSC measurements were assumed to be representative of the horizontal sand flux for irregularly shaped source areas near the sand flux site. Field observers determined the size and shape of the source areas based on GPS mapping after the storms, observation maps made during the storms, and physical surface characteristics. All source areas were represented by sand flux measured at a single site that was applied to a series of 250 m x 250 m cells that were configured to conform to the general shape of the source area represented by the sand flux site.

The following general rules are used to characterize and map source areas on the lake bed:

- Actual source boundaries will be used when available to delineate emission sources in the simulations. Actual source boundaries will be determined using a weight-of-evidence approach considering visual observations, GPS mapping, and surface erosive characteristics. Erosive characteristics that might be considered when defining a source boundary include properties of the soil, surface crusting, wetlands, and the proximity of the brine pool and existing DCMs.

- Source boundaries will also be defined based on the DCM locations. For example, sand flux measurements outside the DCM will be assumed to apply up to the boundary of the DCM. Sand flux measurements inside the DCM will be assumed to apply to the area inside the DCM.
- All source areas will be represented by a series of 250 m x 250 m cells that generally conform to the shape of the source area and share the same hourly sand flux rates as the sand flux site representing that source area. Cells small than 250 m x 250 m may be used near the shoreline to better represent source areas where predicted concentrations are expected to be particularly sensitive to the source area configuration. (Figure 6.2)

## **6.6 Estimation of PM<sub>10</sub> Emissions**

Hourly PM<sub>10</sub> emissions for each source area will be estimated using Dust ID sand flux data and K-factors following the procedures described in Section 5. See also SCR Section 1.2 and 2.1 regarding the order of priority for using K-factors for modeling.

## **6.7 Simulation of Shoreline Concentrations**

Under the provisions of the SCR in the RSIP, CALPUFF simulations will be used to assess whether lake bed source areas cause or contribute to an exceedance of the PM<sub>10</sub> NAAQS in areas without PM<sub>10</sub> monitoring sites. Predictions will be obtained using the RSIP receptor network that contains more than 460 receptor locations placed at the historic shoreline (approximately at the 3600' elevation) of Owens Lake (see Figure 6.2). The receptor spacing along the historic shoreline ranges from 100 to 200 m. Note in several locations along the shoreline, receptors are very close to or even within potential source areas (see Figure 6.3).

## **7. Owens Lake Safety & Training Program**

### **7.1 Objective**

All field personnel that work at Owens Lake are required to complete special training courses to deal with the unique hazards and environmental precautions that must be considered when working on the lake bed. Training includes: first aid and CPR training, proper ATV use, respiratory protection and dust safety, lake bed access reporting, and snowy plover protection.

### **7.2 Safety Requirements**

Safety is the first priority while working at Owens Lake. Training requirements are required for every worker at the lake for their own safety. Dust storms can start within minutes exposing workers to dust and sand. Lightning storms often occur in the summer. Winters have sub-freezing temperatures and summers have temperatures well above 100 degrees. Access is usually restricted to ATV's and can change often throughout each year. The objective of all the training requirements is to put safety as the highest priority at all times.

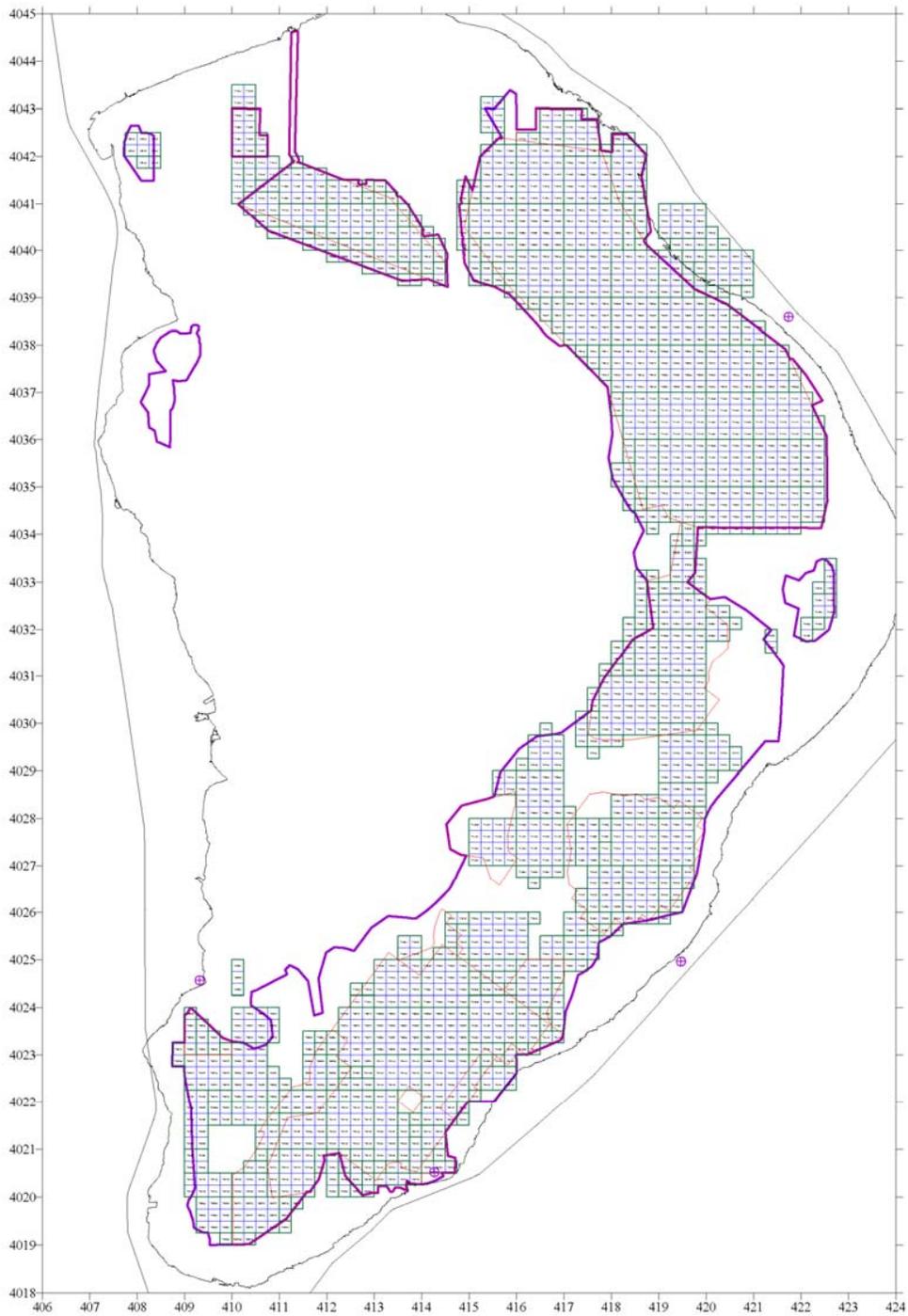


Figure 6.2 - Area source configuration using 250 m x 250 m cells for July 2002 through June 2003 Dust ID model run. Purple lines represent the control area boundary used with the Settlement Agreement.

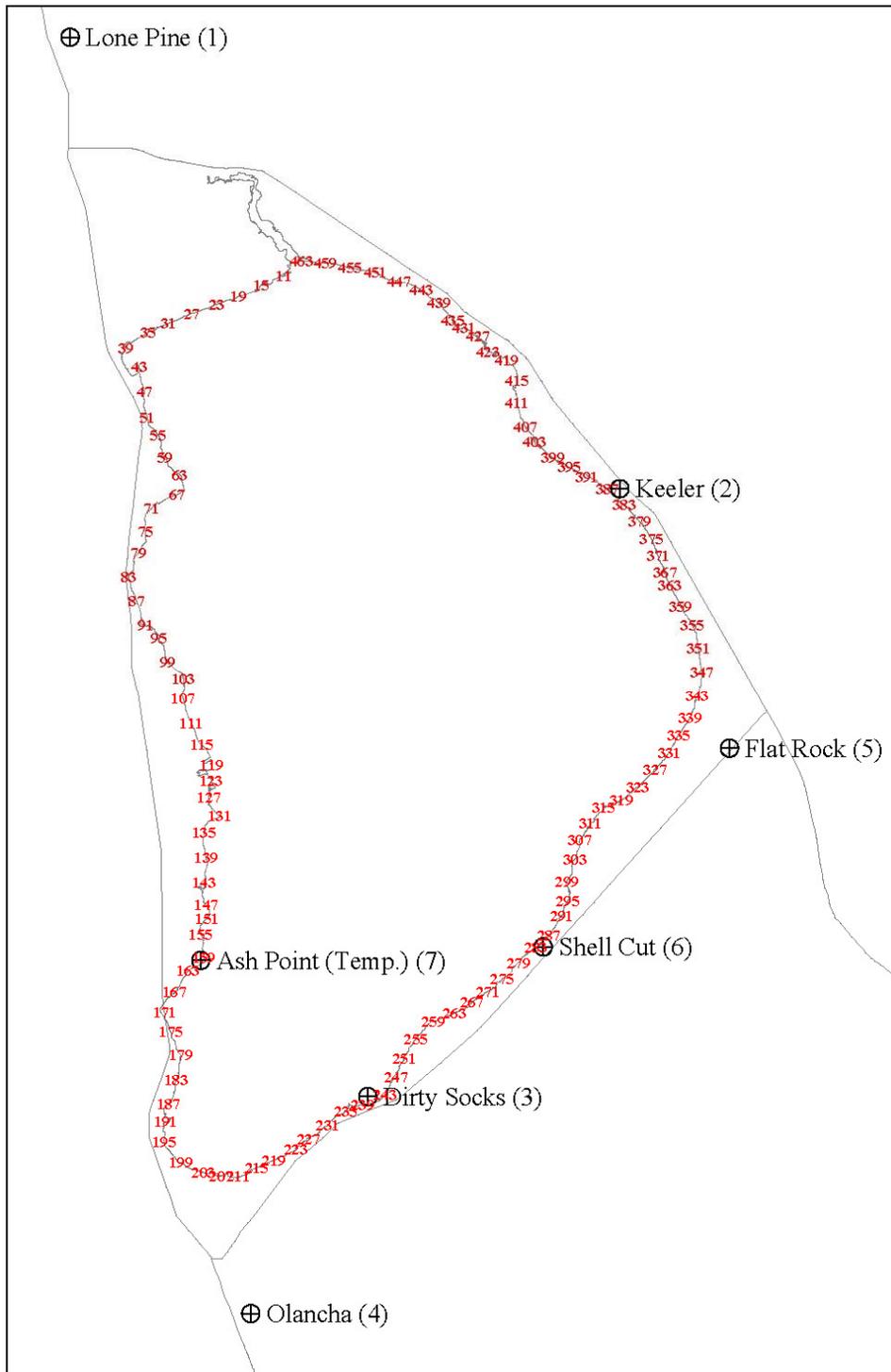


Figure 6.3 -The Dust ID model evaluates PM<sub>10</sub> impacts at over 460 receptor locations around Owens Lake.

All personnel that are involved with any fieldwork under the Dust ID Program are required to complete all safety training before working on the lake. Everyone must report going onto and leaving the lake. Workers are required to stop work and leave the lake when a dust storm starts. Every field worker will be issued a respirator, goggles for eye protection and earplugs to be used when caught in a dust storm while leaving the lake. Workers are required to leave the Keeler office when the dust impacts Keeler and the TEOM monitor reading exceeds  $1000 \mu\text{g}/\text{m}^3$ . Respirator training and face fits will be completed annually. First Aid and CPR training and successful certification is required every three years. Snowy Plover training is required before any new worker can start work on the lake. Other safety issues that all workers will be informed of include the proper use of tools, special weather conditions such as temperature extremes, rain and lightning and training in the operation of ATVs.

### **7.3 Reporting Procedure for Working on the Lake and Contacts**

1. Normal work hours on the Owens Lake are defined as sunrise to 4:45 PM, Monday through Friday. The lake is defined as any area below the 3600 ft. contour.
2. Every person or group must call the Bishop office and leave a message or speak to the Administrative Specialist (AS) to notify that they are working on the lake. They also must inform the AS what area of the lake they will be working. Examples: DIVIT, Dirty Socks sand sheet, "A" Met tower or any commonly used identifiable name of a site or area you will be working.
3. The AS will record the person's name (s) and area of the lake they are working on.
4. Every person or group working on the lake must notify the Bishop office before 4:45 PM on the same day; that they have left the lake OK. This must be done or a person will be sent out to look for you! False alerts will not be appreciated.
5. The AS will call the Director of Technical Services (DTS) in Keeler or one of the back up persons in order on the list below, and report the missing person if not notified before the specified time. An attempt will be first made to contact the missing person by phone and determine their situation. The DTS or an assigned person will begin a search for the missing person if the person cannot be contacted by phone. The search will continue until dark or unsafe conditions at which time the Inyo Sheriff will be notified for assistance.
6. Everyone may work outside normal work hours Monday through Friday at your own risk. However, they must call the Bishop office before the designated time and notify the AS that they will be working past 4:45 PM and call again and leave a message that they left the lake OK before 8:00 AM the next day.
7. The AS will check the messages every morning and record the information. The DTS will be notified if a person that worked after normal hours did not call and leave a message that they left the lake OK. The DTS or an assigned person will follow the procedure for a missing person outlined in step 5.

8. Nobody may work on the lake after 4:45 PM on Friday, all day Saturday or Sunday unless they receive special permission from their direct supervisor. The supervisor will be responsible for making sure the worker left the lake OK and responding to an emergency or search if necessary. The worker must notify their supervisor when they leave the lake OK during these periods.

**Emergency Assistance Reporting Contacts and Phone Numbers (Area Code 760):**

**Call 911 first if you have an emergency!**

Bishop Office AS	872-8211	
Bill Cox (DTS)	876-8103	Cell 937-2886
Earl Wilson	876-8104	Cell 937-1060
Nik Barbieri	876-1803	Cell 937-6696
Grace Holder	872-8211	Cell 937-2887
Guy Davis	876-8115	Cell 937-1766
Dan Johnson	876-4544	Cell 937-1715
Ted Schade	872-8211	Cell 937-3360

**7.4 Snowy Plover Training and Other Wildlife Protection Procedures**

Field technicians and other District personnel and contractors are required to take precautions to avoid disturbing western snowy plovers during the nesting and brooding season which is from March 15 through August 30 each year. All lake bed personnel must complete snowy plover awareness and avoidance training before venturing onto the lake bed during snowy plover season. A qualified biologist will provide training for all lake bed personnel. In addition to completing snowy plover training, the plover protection program requires the following:

- Report snowy plover sightings to the District's biological resources monitor for dissemination to all lake bed personnel and for scientific data collection purposes. The biological resources monitor will map and mark the sightings in the case of nesting pairs, and will map the last known locations of broods. Lake bed workers will be responsible for checking the latest maps before encroaching onto potential snowy plover use areas.
- If snowy plover nests are found within areas of potential conflict with Dust ID monitoring, they will be marked in the field with green stakes. Within the buffer area demarked by stakes, the maximum allowable time per visit is 10 minutes.
- Field personnel should use established ATV and 4WD vehicle trails to approach and depart monitoring sites. The maximum allowable speed on ATV and off-road 4WD on the lake bed is 15 mph during the snowy plover season.

All existing and new Dust ID monitoring installations will be fitted with raptor perching deterrent (eg., Nixalite) at potential perch sites with a height of greater than 60 inches above the

playa surface. Maintenance of perching deterrents will be routinely performed. Any new construction that causes new ground disturbance during the snowy plover season will require a pre-construction survey for snowy plover use. A qualified biologist will perform the survey within 1 week prior to the start of construction.

Monitoring will be performed on site in a manner that is least disturbing to wildlife and plant resources as possible. Potentially affected upland resources (those located outside the playa) that could be disturbed during any new ground-disturbing construction activities were identified during District environmental analyses. The animals that use upland areas vary seasonally, with nesting and foraging birds, mammals, reptiles, and invertebrates occurring during the period of dust monitoring. No special training is required to work in upland areas during the dust monitoring season, however pre-construction wildlife and rare plant surveys are required if placement of new facilities at any time of year will cause new ground disturbance.

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## **Board Order 080128-01 Attachment D**

### **2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area**

The City may transition from one approved BACM to another provided that the performance standard of one or the other BACM is met at all times during the transition, and that the City makes a complete and technically well-supported written demonstration of that performance, with a built-in margin of safety, to the satisfaction of the APCO in advance of any actions by the City to transition. There are three circumstances under which temporary modifications may be allowed to the BACM identified in this SIP, if certain conditions are met. The circumstances are:

1. Adjustments to existing BACM. Research to demonstrate that sufficient PM<sub>10</sub> control efficiency during the dust season can be achieved and the NAAQS can be attained everywhere on or above the historic shoreline with a different performance standard for an existing BACM.
2. Research on new BACM
3. Transition from one BACM to another that requires a time period where neither BACM's performance standards can be met.

The City may make an application for any of these modifications in writing to the APCO. The complete application must include all necessary data and other technical information to support the application. Except for the specific limitations set forth below for BACM adjustments to Shallow Flooding, the APCO shall have full and sole discretion to accept, reject or condition the City's application for modifications to BACM on Owens Lake, to require additional technical information, and/or to independently monitor the results of the project, and shall provide her/his decision in writing. This same discretion shall apply to the APCO's consideration of each of the other applications that the City may make as further described below. The APCO will consider and respond to comments made by the City regarding any decision by the APCO to reject, condition or modify an application. Failure by the City to comply with any condition of the project approval may result in the APCO revoking the project approval and directing closure procedures be implemented for the project.

The flexible BACM description under the terms of the Order preclude the application of the U.S. Environmental Protection Agency's Natural Events Policy for monitoring data used to make the determinations in this Attachment. All monitored PM<sub>10</sub> concentrations that meet the EPA quality-assurance requirements contained in 40 CFR Part 58 and are measured at stations located at or no more than 3 kilometers above the historic shoreline (shoreline monitors) will be used in the analysis. The monitored values will be used as measured, and will not be adjusted for from-the-lake and non-lake wind directions as they are for the Supplemental Control Requirements.

The modeling for the determinations will be performed in accordance with the 2008 Owens Lake Dust Source Identification Program Protocol (Board Order 080128-01, Attachment C).

## **1. ADJUSTMENTS TO EXISTING BACM**

### **A. BACM Adjustments to Shallow Flooding**

1. After approval of the 2008 SIP, the City shall have the option to conduct field testing to refine the wetness cover requirement to achieve 99 percent control efficiency in Shallow Flood areas within the boundaries of the 2003 Dust Control Area (Shallow Flood Cover Test).
  - A. The Shallow Flood Cover Test shall occur on one or more areas totaling not more than 1.5-square-miles, to be selected by the City and approved by the APCO, which approval shall not be unreasonably withheld, from within the TDCA areas requiring 99 percent control.
  - B. The Shallow Flood Cover Test design shall be prepared by the City and approved by the APCO, which approval shall not be unreasonably withheld, prior to implementation. Based on that design, the APCO will reasonably determine wetness cover requirements for the Shallow Flood Cover Test.
  - C. The City will be CEQA lead agency for the Shallow Flood Cover Test and shall secure all required responsible agency approvals, permits and leases.
2. If the APCO reasonably determines in writing that the PM<sub>10</sub> Dust Control Measures in the 2008 Total Dust Control Area (TDCA) have been operational for one continuous year (defined as 365 consecutive days) with no exceedance of the federal standard at monitors located at or above the historic shoreline caused solely by sources within the 2008 TDCA, the City shall be permitted to reduce the wetness cover by an average of 10 percent over those Shallow Flood areas requiring 99 percent control efficiency, excluding areas identified in Section A.2.C, below, provided that:
  - A. Application of the 10 percent reduction in wetness cover during the May 16 through June 30 Shallow Flood areal wetness cover reductions provided for in Paragraphs 15.A.ii and 15.B.ii of Board order 080128-01 shall result in the lower of:
    - i. The areal cover resulting from a 10 percent reduction; or
    - ii. The areal cover required in Paragraphs 15.A.ii and 15.B.ii of Board Order 080128-01.
  - B. To implement the reductions set out in this Section, the City shall be required to first submit a written Wetness Cover Plan to the District for reducing the wetness cover on the eligible areas. The Wetness Cover Plan shall take into account:



Section A.4.A.(i) plus the background of  $20 \mu\text{g}/\text{m}^3$  do not exceed  $120 \mu\text{g}/\text{m}^3$  at the historic shoreline.

- B. If the monitored values at the historic shoreline exceed  $130 \mu\text{g}/\text{m}^3$ , and it is determined that non-lake bed sources are contributing greater than  $20 \mu\text{g}/\text{m}^3$ , then the District will expeditiously seek to identify and require control of those non-lake bed sources so that the City may continue to implement efficient DCMs on the lake bed.
- C. If the City is entitled to further reduce wetness cover pursuant to this Section, the City shall prepare and submit an updated Wetness Cover Plan to the District to describe the wetness cover proposed for the subsequent, applicable Dust Control Season. The updated Wetness Cover Plan shall include:
  - i. A map that depicts the eligible Shallow Flood areas;
  - ii. The proposed amount of wetness cover for each eligible Shallow Flood area; and
  - iii. The method for determining effectiveness of the proposed wetness cover.
- D. The Wetness Cover Plan shall be subject to approval of the APCO, which approval shall not be unreasonably withheld.

## **B. BACM Adjustment to Measures Other than Shallow Flooding within Existing Dust Control Areas**

### Requirements to Begin the Process

At least once per calendar year after May 1, 2010, the District's APCO will make a written determination as to whether the Owens Lake bed will require additional  $\text{PM}_{10}$  controls in order to attain or maintain the federal 24-hour  $\text{PM}_{10}$  NAAQS. The APCO will use the procedure forth in Board Order 080128-01 to make the determination.

If the APCO determines that there were no monitored or modeled exceedances of the  $\text{PM}_{10}$  NAAQS as described above for the previous calendar year, each calendar year the APCO will do the following:

- 1) determine from the modeling if there are shoreline receptors where the model shows the combined predicted yearly maximum 24-hour contribution from all source areas on the lake bed contributing to those receptors plus background (24-hour average of  $20 \mu\text{g}/\text{m}^3$ ) is less than  $120 \mu\text{g}/\text{m}^3$ , and
- 2) determine that there were no concentrations greater than  $120 \mu\text{g}/\text{m}^3$  measured at any shoreline or near-shore monitoring site in the area of those receptors.

The City may perform an independent assessment using the data and methods of the Dust ID Protocol in order to confirm the APCO's findings. The APCO will consider and respond to the

City's assessment before making his/her final determination. The APCO has full and sole discretion to make this determination.

#### First Step on Test Areas

If there are receptors that meet the requirements described above, and provided that the City is in compliance with SIP control requirements on all areas of the lake bed, the APCO will inform the City that they may submit an application to reduce the level of control within a 1 to 2-square-mile test area of an existing Shallow Flooding Dust Control Measure (DCM) area or within a 160 to 320 acre test area of an existing Managed Vegetation DCM area that the modeling shows contributes to, and only to, the shoreline receptors described above where the yearly maximum 24-hour contribution from the lake bed plus background is less than  $120 \mu\text{g}/\text{m}^3$ . Application may be made for more than one area to be tested simultaneously provided the test areas do not impact any of the same modeled shoreline receptors or monitors (no overlapping impacts). The above limitations on test area size and location do not apply outside the boundaries of existing Dust Control Areas.

For the Managed Vegetation DCM, the cover may be reduced by no more than 5%, e.g. 50% to 45%, (one step). For other BACM or changes to compliance averaging areas (e.g., one acre for Managed Vegetation), the APCO will determine the permitted test area size, averaging area, test location and step amount. An area with a non-zero contribution to a receptor will be considered not to contribute to a receptor if the contribution from that area is less than  $5 \mu\text{g}/\text{m}^3$  and the yearly maximum 24-hour contribution from the lake bed plus background ( $20 \mu\text{g}/\text{m}^3$ ) to that receptor is less than  $140 \mu\text{g}/\text{m}^3$ . (A "zero contribution" is defined by the accuracy of the instruments used to collect the data, but in no case shall it be greater than  $1 \mu\text{g}/\text{m}^3$ .) The City may also satisfy the requirements of a BACM test for Managed Vegetation with documentation of a site-specific BACM test, along with written justification for more general application of the results of this test.

The City's application to reduce the level of control over any area within the boundaries of existing Dust Control Areas must be accompanied by a modeling analysis that demonstrates that increasing  $\text{PM}_{10}$  emissions within the test area will not cause the predicted yearly maximum 24-hour concentrations along the shoreline to exceed  $120 \mu\text{g}/\text{m}^3$ , including background ( $20 \mu\text{g}/\text{m}^3$ ).

The application must also include, but is not limited to:

- 1) a project description,
- 2) site plan,
- 3) any necessary environmental documentation, responsible agency approvals, permits and leases,
- 4) a protocol to measure  $\text{PM}_{10}$  emissions and performance standards,
- 5) a time frame for project milestones and completion,
- 6) plans to control  $\text{PM}_{10}$  emissions if they exceed project limits,
- 7) project closure procedures if the project is discontinued,
- 8) soil texture information, soil chemistry, groundwater chemistry and applied water chemistry, and

- 9) a protocol to evaluate control effectiveness, estimate emissions and determine whether the results are transferable to other areas of the lake bed.

For BACM other than Shallow Flooding, the City will submit a relationship between control efficiency and performance standards based upon research results. The APCO has full and sole discretion to accept, reject, or modify that relationship. All modeling will be done according to the Dust ID Protocol.

Rectified aerial or satellite images of the area of adjusted BACM, or any other method approved by the APCO, will be used by the APCO to determine the performance standards for the adjusted BACM for this step and all subsequent steps.

All raw data must be shared with the APCO, and all data screening criteria must be approved (or disapproved) in writing by the APCO. The APCO may terminate the test at any time if modeling or monitoring show that modeled (including background of  $20 \mu\text{g}/\text{m}^3$ ) or monitored emissions are increasing above trigger levels set by the APCO based upon a  $140 \mu\text{g}/\text{m}^3$  modeled or monitored  $\text{PM}_{10}$  concentration at the shoreline, or if the City is not following the APCO-approved protocol. The APCO has full and sole discretion to determine whether these conditions have been met.

The APCO has full and sole discretion to approve or reject the City's application or require conditions. The APCO will take action and notify the City in writing within 90 days of receipt of the written application. No changes may be made to BACM in advance of the APCO's approval. Any adjustments to BACM will be reported to EPA by the APCO within 60 days of the APCO's approval.

#### Subsequent Steps on Test Areas

The adjusted BACM shall be maintained by the City for one year. No other adjustments to BACM may be made during that year that impact any of the same set of model shoreline receptors. At the end of the year, the City may submit a new application to the APCO to reduce the level of control in the test area by another step provided:

- 1) the modeled yearly maximum 24-hour contribution at all of the shoreline receptors identified above from all lake bed sources including the test area, plus background ( $20 \mu\text{g}/\text{m}^3$ ), during the test period is less than  $120 \mu\text{g}/\text{m}^3$ , and
- 2) no concentrations greater than  $120 \mu\text{g}/\text{m}^3$  were measured at any shoreline monitor in the area of those receptors during the test period.

The new application must contain all the same elements as the original application, and all the data and modeling from the first step of the test.

The APCO has full and sole discretion to approve or reject the City's application, or to require conditions. Subsequent steps may be made in the same manner. The APCO will take action and notify the City in writing within 90 days of receipt of the written application.

### Requirement to Increase Controls on Test Areas

If, at the end of the year or any subsequent year before the SIP Revision to adjust BACM is approved by USEPA, the predicted yearly maximum 24-hour contribution from all lake bed sources including the test area plus background ( $20 \mu\text{g}/\text{m}^3$ ) exceeds  $140 \mu\text{g}/\text{m}^3$  at any of the shoreline receptors identified above, and/or concentrations greater than  $140 \mu\text{g}/\text{m}^3$  were measured at a shoreline monitor in the area of the identified receptors, then the City must increase the control efficiency on the test area to the last step that achieved concentrations below the  $140\text{-}\mu\text{g}/\text{m}^3$  threshold. For Managed Vegetation, this action must be taken within 12 months of the written determination by the APCO that the requirements for adjusting BACM were not met. For all other  $\text{PM}_{10}$  control measures, this action must be taken within 60 days of the written determination by the APCO that the requirements for adjusting BACM were not met. The APCO has full and sole discretion to make that determination. The APCO will determine the time scale for compliance for other BACM as part of the approval of the application.

### SIP Revision for BACM for the Test Area

After three consecutive years of successful operation of the adjusted-BACM test area (modeled and monitored concentrations less than  $140 \mu\text{g}/\text{m}^3$  as described above), the City may apply to the District for a SIP Revision to redefine BACM for that test area on the Owens Lake bed provided:

- 1) the predicted yearly maximum 24-hour  $\text{PM}_{10}$  contribution for each year of the test from the test area plus background ( $20 \mu\text{g}/\text{m}^3$ ) at all shoreline receptors is  $140 \mu\text{g}/\text{m}^3$  or less, and
- 2) no  $\text{PM}_{10}$  concentrations greater than  $140 \mu\text{g}/\text{m}^3$  were measured at any shoreline monitor during the three years of the test.

The APCO has full and sole discretion to determine whether these conditions have been met. After public notice and comment and a public hearing, the District Board has full and sole discretion to determine whether to adopt the SIP revision.

### Lake-Wide SIP Revision for BACM for a Soil Type

If, after three consecutive years of successful operation of the adjusted-BACM test area, the predicted yearly maximum 24-hour contribution from the test area and all source areas on the lake bed plus background ( $20 \mu\text{g}/\text{m}^3$ ) at all shoreline receptors for all three years of the test is  $140 \mu\text{g}/\text{m}^3$  or less and no concentrations greater than  $140 \mu\text{g}/\text{m}^3$  were measured at any shoreline monitor during the three years of the test, the research conducted on these test areas can be used to determine the relationship between the  $\text{PM}_{10}$  emissions, control efficiency and DCM performance standards. After the relationship has been identified, the City will use the research results in an updated modeling analysis that applies the test results to other areas on the lake bed with the same general soil type (sand-dominated, silt-dominated or clay-dominated) and under the same range of evaluated emissions or control efficiencies and performance standards as the test. The modeling will cover the entire test period, and will be done in accordance with the Dust ID Protocol. A DCM control map (map) will be prepared of lake bed control efficiencies (with corresponding DCM performance standards) that would be required to achieve the  $\text{PM}_{10}$  NAAQS everywhere along the historic shoreline with that DCM in the same general soil type

(sand-dominated, silt dominated or clay-dominated) as the test area and under the same range of control efficiencies, emissions, and performance standards evaluated in the test.

The City will then submit this draft map to the APCO for approval. The submittal must contain all the data from the test area and the modeling that produced the map. The APCO has full and sole discretion to approve, disapprove, or modify the draft map.

If the APCO approves the map, the City may apply to the District Board for a SIP Revision to redefine that BACM for that mapped area on the Owens Lake bed. After public notice and comment and a public hearing, the District Board has full and sole discretion to determine whether to adopt the SIP Revision. If a SIP Revision identifying a redefined BACM for Owens Lake is adopted by the District Board and approved by USEPA, the redefined BACM may be implemented anywhere designated by the new DCM control map. If the City has implemented a different DCM in the mapped area, the requirements of the following section below titled "Transitioning From One BACM to Another BACM After 2010" must also be met. If any modeled or monitored exceedance of the PM<sub>10</sub> NAAQS results from these adjustments to BACM, the requirements of Board Order 080128-01, Paragraphs 10 and 11, will automatically apply to increase controls on these extreme violators to restore attainment of the NAAQS.

As many of the existing and potential dust control areas on the Owens Lake bed fall under the jurisdiction of the California State Lands Commission and other responsible agencies, the City must secure the appropriate approvals, leases and permits prior to implementing adjustments to existing BACM. However, nothing in this section is intended to give any responsible agency any authority beyond their authority under law.

## **2. RESEARCH ON POTENTIAL NEW BACM INCLUDING MOAT ROW**

The City may test new dust control measures at any time on areas of the lake bed that are emissive, except within the 43.0 square-mile 2008 Total Dust Control Area footprint where BACM (or on up to 3.5 square miles, the non-BACM dust control known as Moat & Row) must be implemented by April 1, 2010 or within any Supplemental Control Area where existing BACM has been implemented or is scheduled for implementation. This testing area exclusion does not apply to Moat & Row PM<sub>10</sub> controls constructed within the 12.7 square-mile 2006 Supplemental Dust Control Area (SDCA). The City may test up to 3.5 square miles of Moat & Row within the SDCA. If the City has tested a new control measure for three years in this manner, it may apply in writing to the APCO for a SIP Revision to designate the new dust control measure as BACM. The application must meet all USEPA requirements for BACM designation and demonstrate to the APCO's satisfaction that the new control measure is sufficient to achieve the required PM<sub>10</sub> emission reductions or control efficiency during the dust season and attain the NAAQS everywhere on the shoreline. The APCO has full and sole discretion to determine whether these conditions have been met.

The application shall include, but not be limited to:

- 1) a description of the new dust control measure

- 2) a description of the test site and the meteorological conditions under which it was tested
- 3) the measured PM<sub>10</sub> emissions during the test
- 4) the test time frame
- 5) all raw data collected during the test
- 6) all data screening criteria and final data sets
- 7) data supporting the conclusion that the required control efficiency was achieved
- 8) a performance standard that the new dust control measure must meet in order to achieve the required emission reductions or control efficiency
- 9) an analysis of any environmental impacts of the dust control measure
- 10) the appropriate responsible agency approvals, permits and leases

The application must include modeling that demonstrates that the required PM<sub>10</sub> emission reductions or control efficiency can be achieved during the dust season anywhere this control measure may be implemented on Owens Lake, and the NAAQS can be met at all times everywhere along the historic shoreline.

If the APCO determines that the application is complete and the above conditions have been met, he/she will have full discretion to select or approve a method of determining compliance of the proposed new BACM with its performance standard and include that method in the description of the proposed BACM for the SIP Revision. The District Governing Board has full and sole discretion to determine whether to adopt a SIP Revision for approval of any new BACM.

Upon adoption by the District Board, approval by CARB, and submission to USEPA of a SIP Revision that identifies a new BACM for Owens Lake, the City may implement only this one new control measure on one-half square mile of the next area to be identified as needing control under the 2003 SIP Revision Supplemental Control Requirements until EPA approves this new measure as BACM. No other new control measures may be implemented on areas identified as needing control under the 2003 SIP Revision Supplemental Control Requirements until EPA approves this new measure as BACM. The District Governing Board may limit the new BACM to specific circumstances, for example, distance of the new dust control measure from the shoreline or approval in a specific general soil type. Upon approval by USEPA, the new BACM may be implemented per the requirements described in the following section, "Transitioning From One BACM to Another BACM After 2010," or on any subsequent areas requiring control under the "2008 Owens Valley Planning Area Supplemental Control Requirements Procedure" (Board Order 080128-01, Attachment B), subject to any limitation to specific circumstances.

As many of the existing and potential dust control areas on the Owens Lake bed fall under the jurisdiction of the California State Lands Commission and other responsible agencies, the City must secure the appropriate approvals, leases and permits prior to implementing any BACM test or new BACM. However, nothing in this section is intended to give any responsible agency any authority beyond their authority under law.

### **3. TRANSITIONING FROM ONE BACM TO ANOTHER BACM AFTER 2010**

If the City wishes to transition from one existing BACM to another existing BACM without meeting the performance standard of one or the other BACM at all times, it may submit an application to the APCO in writing for permission to do so after April 1, 2010. The APCO has full and sole discretion to accept, reject or condition the City's application. The transition may be done on no more than one and one-half (1.5) square miles lake-wide for any BACM except Managed Vegetation, or 320 acres lake-wide if the transition is to Managed Vegetation, at one time. The City shall not begin the transition in advance of the APCO's written approval.

The application shall include, but not be limited to:

- 1) a protocol that includes a project description
- 2) a site plan
- 3) a plan to measure PM<sub>10</sub> emissions
- 4) a time frame for project milestones and completion
- 5) plans to control PM<sub>10</sub> if emissions exceed any trigger value set by the APCO based upon a 140µg/m<sup>3</sup> modeled (including background of 20µg/m<sup>3</sup>) or monitored PM<sub>10</sub> concentration at the shoreline
- 6) data supporting the assumption that the transition can be completed and the BACM performance standards can be achieved within three years of the start-up of construction
- 7) project closure procedures if the project is discontinued for any reason or if the PM<sub>10</sub> trigger value is exceeded
- 8) any necessary environmental documentation, responsible agency approvals, permits and leases

The protocol must include modeling in accordance with the Dust ID Protocol that predicts that the NAAQS will be met at all times everywhere on the shoreline during the transition period, and must include a method to monitor emissions continuously throughout the transition period. The transition must be complete, and the new BACM performance standard achieved, within three years of written notification from the City to the APCO that they are no longer maintaining the performance standard for the existing BACM, and are beginning the transition.

All raw data must be shared with the APCO, and all data screening criteria must be approved (or disapproved) in writing by the APCO. The APCO may terminate the transition at any time if modeling or monitoring show that emissions are increasing above any pre-set trigger level described in 5) above, or if the City is not following the APCO-approved protocol. The APCO has full and sole discretion to determine whether these conditions have been met.

If the data show to the APCO's satisfaction that the transition has been accomplished while attaining the NAAQS everywhere at the shoreline, the City may submit an application to the APCO to allow another area to be transitioned. The APCO has full and sole discretion to accept, reject or condition the City's application. The same procedures outlined above will apply.

As many of the existing and potential dust control areas on the Owens Lake bed fall under the jurisdiction of the California State Lands Commission and other responsible agencies, the City must secure the appropriate approvals, leases and permits prior to BACM transitions. However, nothing in this section is intended to give any responsible agency any authority beyond their authority under law.

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GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

**EXHIBIT 3**  
**DISTRICT HEARING**  
**BOARD ORDER**  
**GB09-06**



1 experimental dust control measure (DCM) known as "Moat & Row" on the dried bed of Owens Lake,  
2 California.

3 As described in the variance petition, Petitioner contended that delays in securing approvals for  
4 their Moat & Row project from State Lands Commission and California Department of Fish and Game  
5 will cause the 3.5 square-mile project to be completed one year late, by October 1, 2010. Petitioner  
6 contended that the delays were beyond its reasonable control. However in order to offset the excess air  
7 pollution emissions caused by the one year delay, Petitioner agreed to two additional dust control  
8 projects.

### 9 PROCEEDINGS

10 Pursuant to District Rule 617, upon receipt of the petition, the Air Pollution Control Officer  
11 (APCO) transmitted the Petition together with the APCO's recommendation to grant the regular  
12 variance to the Hearing Board. The recommendations were set forth in the Staff Report for this matter,  
13 which is on file with the Hearing Board.

14 Pursuant to Government Code 42359.5 and District Rule 16, with notice and hearing, the  
15 Hearing Board considered the Petitioner's Regular Variance petition and the District's recommendations  
16 on September 25, 2009 in the Town of Mammoth Lakes Council Chambers, 437 Old Mammoth Road,  
17 Suite Z, Mammoth Lakes, California 93546, with participation and sworn testimony from Ted Schade,  
18 GBUAPCD APCO; Grace McCarley Holder, GBUAPCD Playa Geologist; William VanWagoner,  
19 Milad Taghavi, Brian Tillemans and Gene Coufal, City of Los Angeles Department of Water and Power.  
20 Tori Jenkins, Clerk of the Board; Julie Conboy Riley and David Hodgekiss, Counsel for the City of Los  
21 Angeles Department of Water and Power; George Poppic of the California Air Resources Board,  
22 Representing Counsel for the Hearing Board; and Mel Joseph of the Lone Pine Paiute Shoshone  
23 Reservation were in attendance. After hearing all testimony and considering all evidence, the Hearing

1 Board made the Findings and granted the issuance of a Regular Variance subject to certain conditions as  
2 set forth below.

### 3 FINDINGS

4 The Hearing Board makes the following findings as required by Sections 42352 and 42353 of the  
5 California Health and Safety Code:

- 6 1. Petitioner will be in violation of District Board Order 080128-01, Paragraph 3, which requires  
7 Petitioner to have any Phase 7 Moat & Row DCM operational by October 1, 2009.
- 8 2. Due to conditions beyond the reasonable control of the Petitioner, it has been prevented it from  
9 completing the Moat & Row DCM by the October 1, 2009 deadline specified in the Board Order.  
10 There is no practical method to achieve compliance with the Board Order sooner than through a  
11 time extension to complete the Dust Mitigation Project, Moat & Row. Closing the Los Angeles  
12 Aqueduct would not alleviate the PM10 emission problem. Immediate compliance would impose  
13 unreasonable burden upon an essential public service.
- 14 3. There would be no corresponding benefit to the closing or taking of the Los Angeles Aqueduct.  
15 Closing the aqueduct would not be an expeditious means of controlling emissions from the 3.5  
16 square-mile Moat & Row project area. The 3.5 square-mile Moat & Row project area is made up  
17 of seven small sub-areas, none of which have existing water-delivery infrastructure. Controlling  
18 the emissions from these widely dispersed areas by closing the Aqueduct and redirecting its  
19 waters onto the Owens Lake bed via the Owens River would take the full flow of the Aqueduct  
20 for 5 to 20 years.
- 21 4. Applicant has considered curtailing operations, however, such action would not lead to  
22 compliance with the Board Order, nor would it provide any immediate control of the emissions

1 associated with the 3.5 square-mile Moat and Row area. Closing the aqueduct would cause  
2 considerable hardship to the City of Los Angeles.

- 3 5. Petitioner has committed to control excess emissions from the Owens Lake bed to the maximum  
4 extent feasible during the period the variance is in effect. Petitioner proposes two methods during  
5 two periods.

6 The first period is the six months from October 1, 2009 until April 1, 2010. Petitioner  
7 will be continuing construction of the 9.7 square-mile of Phase 7 Shallow Flooding DCMs during  
8 this period. The Board Order requires the additional 9.7 square-miles of Shallow Flooding control  
9 to be operational by April 1, 2010. Petitioner is committed to providing at least 3.5 square-miles  
10 of temporary dust control within the 9.7 square-mile Phase 7 project by area by October 1, 2009.  
11 The temporary control will be provided by tilling 3.5 square-miles of clay soils up into very large  
12 clods that will increase the surface roughness of the lake bed and temporarily prevent emissions.  
13 Based on various studies conducted, Petitioner believes tilling will provide at least six months of  
14 sufficient control. As the Petitioner completes the Shallow Flooding construction in the tilled  
15 areas, water will cover the tilled surfaces and permanent control will be established. Petitioner is  
16 expediting control via tilling method in areas already scheduled for control by April 2010.

17 The second period for required emission reduction is the six-month period between April  
18 1, 2010 and October 1, 2010. Petitioner is unable to provide direct on-lake bed offsets of the  
19 emissions from the 3.5 square-mile of Moat & Row are during this six month period because  
20 required DCMs will occupy all lake bed areas (39.5 square miles) for which Petitioner has  
21 permits and approvals.

22 However, the District's air quality monitoring indicates that there are additional areas on  
23 the lake bed, beyond the 43 square miles currently ordered (39.5 square-miles with permits and

1 3.5 square-miles of Moat and Row), that require controls. District and Petitioner staffs have  
2 preliminarily identified two square miles that were emissive during the 2007 through 2009 period.  
3 However, the 2008 SIP and Board Order prevent the District from ordering controls on much of  
4 these areas until possibly well after May 1, 2010.

5 Petitioner has agreed that, as an offset to the emissions that will occur from the 3.5  
6 square-mile Moat & Row area, it will immediately begin the regulatory approval process required  
7 to construct two additional square miles of BACM dust controls on the lake bed and will  
8 complete those controls six months earlier than would ordinarily be required by the 2008 SIP.  
9 Because Petitioner is starting the process seven months earlier than the earliest it would normally  
10 start under an order from the District and it will complete the DCMs six months earlier than  
11 provided in the 2008 SIP, necessary dust controls will be in place on the lake bed more than a  
12 year earlier than under the normal procedures. The additional two square miles of expedited dust  
13 controls offsets the six months of excess emissions from the 3.5 square-mile Moat & Row area.

14 6. The District has an extensive air and emissions monitoring program at Owens Lake and will  
15 continue to operate the program and quantify dust emissions from the lake bed, including areas  
16 subject to this variance request. Petitioner provides annual funding through assessments levied by  
17 the Governing Board to conduct this monitoring.

18 7. Petitioner will continue to operate between 29.8 and 39.5 square-miles of DCMs on the lake bed  
19 during the one-year variance period. The existing controls have reduced historic PM10 levels  
20 about 90 percent and additional reductions are expected by April 1, 2010, when the current 9.7  
21 square-mile Phase 7 Shallow Flooding project areas are completed. The delay in implementing  
22 DCMs on 3.5 square-miles of Owens Lake is not expected to result in discharge of "air  
23 contaminants or other material which may cause injury, detriment, nuisance or annoyance to any

1 considerable number of persons or to the public, or which endanger the comfort, repose, health or  
2 safety of any such persons or the public, or which cause, or have a natural tendency to cause,  
3 injury or damage to business or property.”

#### 4 **ORDER**

- 5 1. Now therefore, the Hearing Board orders that the Petitioner, the City of Los Angeles Department  
6 of Water and Power, is granted a Regular Variance, subject to the conditions set forth in  
7 Paragraphs 3, 4 and 5, below, for a one-year extension of the deadline for the completion of Moat  
8 & Row dust control measures on the bed of Owens Lake. The existing deadline of October 1, 2009  
9 is required in Paragraph 3 of District Governing Board Order Number 080128-01, which is  
10 contained in the “2008 Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State  
11 Implementation Plan.” The Petitioner is granted regulatory relief from this requirement until  
12 October 1, 2010.
- 13 2. Further, the Hearing Board finds that, subject to the conditions set forth in Paragraphs 3, 4 and 5,  
14 below, that by granting one year of regulatory relief from the existing October 1, 2009 deadline for  
15 the completion of the Moat & Row dust controls contained in Paragraph 3 of Board Order  
16 080128-01, the Petitioner does not trigger the provisions in Paragraphs 7 and 10 of said Order,  
17 which provide for supplemental control determinations to resume prior to May 1, 2010, due to the  
18 non-completion of Moat & Row dust controls.
- 19 3. In order to reduce excess emissions to the maximum extent feasible, the Hearing Board conditions  
20 the variance to require the Petitioner to:
- 21 a. Temporarily control at least 3.5 square-miles of Owens Lake within the Shallow Flood  
22 portion of the current Phase 7 dust control construction project through surface tillage to

1 increase surface roughness by October 1, 2009. A map showing the locations of the tilled  
2 areas and the tilling specifications are attached as Order Exhibit 3.

- 3 b. Construct and operate a new dust control project on at least two square-miles of Owens Lake  
4 in the areas shown in Order Exhibit 4. This new dust control project shall be known as  
5 "Phase 8" of the Owens Lake Dust Mitigation Program. The Phase 8 project shall be  
6 implemented by the Petitioner in lieu of any other areas that would be required for control by  
7 the District under the supplemental control determination provisions in Paragraphs 7 and 10  
8 of Board Order 080128-01 for the period from July 1, 2006 through April 1, 2010. Thus,  
9 other than the determination that the Phase 8 areas require the implementation of DCMs, no  
10 supplemental control determination should be issued the Air Pollution Control Officer in  
11 2010. A set of geographic coordinates defining the boundaries of the Phase 8 dust control  
12 areas shall be developed by the District and provided to the Petitioner by January 1, 2010.  
13 The size and location of the Phase 8 areas may be modified upon mutual agreement of the  
14 District Governing Board and the Los Angeles Department of Water and Power Board of  
15 Commissioners. The type of dust control measures used in the Phase 8 areas will be selected  
16 at the Petitioner's sole discretion from the list of Best Available Control Measures approved  
17 by the District as of the date construction begins on the Phase 8 project. The Petitioner shall  
18 conduct all required site investigations and environmental impact analyses and secure all  
19 required regulatory approvals and permits. The Petitioner shall start the regulatory approval  
20 and design processes for the Phase 8 project immediately upon receipt of this variance from  
21 the Hearing Board. The Petitioner shall complete construction and begin operation of the  
22 Phase 8 dust control measures six months earlier than it would have been required to do so

under the provisions of Board Order 080128-01. These modified times are set forth in the attached Order Exhibit 2.

4. The Hearing Board requires, as a condition of the variance, that the Petitioner agree to a stipulated order from the District Governing Board under the provisions of California Health and Safety Code Section 42316 ordering the Phase 8 project as set forth in Paragraph 3.b, above. This order will be issued by the District Governing Board within 90 days of the certification of the environmental impact analysis by the Petitioner but no later than October 1, 2010, whichever date is later.

5. The Hearing Board requires, as a condition of the variance, that the Petitioner meet the increments of progress schedule attached as Order Exhibit 1 and submit quarterly progress reports to the Hearing Board.

Dated the 25<sup>th</sup> day of September 2009



Brad Mettam  
Hearing Board Chairman

Attest:

  
Tori Jenkins, Board Clerk

Order Exhibit List:

- Exhibit 1 –Increments of Progress Schedule
- Exhibit 2 – Modified Times for Completion of Phase 8 Dust Controls
- Exhibit 3 – Map and Specifications for 3.5 square-mile Temporary Tilling Dust Controls
- Exhibit 4 – Map of Phase 8 Dust Control Project

**ORDER EXHIBIT 1****INCREMENTS OF PROGRESS SCHEDULE****FOR VARIANCE GB09-06****LOS ANGELES DEPARTMENT OF WATER AND POWER****MOAT & ROW DUST CONTROL MEASURE DEADLINE EXTENSION**

<b><u>By:</u></b>	<b><u>Milestone</u></b>
October 1, 2009	Petitioner shall complete 3.5 square miles of temporary tilling dust control within the Phase 7 dust control area as shown on Order Exhibit 3.
October 1, 2009	Start clock for completion of 2 square-mile Phase 8 dust control project (project times shown in Order Exhibit 2).
October 1, 2009	Petitioner shall begin preparation of required CEQA documentation for the 2 square-mile Phase 8 dust control project.
January 1, 2010	Petitioner shall commence construction of the Moat & Row dust controls.
April 1, 2010	Petitioner shall convert 3.5 square miles of temporary tilling dust controls to 3.5 square miles of Shallow Flooding dust controls.
October 1, 2010	Petitioner shall select and notify the District of the BACM to be used on the 2 square-mile Phase 8 project.
October 1, 2010	District Governing Board shall issue stipulated order under H&S Sec. 42316 requiring the 2 square-mile Phase 8 dust control project (subject to certification of Phase 8 CEQA document by Petitioner).
October 1, 2010	Petitioner shall complete 3.5 square miles of Moat & Row dust controls.
To be determined	Depending on which BACM Petitioner selects, Petitioner shall complete 2 square-mile Phase 8 dust control project (times for completion are set forth in Order Exhibit 2).

**DISTRICT EXHIBIT 2**  
**MODIFIED TIMES FOR COMPLETION OF PHASE 8 DUST CONTROLS**  
**FOR VARIANCE GB09-06**  
**LOS ANGELES DEPARTMENT OF WATER AND POWER**  
**MOAT & ROW DUST CONTROL MEASURE DEADLINE EXTENSION**

<b><u>Activity</u></b>	<b><u>Duration (years)</u></b>
New area of Shallow Flooding DCM	2.4*
New area of Managed Vegetation DCM	5.6*
New area of Gravel Cover DCM	1.7*
Other approved BACM	Determined by District**
Additions to above times:***	
Mainline capacity increase	2.1
New aqueduct turnout	1.4
New power feed	1.0
Expanded CEQA triggered	1.4

\* The durations shown for the three existing BACMs are 0.5 years shorter than the times provided in Attachment B, Exhibit 3 of District Board Order 080128-01.

\*\* If the District approves any new BACM prior to the start of the Phase 8 project, implementation durations will be included in the new BACM description. The Phase 8 durations will be 0.5 years shorter than non-Phase 8 durations.

\*\*\* Multiple additions to the BACM completion durations are not additive.

Order Exhibit 3



Phase 7 Areas Selected for Tillage

Total High Priority Area: 3.76 SM  
Total Contingency Area: 0.65 SM

Revised Aug 14, 2009

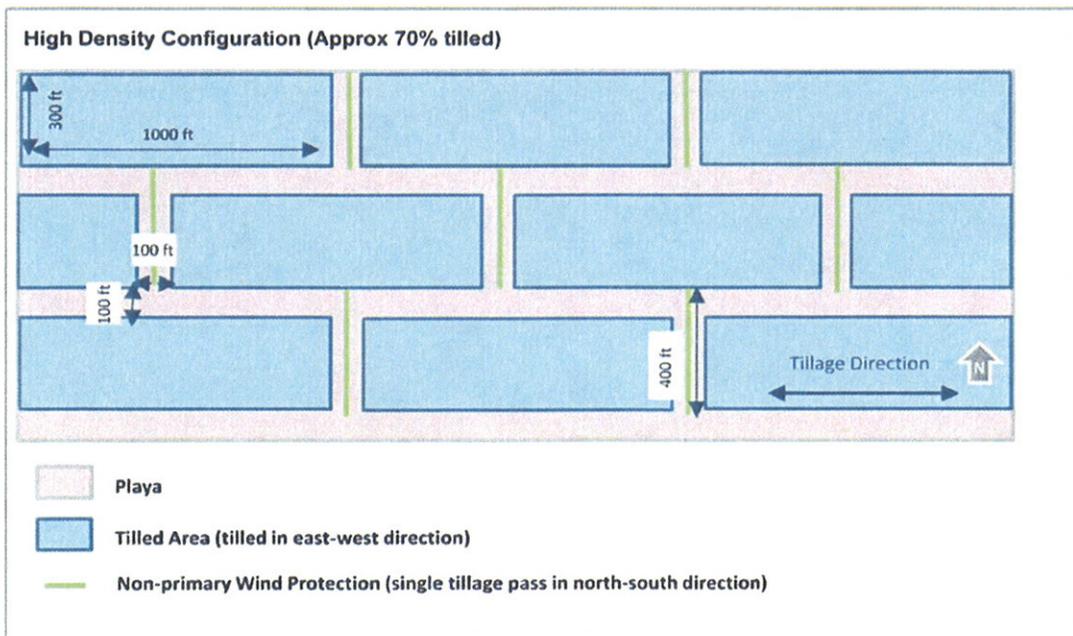
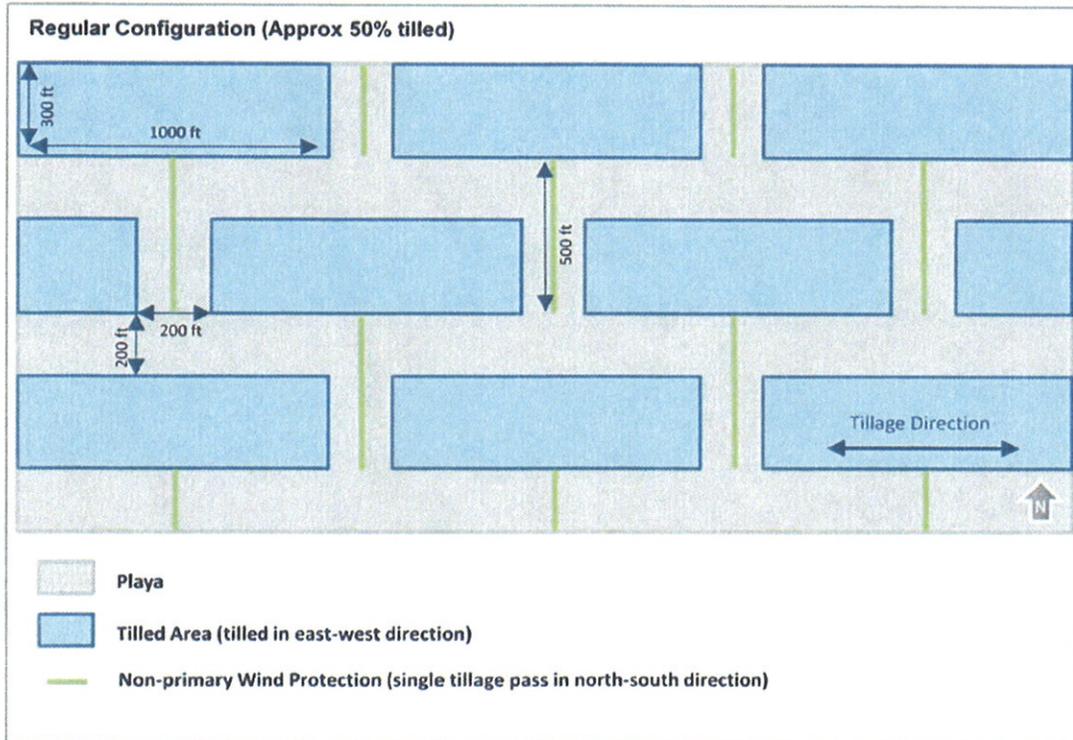
**Legend**

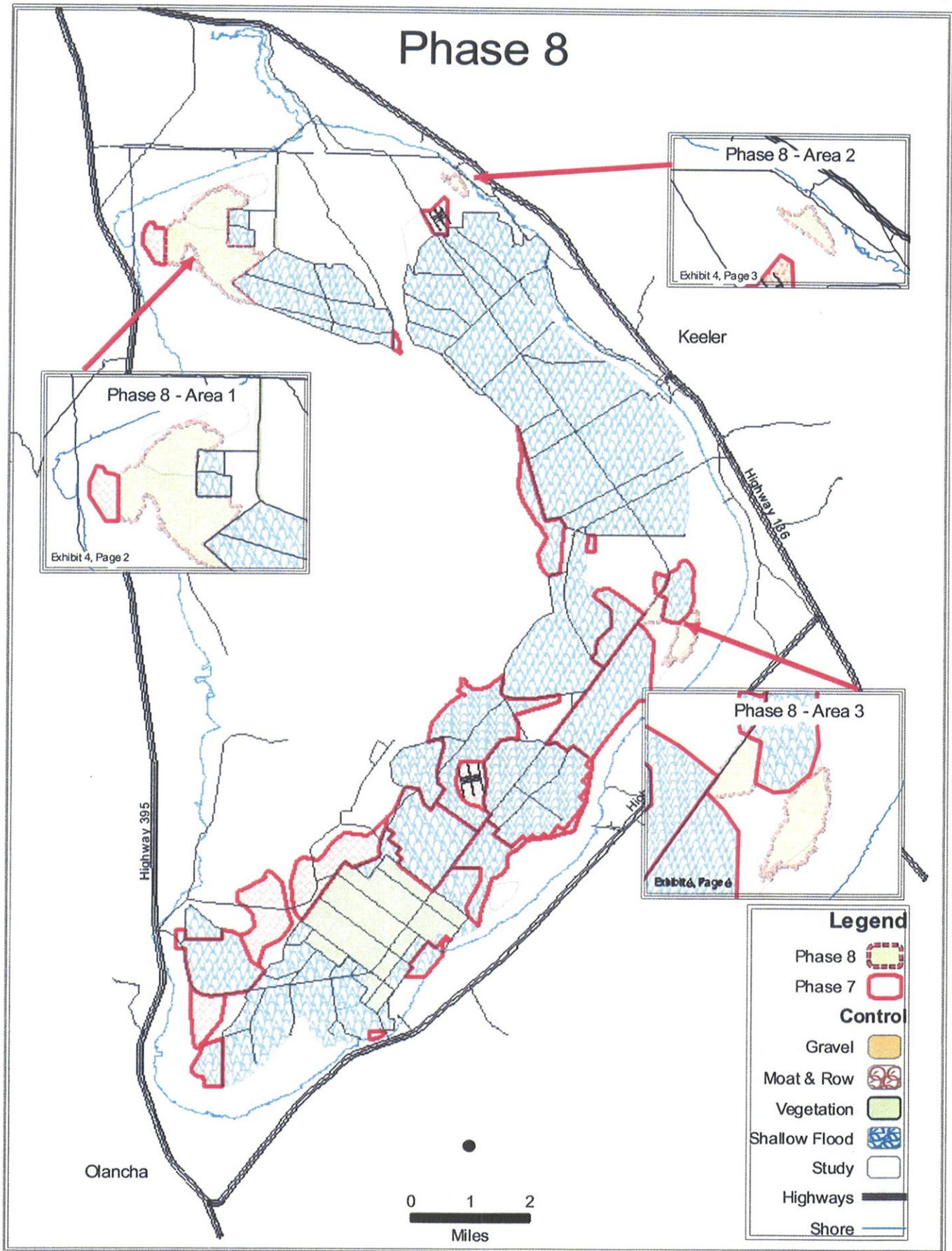
— Laterals	DCM Boundaries
— Brazy Highway	GR
Potential Tillage Areas	HSP
Tillage Priority	MR
Contingency	MV
High Density	SFL
Regular Density	SFP

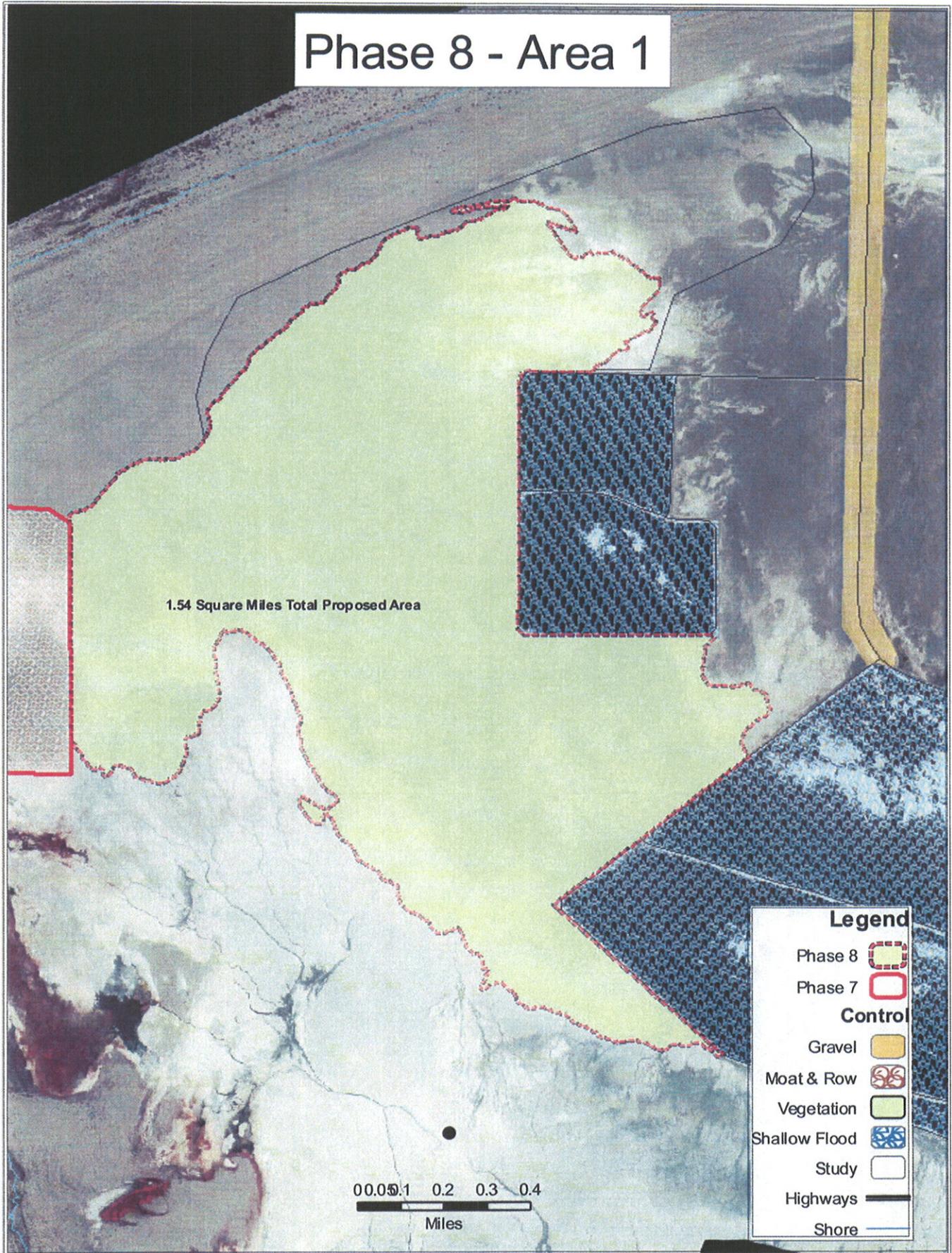


Order Exhibit 3

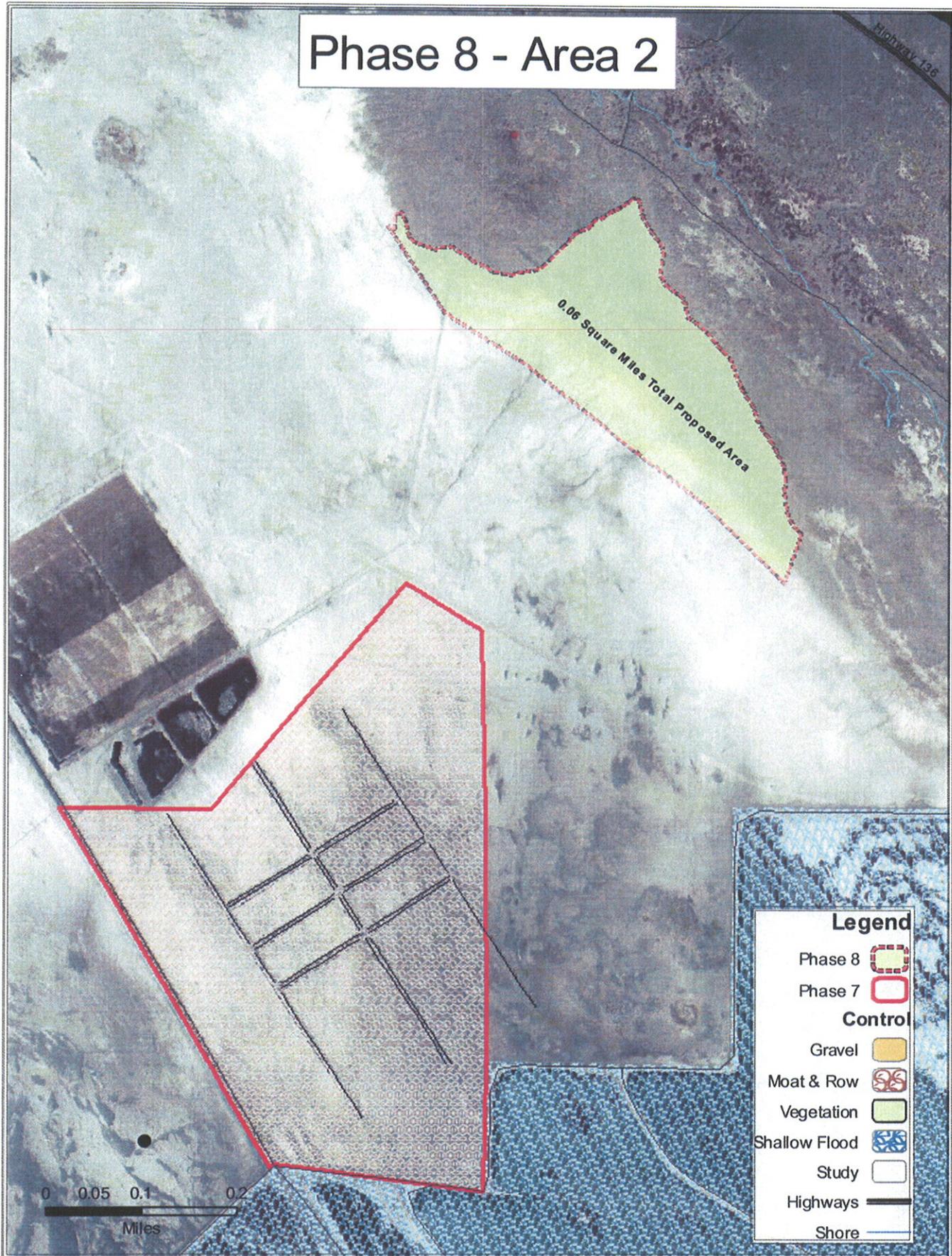
Phase 7 Tillage Configurations

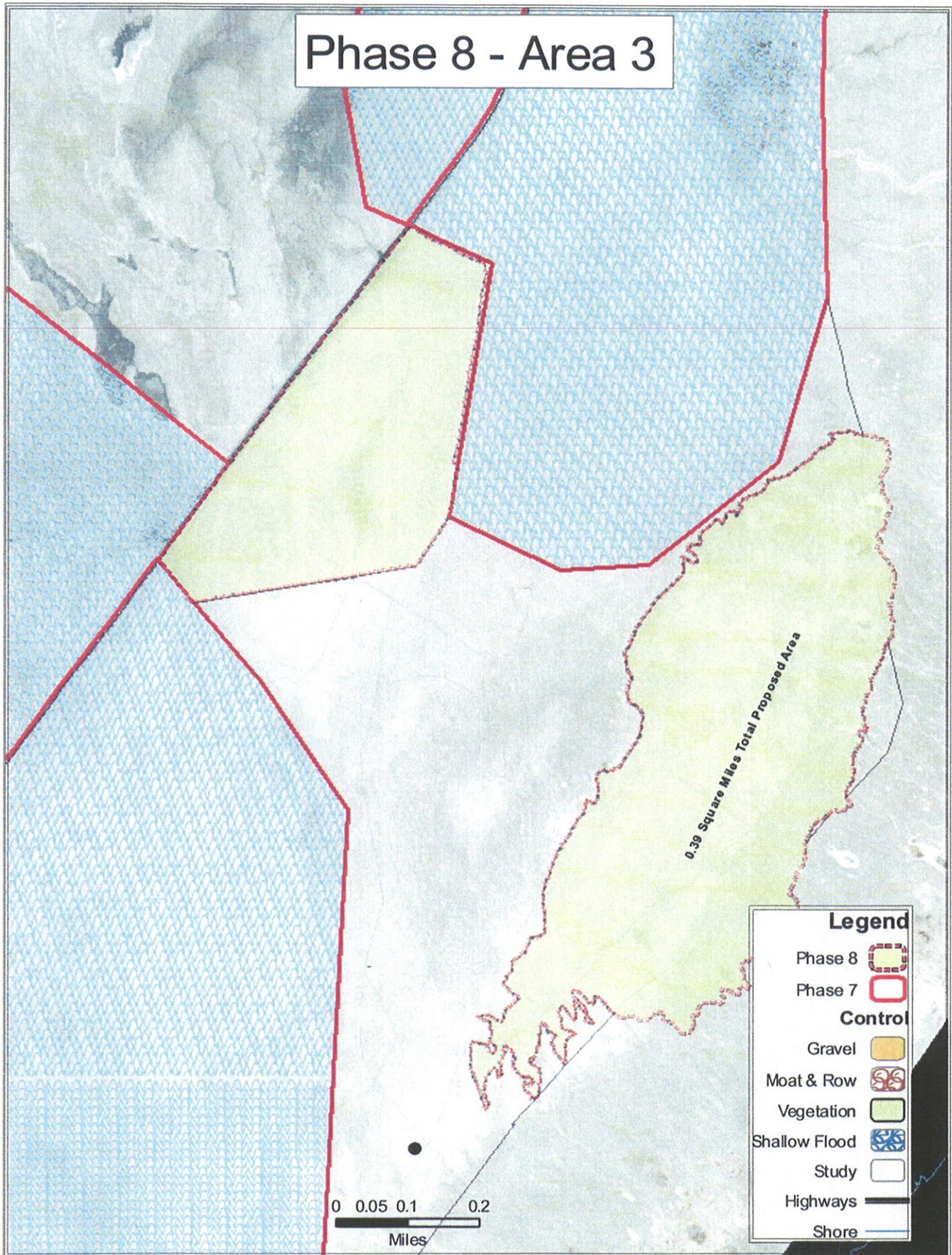






Order Exhibit 4





GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

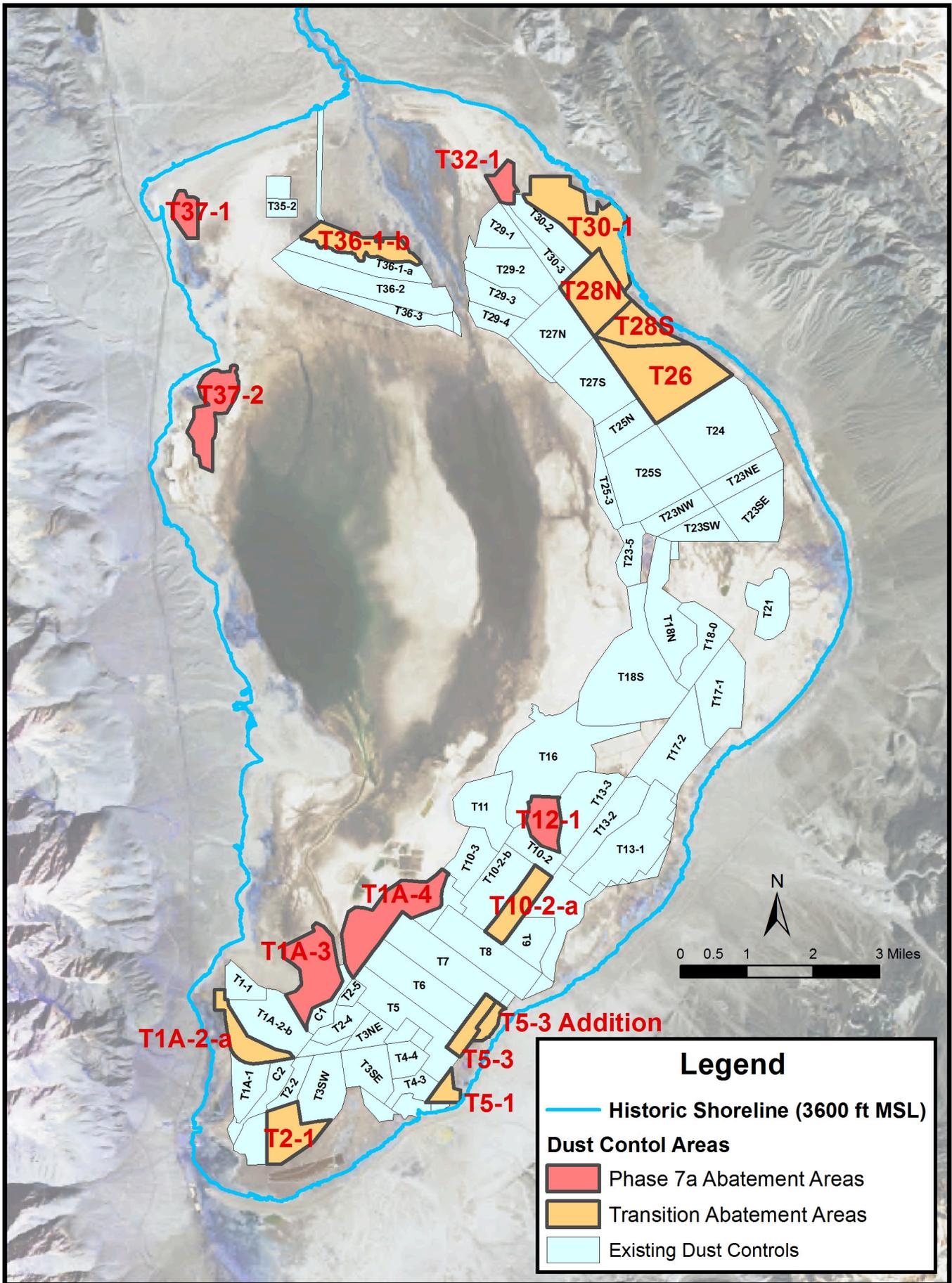
**EXHIBIT 4**

**PHASE 7A AND**

**TRANSITION AREAS –**

**MAP AND COORDINATE**

**DESCRIPTION**







GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

**EXHIBIT 5**

**PHASE 7A AND**

**TRANSITION AREAS**

**PROJECT DESCRIPTION**

## OWENS LAKE PHASE 7A AND TRANSITION AREAS DUST CONTROL MEASURES

### PROJECT DESCRIPTION

**February 2011**

The Phase 7a Project consists of a total of 3.1 square miles of new dust control measures (DCMs) and 3 square miles of transitioned dust controls for a total area of 6.1 square miles. The 3.1 square miles of new DCMs consist of 6 separate subareas. Within five of these subareas totaling 2.77 square miles, the Los Angeles Department of Water and Power (LADWP) will implement current Best Available Control Measures (BACM) including Gravel Cover, Shallow Flooding, and Managed Vegetation. The remaining sixth area with an area of 0.33 square miles is currently planned for a tillage BACM test. (**Figure 1**). The Phase 7a project components are:

- Shallow Flooding in T1A-4 and a portion of T37-2
- Managed Vegetation in T32-1 and a portion of T37-2
- Gravel Cover in T37-1 and T1A-3
- A Tillage BACM test in T12-1

Water demand related to implementation of BACM on the new Phase 7a dust control areas (DCAs) will be balanced with water conservation measures at existing DCAs, including:

- Conversion of approximately 3 square miles of existing Shallow Flooding to a hybrid of BACM including Managed Vegetation, Gravel Cover and Shallow Flooding (Transition Areas). The 3 square miles of Transition Areas will be selected from the following 6 square miles of existing Shallow Flooding areas: T1A-2\_a, T10-2\_a, T2-1, T5-1, T5-3, T5-3 Addition\_a, T5-3 Addition\_b, T26, T28N, T28S, T30-1\_a, T30-1\_b, and T36-1\_b
- Optional Additional Component - Conversion of existing Shallow Flooding areas T35-1 and T35-2 to Gravel Cover, potentially including installation of a water supply pipeline (and access roadway) to the western and northern perimeter of T37-1 to enhance vegetation growth

### **1.1 SHALLOW FLOODING**

#### **1.1.1 Shallow Flooding Description**

This dust control measure (DCM) consists of releasing water into a bermed DCA and allowing it to spread, wet the surface, and thereby suppress windborne dust. In order to meet the requirements for dust control in the 2008 SIP for Shallow Flooding, at least 75% of the surface must be wet or have saturated soil. There are two general methods of Shallow Flooding: 1) Ponding and 2) Lateral Shallow Flooding. The Shallow Flooding planned in the Phase 7a project consists of Lateral Shallow Flooding. The performance

requirements for Shallow Flood BACM are set forth in detail in the 2008 SIP. Nothing in this document is intended to supersede SIP requirements.

Lateral Shallow Flooding is proposed for subarea T1A-4 and a portion of subarea T37-2 (the portion where vegetation cannot be established). Located in the southern portion of the dry lake adjacent to the existing Managed Vegetation areas (T5 through T8), Subarea T1A-4 occupies approximately 0.97 square miles. Area T37-2 is located on the western edge of the lake, west of the brine pool and occupies approximately 0.59 square miles. It is estimated that the Shallow Flood portion of T37-2 will comprise approximately two-thirds of T37-2.

A lateral Shallow Flooding network for T1A-4 will include two 18- to 24-inch diameter buried pipelines (mainlines) that will supply water to the lateral submains (4- to 12-inch diameter buried pipelines), which will be spaced up to 1,400 feet apart. The network includes a modified whipline array (diameter to be determined by available equipment and cost), spaced up to 120 feet apart and with a length of up to 700 feet. The whipline array includes sprinkler heads spaced up to 70 feet apart or bubblers. Laterals up to 4,000 feet in length will have risers with drains at the end. Lateral valves will be placed at each intersection with the mainline. Flush lines will be incorporated for sprinkler drainage and to reduce plugging. A small pump station (capacity determined by infrastructure installed) will be located at the lowest point to drain the system. Drain water will most likely be recycled within T1A-4. A second supply alternative to TA1-4 will also be evaluated during project design that consists of a single 24-inch mainline connected to the zonal mainline near the T1A-1 turnout.

The components of the lateral Shallow Flooding network for T37-2 are similar to the Shallow Flooding design for T1A-4, with the exception of spacing. The lateral submains will be spaced up to 1,000 feet apart. The whiplines in T37-2 will be up to 500 feet long and spacing will be up to 60 feet. Approximately the western third of this area will be designed, constructed, and operated as Managed Vegetation.

**Turnout Facilities.** Water to the lateral Shallow Flooding will be distributed to the lake bed DCAs via area turnouts. Turnouts consist of above grade piping, pressure reducing valves (PRV), control valves (CV), magnetic flow meters (or flow elements, FE), isolation valves, combination air-vacuum release valves (CARV), pressure indicating transmitters (PIT), filtering system control valve filters, electric equipment, and monitoring and automatic control instrumentation. The turnouts are typically constructed on raised earthen pads adjacent to the DCAs. The turnouts include mechanical equipment and electrical equipment on concrete pads; **Figure 2** is an existing turnout located on the lakebed. It is anticipated that four turnouts will be constructed under the Phase 7a project.

The turnouts will be connected to the zonal mainline that is a continuous loop connecting to the Los Angeles Aqueduct at the north and south ends of the Owens Lake Dust Mitigation Program (OLDMP) area. T1A-4 and T32-1 will require new connections to the zonal mainline. T37-1 will be connected to an existing submain near the end of Corridor 1 Road. The Corridor 1 Road submain is connected to the zonal mainline.

Water enters a Shallow Flood area through PRVs, located at the turnouts. The turnouts distribute freshwater to the DCAs via area Shallow Flood submains. The PRVs at the turnouts function to lower the zonal mainline pressure to the submain operating pressure for the shallow pond submains. The PRVs at the laterals function to control and further lower the Shallow Flood submain pressure to the lateral operating maximum pressure.

**Figure 2**  
**Existing Turnout on Owens Dry Lake**



Source: LADWP, November 2010 (T1A-2)

The PRVs at the turnouts are hydraulically controlled valves. These valves operate by using pilot water (supplied by the freshwater from the submains) to control the valves. The freshwater from the submains contain large quantities of sediments which will clog up the PRVs. To prevent the PRVs from clogging, the pilot water is diverted through a separate pilot water filtration system. Tailwater and Drainwater pump stations collect and recirculate flow within a given DCA and submain to optimize use of water within the irrigated zone and minimize loss of water offsite.

**New Supply Pipeline.** A new supply pipeline will be required to deliver water from T36-2 to T37-2. An up to 30-inch high density polyethylene (HDPE) pipeline will be

installed underneath a new roadway to be built between these two DCAs. The approximately 1.7 mile roadway is required to enable year-round accessibility for maintenance of the up to 30-inch HEPE pipeline and the T37-2 irrigation system (**Figure 1**). The roadbed will be raised approximately 3 feet, with culverts installed to prevent stormwater from being impounded. Additionally, a vehicle bridge (approximately 16 feet wide, 1 to 2 feet high prefabricated or possibly portable bridge) may be installed between the northern and southern portions of T37-2 for maintenance access.

### **1.1.2 Shallow Flooding Construction**

Construction of Shallow Flood DCAs for Phase 7a is estimated to occur over 14 months at T1A-4 and at T37-2 with the heaviest levels of construction activity occurring during the dry season. Anticipated sequential activities are:

- Installation of new turnouts
- Land leveling
- Installation of berms
- Pipe and electrical cable excavation
- Placement of irrigation pipes and sprinklers

To the maximum extent feasible, earthwork in each area will be balanced onsite. As suitable, onsite material will be used to build berms and turnout earthen pads. In some cases, suitable material may be disked and spread to reduce moisture content before placement. Sand bedding, base course, and riprap will be imported to the DCAs. It is anticipated that this material will be obtained from a local gravel production operations such as the LADWP Shale borrow pit and the Federal White Aggregate (F.W. Aggregate) Dolomite mine.

Land leveling will be performed based on existing topography and final design to achieve required 75% surface cover of water and consideration of excavation of suitable material for berm and turnout pad construction. It is anticipated that berm heights will vary from 3 to 5 feet and the turnout earthen pads may range up to 5 to 8 feet in height to protect facilities from localized flooding. Over excavation will be done underneath proposed earthen berm alignments to remove any unsuitable material. Geotextile fabric will then be placed directly on the existing surface to create a firm base. The earthen berm will be constructed over the geotextile fabric. Earthen berm side slopes facing water will be armored with riprap. Earthen berm slopes not directly in contact with water and travel surfaces will be covered with road base.

## **1.2 MANAGED VEGETATION**

### **1.2.1 Managed Vegetation Description**

Vegetation on the playa reduces sand motion and soil erosion. Aboveground cover acts as a wind break, lowering the velocity at the playa surface. Under Phase 7a, Managed Vegetation is proposed for the 0.16-square-mile area in T32-1, which is located in the northeast portion of the dry lake, and for a portion of the western half of T37-2; the

specific acreage of Managed Vegetation will be determined based on soil conditions at the time of construction.

Currently, only saltgrass (*Distichlis spicata*) is approved as a vegetation dust control measure on Owens Lake; existing Managed Vegetation areas T5 through T8, located in the southeastern portion of the dry lake, are planted with saltgrass. A revised plant species list for Owens Lake BACM was recently developed and has been approved by the Great Basin Unified Air Pollution Control District (District), but awaits approval by the California State Lands Commission. The plant species on this list meet the locally-adapted native criterion specified by the 2008 State Implementation Plan (SIP) adopted by the District. In addition to saltgrass, 39 species have been proposed to increase the habitat diversity of the Managed Vegetation areas, reduce fertilizer need, and increase the diversity and amount of seed produced on the playa for use in future projects (**Table 1**). The final species mix in T32-1 and T37-2 will depend on the availability of planting material, and suitability of species to soil and hydrologic conditions. The T32-1 area is relatively well drained and will probably be reclaimed (i.e., decline in salinity) fairly rapidly. T37-2 is less well drained and may require additional time for reclamation. The initial cover may be achieved by fast-growing species, but after some time, the stand will probably change and diversify, partly from planted material, and partly from volunteer plants establishing from windblown seed.

An existing supply of 600 pounds of saltgrass seed is stored by S&S Seeds (in Carpinteria, California), and is available for use. Although seed of most species other than saltgrass will need to be collected, some additional seed may be available commercially. If the full complement of desired species is not available initially, the area may be over-seeded or interplanted with additional species in the future.

Seed supply for T32-1, T37-2 and the Transition Areas will be collected by hand, and by targeted mowing of existing vegetated DCAs. Seed of some herbaceous species may be multiplied by planting in managed areas and then harvesting. Once collected and cleaned, seed will be tested for germination, dried, and stored. Before planting, some seed may require special treatment to break dormancy. While seeding is preferred, some species may also be transplanted to accelerate establishment of vegetative cover. The finished landscape will consist of a variety of plants native to the Owens Valley area.

The goal for these areas will be to establish a compliant vegetative cover (per cover requirements in the SIP) as quickly as possible. Vegetative cover is assessed each fall, and compliance is determined by comparing cover levels with criteria contained in the BACM definition. The criteria contained in the 2008 SIP are currently in effect, but a modification providing for the compliance methodology on existing Managed Vegetation area to be applied to new managed Vegetation areas is pending before the District's Board, having already gained a staff recommendation for approval. These new criteria accommodate levels of soil and drainage variability that occur on the playa, while maintaining needed levels of dust control. They are likely to be the basis for evaluating new Managed Vegetation on Owens Lake. The criteria have been applied to the existing

Managed Vegetation site during the 2009 and 2010 seasons under a Managed Vegetation Operations and Management Plan with good agronomic and dust control results.

With fall seeding, a fast-growing early-cover species mix, and potentially some spring transplants, compliance in these areas may be achieved during the first growing season. In the event that this does not occur, areas with the most limited growth would be assessed for drainage limitations. Drainage would be improved by constructing surface, French, or subsurface drains, and the area might be replanted. The site would continue to be managed to comply and/or control dust as swiftly as possible.

**Table 1**  
**Species Proposed for Managed Vegetation DCAs**

Scientific Name	Common Name
<b>Alkali Marsh Species</b>	
<i>Amphiscirpus nevadensis</i>	Nevada bulrush
<i>Anemopsis californica</i>	Yerba mansa
<i>Schoenoplectus maritimus</i>	Saltmarsh bulrush
<i>Cordylanthus maritimus</i>	Bird's beak
<i>Distichlis spicata</i>	Saltgrass
<i>Eleocharis parishii</i>	Spikerush
<i>Frankenia salina</i>	Alkali heath
<i>Helianthus annuus</i>	Sunflower
<i>Heliotropium curassavicum</i>	Heliotrope
<i>Juncus arcticus var. balticus</i>	Wire rush
<i>Juncus arcticus var. mexicanus</i>	Mexican rush
<i>Nitrophila occidentalis</i>	Alkali pink
<i>Poa secunda</i>	Blue grass
<i>Schoenoplectus americanus</i>	Bulrush
<i>Sporobolus airoides</i>	Alkali sacaton
<i>Sesuvium verrucosum</i>	Verrucose seapurslane
<b>Playa Scrub Species</b>	
<i>Atriplex confertifolia</i>	Shadscale
<i>Atriplex lentiformis ssp. torreyi</i>	Torrey's saltbush
<i>Atriplex parryi</i>	Parry's saltbush
<i>Atriplex phyllostegia</i>	Leafcover saltweed
<i>Cleome sparsifolia</i>	Fewleaf bee plant
<i>Cleome lutea</i>	Yellow bee plant
<i>Cressa truxillensis</i>	Alkali weed
<i>Kochia californica</i>	Mojave red sage
<i>Poa secunda</i>	Blue grass
<i>Sarcobatus vermiculatus</i>	Greasewood
<i>Suaeda moquinii</i>	Bush seepweed
<i>Chrysothamnus nauseosus</i>	Rubber rabbitbrush
<i>Machaeranthera carnosa</i>	Shrubby alkaliaster

<b>Marsh and Riparian Species</b>	
<i>Paspalum distichum</i>	Knotgrass
<i>Populus fremontii</i>	Fremont cottonwood
<i>Salix lasiolepis</i>	Arroyo willow
<i>Schoenoplectus californicus</i>	Bulrush
<i>Typha domingensis</i>	Southern cattail
<i>Typha latifolia</i>	Broad-leaved cattail
<i>Cyperus laevigatus</i>	Smooth flatsedge
<i>Juncus torreyi</i>	Torrey's rush
<i>Triglochin concinna</i>	Slender arrowgrass
<i>Muhlenbergia asperifolia</i>	Scratchgrass
<i>Phragmites australis</i>	Common reed

### 1.2.2 Managed Vegetation Construction

During installation and establishment, several steps will be required to create an environment where plants can thrive on the otherwise dry and hypersaline playa:

- Irrigation systems will be installed and may include sprinklers, bubblers or drip irrigation. For areas with sprinklers or bubblers, irrigation piping will be buried to avoid damage from traffic, animals, temperature fluctuations, and UV radiation. Sprinkler heads or bubblers in these areas will rise from the buried laterals to allow water to be dispersed across the planted area during irrigation. Some irrigation systems (i.e., drip irrigation) require filtration of water; filters would be located at the turnout, and at times in the field. Liquid fertilizer will periodically be blended into irrigation water at relatively low rates that have been shown to accelerate growth and increase salinity tolerance (and therefore plant growth and survival) of several native species that have been studied on Owens Lake. Fertilizer tanks with associated injection pumps and containment will be needed in close proximity to Managed Vegetation areas.
- Broad, raised ridges will be formed to provide a reclaimed drained area within which plants can grow. Without this feature, saline shallow groundwater can easily invade the root zone, especially during and after storms, and kill plants. The ridges will be laid out such that they traverse topographic contours, allowing surface water to drain downhill along the low areas. Closed depressions that would otherwise prevent surface drainage will be opened by grading. Starter fertilizer needed to promote early growth and expansion will be applied and incorporated into the soil. The amounts of fertilizer applied to native plant stands are typically very low relative to what is used for agricultural production, but the ability of plants to tolerate drought and salinity, and to rapidly expand to protect the soil, is greatly enhanced.
- Initial reclamation (reduction of salt concentration in the surface soil by irrigation) will be completed before planting. This will likely require several irrigation events that may occur over up to 30 or 40 days. Once monitored soil

salinity levels have declined to acceptable levels, the land will be allowed to dry sufficiently until it can again bear equipment traffic.

- Seeding will be done with a billion seeder (wheeled seed bin that tows behind a tractor) and an air disc/drill. Seed is dispensed from the bottom of the box and buried by pulverizing discs that also break up surface soil, providing good seed-soil contact needed for germination and emergence.

### 1.3 GRAVEL COVER

#### 1.3.1 Gravel Cover Description

Under the Phase 7a project, LADWP will install a 4-inch layer of coarse gravel to T37-1 and T1A-3, and potentially T35-1 and T35-2, to reduce PM<sub>10</sub> emissions by: (a) preventing the formation of efflorescent evaporite salt crusts at the surface, because the large pore spaces between the gravel particles disrupt the capillary movement of saline water to the surface where it can evaporate and deposit salts; and (b) creating a surface that has a high threshold wind velocity so that direct movement of the large gravel particles is prevented and the finer particles of the underlying lake bed soils are protected.

The term “gravel” includes clasts from both fluvial and alluvial sources and crushed stone. The gravel will be screened to greater than ½-inch in diameter, pursuant to the specifications issued by the District (District, 2008). Gravel application will include approximately 122,000 tons distributed over 0.21 square miles of T37-1, 447,000 tons distributed over 0.79 square miles of T1A-3, 67,000 tons distributed over 0.11 square miles of T35-1, and 92,000 tons over 0.15 square miles of T35-2. A total of 728,000 tons of gravel is proposed to be spread over the four areas.

**Gravel Sources.** It is anticipated that gravel will be obtained from local gravel production operations such as the F.W. Aggregate Dolomite mine or the LADWP State Route 136 Shale borrow pit (LADWP Shale borrow pit). The LADWP Shale borrow pit is located just west of the Keeler Fan gravel site – a site previously considered as a gravel source and referenced in the Memorandum of Agreement between LADWP and the District (1998 MOA). The LADWP Shale borrow pit is located east of SR 136, approximately 1.5 miles southeast of Keeler, and less than 2 miles from the lakebed. The LADWP Shale borrow pit is located on public lands managed by the U.S. Bureau of Land Management (BLM) and operated per the requirements of the Surface Mining and Reclamation Act (SMARA). Shale is a fine-grained sedimentary rock consisting of compacted and hardened clay, silt or mud. The LADWP Shale borrow pit is currently permitted for 40 acres of development.

The F.W. Aggregate Dolomite mine is a privately owned commercial aggregate facility located in Dolomite, California, approximately 0.75 miles southeast of Swansea. The access point for the mine is directly off SR 136, between Swansea and Keeler. The Dolomite mine is situated on both privately owned lands and public lands managed by the BLM. Three subareas of the mine (Durability, North Pole, and Translucent) total

approximately 480 acres and are able to produce up to 50 million tons; the site is permitted up to the year 2057 (T. Lopez, pers. comm., June 25, 2010). Rock at the F.W. Aggregate site is obtained from a dolomitic limestone source (mountain face), which is blasted and crushed to supply primarily white decorative rock. The existing 0.14 square miles of Gravel Cover DCM area (Corridor 1 which separates Phase 8 Areas A and B) was covered with limestone from the Dolomite mine. This source has also supplied other areas on the lakebed where gravel and rip-rap were necessary for road construction and for armoring of berms.

**Gravel Coloration.** Per the terms of the 1998 MOA, gravel used for dust control on Owens Dry Lake shall be comparable in coloration to the lake bed soils.

**Gravel Effectiveness.** The effectiveness of Gravel Cover is summarized from the 2008 SIP (District, 2008). According to the District, gravel blankets (also known as Gravel Cover) are effective at controlling dust emissions on essentially any type of soil surface. A gravel layer forms a non-erodible surface when the size of the gravel is large enough that the wind cannot move the surface. If the gravel surface does not move, it protects finer particles from being emitted from the surface. Gravel and rock coverings have been used successfully to prevent wind erosion from mine tailings in Arizona (Chow and Ono, 1992).

The District estimated the potential PM<sub>10</sub> emissions from a gravel layer using the U.S. Environmental Protection Agency (USEPA) emission calculation method for industrial wind erosion for wind speeds above the threshold for the surface (District, 2008). PM<sub>10</sub> will not be emitted if the wind speed is below the threshold speed. With a minimum particle size of ½ inch, a gravel layer will have a threshold wind speed of more than 90 miles per hour measured at 10 meters (USEPA, 1992; Ono and Keisler, 1996). The District predicted that PM<sub>10</sub> emissions would be virtually zero for a gravel layer since the threshold wind speed to entrain gravel, and thus PM<sub>10</sub>, is above the highest wind speeds expected for the area. A 100 percent reduction of PM<sub>10</sub> from areas that are covered by gravel was predicted.

The proposed 4-inch thick gravel layer is intended to prevent capillary movement of salts to the surface. Were fine sands and silts to fill in void spaces in the gravel, capillary rise of salts might ensue and reduce the dust control effectiveness of a gravel layer. In addition, finer particles would lower the average particle size and lower the threshold wind speed for the surface. The District performed small-scale gravel test plots at two sites on Owens Lake starting in June 1986. These tests showed that 4-inch thick gravel blankets composed of ½- to 1½-inch and larger rocks prevented capillary rise of salts to the surface. Observations of un-graveled test plots in the same area, one with no surface covering and another with local unscreened alluvial soil, showed that salts would otherwise rise to the surface (Cox, 1996).

**Permeable Geotextile Fabric.** Gravel Cover will be placed over a nonwoven geotextile fabric (anticipated to be approximately 2.3 millimeter (90 mils) thick) to prevent gravel from settling into lakebed sediments and thereby losing effectiveness in controlling dust

emissions. The permanent geotextile will be permeable to allow draining. Geotextile membranes are artificial fabrics that have a variety of uses including: filtration/drainage, ground stabilization, structural waterproofing, land containment, as well as weed and root control. The geotextile is chemically inert and generally not affected by acids and alkalis that may be present in the soils.

**Access Roadways for Gravel Areas.** The boundaries surrounding T37-1 and T1A-3 will have raised roadbeds for vehicle access and for wind protection to limit sand inundation of the gravel. The roadbeds will be earthen, approximately 3 feet high, 16 feet wide and armored with gravel. Vehicle bypass pads (turnoff or turnaround pads) (approximately 20 ft by 40 ft in area) will facilitate vehicle travel in two directions. Geotextile fabric may be placed directly on the existing surface to create a firm base. The earthen raised roadway will be constructed over the geotextile fabric. Earthen side slopes facing water or adjacent to potential runoff flows will be armored with rip rap. Earthen slopes not directly in contact with water and travel surfaces will be covered with road base. Installation of access roadways on the boundaries of T37-1 and T1A-3 will include earthwork inside of the boundary of the DCAs; suitable earth material will be scraped, used to construct the raised roadway, and then the area will be smoothed to an even slope. Base course (crushed rock less than ¾ inch) from a local gravel source would then be placed on the travel surface. To the extent feasible, Gravel Cover for the access roadways shall be consistent with the type, size, and color of the Gravel Cover placed on the adjoining lakebed areas.

### 1.3.2 Gravel Cover Construction

Gravel installation at T1A-3 and T37-1 for Phase 7a is estimated to occur over an approximately 12 month period. Construction activities are:

- Development of gravel stockpile area
- Installation of access roadways
- Gravel conveyance
- Geotextile and Gravel installation

**Gravel Stockpile.** Gravel stockpile areas will be developed within the boundaries of both T1A-3 and T37-1. These areas will be covered with aggregate to prepare the sites for gravel deliveries during the initial months of construction. Dump trucks will deposit gravel and a dozer will be used to pile the aggregate. Assuming 25 tons per truck, approximately 3,000 tons per day will be transported to each staging area location. Gravel transport will continue throughout the construction period concurrent with geotextile fabric and gravel installation. From the stockpile location, low ground pressure (LGP) vehicles will be used for travel directly on the playa.

**Gravel Conveyance.** If gravel is obtained from the LADWP Shale borrow pit, trucks will cross SR 136 to Sulfate Road to Main Line Road and then to the stockpile locations (at T37-1 or T1A-3). Although a conveyor is not currently installed at the borrow pit, if one was constructed in the future it could be used to convey gravel across SR 136 to the

LADWP Sulfate Facility and then trucks would be used to transport gravel to the stockpile locations.

If gravel is obtained from F.W. Aggregate Dolomite mine, trucks will cross SR 136 to the T30 road to Main Line Road and then to the stockpile locations (at T37-1 or T1A-3).

**Geotextile Installation.** Before installation of the geotextile membrane, minor land leveling may be required in areas where obstructions will damage the fabric. A pipe dragged behind a tractor will remove localized high and low spots and prepare the surface; there will be no import or export of soils related to this minor site preparation. It is assumed that the fabric will be delivered to the site on spools carried by flatbed trucks. Small areas of fabric will be rolled out and staked to secure them before gravel installation.

The two vehicle and equipment staging areas previously used (for Phases 7 and 8) will be used for Phase 7a. These previously disturbed sites are located near the intersection of Main Line Road and Corridor 1 at the north end of the lake (20 acre site) and at the southern end of the lake adjacent to Dirty Socks Access Road (3.75 acre site). In addition to office trailers and equipment and vehicle storage, these areas will have fueling stations for gas and diesel. Fuel trucks will be used to refuel construction equipment (including the low ground pressure gravel trucks) and the long haul gravel trucks; no vehicle fuels or oils will be stored in the gravel stockpile areas. Additionally, refueling may occur at the existing LADWP Sulfate facility. Once the geotextile is staked, dozers and ground crews will spread gravel to the required 4-inch thickness. Depending on site conditions, conveyors may be used internally within the DCM boundaries to move gravel from the stockpile locations to other areas of the DCM site.

The onsite construction workforce will consist of laborers, supervisory personnel, support personnel, and construction management personnel. The onsite workforce is expected to reach a maximum of approximately 140 workers during the gravel and geotextile installation.

## 1.4 TILLAGE

Tillage is commonly used to control wind erosion in agricultural and arid regions around the world. It works by clodding and roughening the soil surface, rendering it more resistant to wind erosion. Surface roughness reduces the wind velocity at the surface, so that windblown soil particles like sand are trapped. The creation of soil clods through appropriate tillage methods forms a stable surface resistant to wind erosion by binding of the available fine-grained loose soil particles.

Tillage was previously applied on the playa of Owens Lake for temporary dust control in some Shallow Flooding construction areas (T21-A, T21-B, T18-O, T17-1\_a, T17-2\_a, T16, T10-2\_b, and T10-3) between October 1, 2009 and April 1, 2010. This tillage may have reduced the frequency and intensity of observed emissions within these areas, even when wind erosion occurred within untilled areas immediately adjacent.

Under Phase 7a, a tillage management plan would be implemented as part of a new BACM test on 0.32 square miles of T12-1, an area with relatively heavy (rich in clay and silt) soils. The BACM test plan (in draft) states that the area will be initially tilled and then once it begins to deteriorate such that it does not meet required control dust efficiency it will be sprinkler irrigated to increase soil moisture. Irrigation will be followed by re-tilling to re-establish needed dust control efficiencies. Irrigation piping (submains and whiplines, flush lines connected to flush mains) would be buried more than 2 feet below the soil (such that they are below the reach of the tillage equipment) with sprinkler risers positioned throughout the DCA; the layout will be similar to the Shallow Flooding areas.

Tractors pulling plows or harrows will roughen the surface of T12-1 creating swaths of tilled ridges with spacing between swaths allowing for irrigation installation and maintenance, as well as monitoring access. The goal of the BACM testing will be to establish dust control efficiency relationships over a wide range of climatic conditions upon which to base performance specifications in a new BACM description. Over time, the surface roughness achieved by Tillage will begin to be altered by weathering and dust control efficiency may decline. The amount of fine material (sand and smaller particles) on the surface may change due to 1) disaggregation of soil, 2) crusting and re-aggregation of fine material, 3) deposition of transported fine material, and 4) erosion and export of material. When monitoring indicates that these processes have reduced the dust control efficiency achieved by Tillage to levels that threaten to violate air quality standards, the area will normally be re-tilled. The goal of re-tilling will be to restore erosion-resistant levels of roughness and aggregation. When Tillage control efficiency declines, the area will be irrigated to restore optimum soil moisture, and then re-tilled. Monitoring will include visual observations of surface conditions and other actions as outlined in the draft Tillage BACM Test Monitoring Plan (Air Sciences, 2010).

A complete tillage BACM test project plan must be submitted and approved by the District before any work in the T12-1 area can proceed. Tillage may be implemented in T12-1 before installation of the irrigation network. This tillage was considered in the Addendum to the Supplemental EIR for the Owens Lake Dust Control Measures (LADWP, 2010) for the Phase 7 project.

To minimize dust emissions during construction, areas will be tilled during low wind periods. To the extent feasible, installation will occur in the summer season when winds are relatively lower and when the playa tends to be less erodible. Tilling will be conducted in daylight hours without use of artificial lighting.

## **1.5 TRANSITION AREAS FROM SHALLOW FLOODING TO BACM HYBRID**

New Shallow Flooding in subareas T1A-4 and T37-2, and new Managed Vegetation in T32-1 and T37-2, are estimated to require approximately 3,700 acre-feet per year (afy) of water. To provide water to these areas, approximately 6 square miles of 13 existing DCAs (T1A-2\_a, T10-2\_a, T2-1, T5-1, T5-3, T5-3 Addition\_a, T5-3 Addition\_b, T26, T28N, T28S, T30-1\_a, T30-1\_b, and T36-1\_b) will be evaluated for transition from Shallow Flood to a hybrid mix of approved BACMs. Approximately 3 square miles will

be converted under the Phase 7a project. Note that some areas identified for conversion are already partially vegetated. For example, T30-1 (\_a and \_b) is currently designated as Shallow Flooding by the LADWP and evaluated as Shallow Flooding by the District, despite significant vegetative cover. As of the end of 2010, vegetative cover in this area is being evaluated relative to proposed Managed Vegetation criteria. Areas that pass will be proposed to the District for evaluation as Managed Vegetation for compliance purposes. Area T36-1\_b is also currently partially vegetated.

While 3 square miles of existing Shallow Flooding DCAs are proposed for transition to BACM Hybrid, approximately 6 square miles will be evaluated. Consideration of this larger area is proposed since soil and drainage data are limited; it is anticipated that some areas may prove too difficult to vegetate. Owens Lake soils present significant challenges (mainly a combination of very high salinity, extremely poor drainage, and low bearing capacity) for the establishment of compliant stands of vegetation. Ultimately, 3 square miles will be chosen from the 6 square miles studied for transition as part of the Phase 7a project.

The proposed Transition Areas will be developed as BACM Hybrid. Each portion of these areas would be evaluated as an existing (per the SIP definition) dust control measure for compliance purposes. Under the Hybrid concept, approximately two-thirds of the area will be a mix of Shallow Flooding and Managed Vegetation and up to one third will be Gravel Cover (**Figures 3 and 4**). With a gravel layer 4 inches thick, approximately 500,000 tons of gravel will be applied. Irrigation systems similar to those previously described will be installed in non-gravel areas.

Construction, reclamation, planting, establishment, and compliance in the Transition Areas will proceed as previously described for the new Managed Vegetation areas. However, due to potentially more challenging soil and drainage conditions in the Transition Areas, multi-year efforts for establishment may be necessary. Minor reconfiguration of the eastern berms for areas T30-1\_b, T28N, T28S, T26, T5-1, and T5-3 may be required. Additional berm modifications may be necessary for access.

A reasonable Transition Areas Dust Control Plan will be developed and implemented during construction for all construction areas, including the Transition Areas. The plan will particularly address measures to be taken when removing existing DCAs from service. The following best management practices (BMPs) will be implemented:

- Use of water trucks to spray roadway travel surfaces on existing and temporary roads used for construction
- Installation of temporary sand fences strategically placed within the DCA being constructed
- Placement of a gravel surface on interim staging areas within the DCA used by the contractor
- Termination of work activities during high wind events

**Figure 3**  
**Rendering 1 of BACM Hybrid Area**



**Figure 4**  
**Rendering 2 of BACM Hybrid Area**



## 1.6 OTHER FEATURES FOR PHASE 7A DCAs

### 1.6.1 Drainage System

For new non-gravel DCAs included in Phase 7a (T32-1, T12-1, T37-2, T1A-4), drainage systems will be installed beneath Managed Vegetation fields and on the margins of Shallow Flooding areas. New drainage laterals to be installed in Phase 7a will be perforated plastic pipes in covered trenches placed 5 to 9 feet below the ground surface. The drainage system will control soil saturation to:

- maintain drained root zone under irrigated vegetation
- maintain drained pipe zone (prevent pipe floatation)
- capture water along the DCA perimeters to reduce seepage off-site

Drainage return flows can be recirculated into Shallow Flooding areas. The existing drainwater system functions in this manner. A drainwater mainline (brineline) runs parallel to the water supply mainline throughout the dust mitigation area from T2 to T25. The drainwater mainline also delivers water to the Shallow Flooding areas.

### 1.6.2 Power Supply and Controls

Power for pumps for water conveyance to and from DCAs is supplied by an existing underground 3-phase, 4.8 KV grid. The 4.8 KV grid will be connected to the new turnouts with directed buried cables. The turnouts have their own distribution system for power and controls. Transformers at the turnouts convert the power to lower voltages to supply various equipment, lighting, and control instrumentation. The 3-phase 480 volts alternating current (VAC) is typically used for pump stations. Directed buried cables will be used to supply power from the turnouts to the pump stations. T1A-4, T32-1 and T37-2 will have small pump stations. For Phase 7a, a new high voltage cable will be installed to power pumps associated with T37-2.

## 1.7 OVERALL 7A CONSTRUCTION SEQUENCE

After design of the proposed facilities is complete, it is anticipated that the construction sequence would proceed as follows:

- Tillage
- Turnout construction
- Earthwork, berm re-enforcement and water distribution systems for Shallow Flooding Areas
- Sprinkler system installation in Transition Areas
- Gravel installation
- Earthwork, berm re-enforcement and sprinkler system installation for BACM Hybrid Areas
- Planting and seeding in Managed Vegetation Areas

## **1.8 WATER REQUIREMENTS**

The total water demand for new DCAs (T1A-4, T32-1 and T37-2) for Phase 7a is estimated at approximately 3,700 afy. To enable these additional water commitments, existing areas of Shallow Flooding will be transitioned to BACM Hybrid, and potentially Gravel Cover (T35-1 and T35-2). The approximately 3 square miles of Transition Areas selected for the Phase 7a project will be designed to provide approximately 3,700 afy to ensure adequate water supply for the new Phase 7a areas.

## **1.9 OPERATIONS AND MAINTENANCE**

### **1.9.1 Gravel Cover**

Once the Gravel Cover has been applied to the playa, limited maintenance will be required to preserve the gravel blanket. The gravel will be visually monitored for sand and dust accumulation, evidence of washouts, or inundation. If any of these conditions are observed over a substantial area, additional gravel will be transported to the playa. It is assumed that no maintenance will be needed in the initial years of operation. Subsequently, small areas may require replenishment and later, larger areas may require replacement. It is anticipated that the total volume of gravel on the Phase 7a areas may be replaced at most once every 50 years.

### **1.9.2 Shallow Flooding**

To attain the required PM<sub>10</sub> control efficiency, generally at least 75 percent of each square mile of the control area must be wetted to produce standing water or surface-saturated soil, between October 1 and June 30 of each year. Actual Shallow Flooding BACM requirements are set forth in the 2008 SIP. Surface saturation will continue to be monitored via satellite images (as is currently the practice). Maintenance activities will occur as needed throughout the year. However, when feasible, extended facility maintenance (repair of pumps, berms, laterals, and submains) will be completed during the period when dust storms generally do not occur (mid/late summer to early fall). Inflows, outflows and water quality in Shallow Flooding areas will also be monitored. Drains and valves will be inspected periodically and maintained as necessary.

### **1.9.3 Berms and Roadways**

Berms and roadways will be continually maintained to prevent erosion and washout, and to maintain safe driving conditions. Maintenance activity will include minor earthwork and gravel replenishment.

### **1.9.4 Managed Vegetation**

Vegetation will be monitored in the field to determine reclamation progress (declines in soil salinity), soil moisture, irrigation system function (including leak identification and

repair), germination success, transplant mortality, and plant vigor. Once established, soil fertility and plant tissue will be monitored at least annually, and vegetative cover will be assessed with satellite imagery. At present, imagery is ground-truthed with specialized, near-surface digital images of vegetative cover. Operations activities will include maintenance of irrigation systems and replanting/reseeded as necessary.

### 1.9.5 Tillage

Tillage in DCA T12-1 is proposed as BACM Testing. Periodic wetting, re-tilling, and/or alterations in the configuration of the tilling will occur throughout the testing period. Operations activities will include maintenance of irrigation systems as necessary, as well as monitoring of surface conditions, meteorological parameters, and biological resources as part of the BACM test.

## 2.1 PHASE 7A SCHEDULE MILESTONES

Milestone	Anticipated Completion Date
Award engineering & design contract	April 2011
Design Completion	October/November 2011
LADWP Board approval of CEQA document	December 2011
California Department of Fish and Game issues Streambed Alteration Agreement	No later than March 2012
Lahontan Regional Water Quality Control Board issues Section 401 permit	No later than March 2012
US Army Corps of Engineers issues Section 404 permit	No later than April 2012
California State Lands Commission issues lease	No later than April 2012
Award construction contract	May 2012
Notice to Proceed for Construction	June 2012
Construction Completion	December 2013

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

**EXHIBIT 6**  
**MARCH 2010**  
**MANAGED**  
**VEGETATION BACM**  
**PROPOSAL**

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*Report*

# **Managed Vegetation BACM Proposal**

Prepared for  
**Los Angeles Department of Water and Power**

March 2010

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## ACRONYMS AND ABBREVIATIONS

Adj	adjusted
AFB	Absolute Fractional Bias
APCO	Air Pollution Control Officer
BACM	best available control measure
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
DCM	Dust control measure
DPF	digital point frame
GBUAPCD	Great Basin Unified Air Pollution Control District
LADWP	Los Angeles Department of Water and Power
MVPU	Managed Vegetation Performance Update
NAAQS	National Ambient Air Quality Standards
Plan	Managed Vegetation Operations and Management Plan
Playa	Owens Lake playa
PM <sub>10</sub>	particulate matter less than 10 microns in aerodynamic diameter
Proposal	Managed Vegetation BACM Proposal
SIP	State Implementation Plan
USEPA	U.S. Environmental Protection Agency

## PREFACE

Great Basin Air Pollution Control District (GBUAPCD) prepared the *2008 Owens Valley PM10 Planning Area Demonstration of Attainment, State Implementation Plan* (GBUAPCD, 2008a), referred to in this document as “the SIP”. Among other things, the SIP provided for the development of new best available control measures (BACM), which are applied to stabilize the surface of the Owens Lake playa (Playa), referencing GBUAPCD’s method for identifying dust sources on the Playa, the Dust ID Protocol. The SIP states the following on Pages 8 and 9 of Chapter 8, Appendix D, in the section “Research on Potential New BACM – Including Moat & Row”:

*The application must meet all USEPA requirements for BACM designation and demonstrate to the APCO’s satisfaction that the new control measure is sufficient to achieve the required PM10 emission reductions or control efficiency during the dust season and attain the NAAQS everywhere on the shoreline. The APCO has full and sole discretion to determine whether these conditions have been met.*

*The application shall include, but not be limited to:*

- 1) a description of the new dust control measure*
- 2) a description of the test site and the meteorological conditions under which it was tested*
- 3) the measured PM10 emissions during the test*
- 4) the test time frame*
- 5) all raw data collected during the test*
- 6) all data screening criteria and final data sets*
- 7) data supporting the conclusion that the required control efficiency was achieved*
- 8) a performance standard that the new dust control measure must meet in order to achieve the required emission reductions or control efficiency*
- 9) an analysis of any environmental impacts of the dust control measure*
- 10) the appropriate responsible agency approvals, permits and leases*

*The application must include modeling that demonstrates that the required PM10 emission reductions or control efficiency can be achieved during the dust season anywhere this control measure may be implemented on Owens Lake, and the NAAQS can be met at all times everywhere along the historic shoreline.*

*If the APCO determines that the application is complete and the above conditions have been met, he/she will have full discretion to select or approve a method of determining compliance of the proposed new BACM with its performance standard and include that method in the description of the proposed BACM for the SIP Revision. The District Governing Board has full and sole discretion to determine whether to adopt a SIP Revision for approval of any new BACM.*

*Upon adoption by the District Board, approval by CARB, and submission to USEPA of a SIP Revision that identifies a new BACM for Owens Lake, the City may implement only this one new control measure on one-half square mile of the next area to be identified as needing control under the 2003 SIP Revision Supplemental Control Requirements until EPA approves this new measure as BACM. No other new control measures may be implemented on areas identified as needing control under the 2003 SIP Revision Supplemental Control Requirements until EPA approves this new measure as BACM. The District Governing Board may limit the new BACM to specific circumstances, for example, distance of the new dust control measure from the shoreline or approval in a specific general soil type. Upon approval by USEPA, the new BACM may be implemented per the requirements described in the following section, “Transitioning From One BACM to Another BACM After 2010,” or on any subsequent areas requiring control under the “2008 Owens Valley Planning Area Supplemental Control Requirements Procedure” (Board Order 080128-01, Attachment B), subject to any limitation to specific circumstances.*

This *Managed Vegetation BACM Proposal* (Proposal) is submitted by the City of Los Angeles Department of Water & Power (LADWP) to satisfy the requirements of this section of the SIP. In the sections that follow and attachments, the relationship between measurable conditions and control efficiency is

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presented, and performance standards are proposed. In the future, the Proposal may be updated and re-submitted based on new knowledge or changed conditions.

*The Managed Vegetation Operation and Management Plan* and attachments (Plan; NewFields et al., 2008) was submitted by LADWP in June 2008 and approved by GBUAPCD in a letter dated July 7, 2008. In the process of developing this Plan, LADWP and GBUAPCD invested substantial effort in developing, deliberating, and finalizing a sound scientific basis and set of performance specifications for dust control with vegetative cover. In discussions with the APCO, we have determined that to the maximum practicable extent, applicable technical content from this document will be referenced to satisfy requirements of this Proposal. The main body of this Proposal accordingly contains references to supporting documents (mostly provided previously with the Plan) as needed. These documents are appended. Since the entirety of the Plan has been reviewed by and is familiar to LADWP and GBUAPCD, it is hoped that this approach will minimize duplication of previous effort and allow the parties to focus on questions that are unique to this Proposal.

In addition to these and other cited documents, several sets of environmental documentation and management plans that touch on managed vegetation have been developed for Owens Lake (GBUAPCD 1998, 2003, and 2008b; LADWP 2001 and 2009). These documents are relevant context and useful references when considering both existing managed vegetation and future sites.

## BACKGROUND AND PURPOSE

Performance criteria for Managed Vegetation are explained in the SIP as follows (GBUAPCD, 2008a, pp. 5-11):

*Tests by the District and others have shown that vegetation covers ranging from 11 to 54 percent provide the surface protection necessary for the 99 percent PM<sub>10</sub> control needed at Owens Lake in order to meet the NAAQS. In order to provide the margin of safety necessary to prevent PM<sub>10</sub> emissions in all conditions, the District has determined that 50 percent total cover averaged over every acre is an appropriate, conservative prescription for the Managed Vegetation PM<sub>10</sub> control measure. Total cover includes living plants and any dead plant materials, as both function to prevent PM<sub>10</sub> emissions.*

The SIP also acknowledges the following (GBUAPCD, 2008a, pp. 5-11):

*The City currently has about 3.5 square miles of Managed Vegetation PM<sub>10</sub> controls on the lake bed. The Managed Vegetation area is in one contiguous block near the south end of the lake bed. Initial site planting occurred in the summer of 2002 and the City has worked since that time to improve vegetation cover. Although there are portions of the existing Managed Vegetation area that meet the 50 percent cover requirement, the overall site vegetation cover averages about 24 percent. This is well below the SIP requirement of 50 percent vegetation cover on every acre. However, the 3.5 square mile site, as a whole, has achieved a high level of PM<sub>10</sub> control (Air Sciences, Inc., 2006).*

So, Managed Vegetation performance criteria in the SIP were based on a combination of information from control efficiency results from other sites (documented in scientific literature), from wind-tunnel studies designed to reflect Owens Lake conditions, and observations of plant growth on Owens Lake. With the implementation and monitoring of a full-scale (2,100-acre) Managed Vegetation facility, we now have the opportunity to review and refine performance criteria based on several years of performance relationships observed on Owens Lake. A further advantage is that the large scale of the monitored facility is comparable to potential future installations. These Owens Lake observations, therefore, are the basis for this Proposal.

The purpose of this Proposal is to present and provide technical support for compliance requirements for the Managed Vegetation dust control measure (DCM). Detailed requirements pertaining to levels of control efficiency below 99%, as well as regulatory requirements unrelated to air quality, are not provided in this document.

## **BACM PROPOSAL TECHNICAL ELEMENTS**

As described in the Preface, many of the technical elements of this Proposal have been addressed previously in NewFields et al. (2008). A summary of the technical elements of the proposal is contained in Table 1. Table 1 provides a quick reference to the location of documentation for each element listed in the SIP.

<b>Table 1. Required Elements of BACM Proposal</b>		
<b>Required Element (per the SIP)</b>		<b>Location of Documentation</b>
1	Description of the new dust control measure	Appendix 1
2	Description of the test site and the meteorological conditions under which it was tested	Appendix 3, Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006. Also Appendix 4, Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for the Managed Vegetation Dust Control Measure. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. June, 2007.
3	Measured PM10 emissions during the test	Appendix 3, Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006. Also Appendix 4, Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for the Managed Vegetation Dust Control Measure. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. June, 2007.
4	Test time frame	Appendix 3, Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006. Also Appendix 4, Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for the Managed Vegetation Dust Control Measure. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. June, 2007.
5	All raw data collected during the test	Appendix 3, Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006. Also Appendix 4, Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for the Managed Vegetation Dust Control Measure. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. June, 2007.
6	All data screening criteria and final data sets	Appendix 3, Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006. Also Appendix 4, Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for the Managed Vegetation Dust Control Measure. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. June, 2007.
7	Data supporting the conclusion that the required control efficiency was achieved	Appendix 3, Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006. Also Appendix 4, Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for the Managed Vegetation Dust Control Measure. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. June, 2007.

<b>Table 1. Required Elements of BACM Proposal</b>		
<b>Required Element (per the SIP)</b>		<b>Location of Documentation</b>
8	Performance standard that the new dust control measure must meet in order to achieve the required emission reductions or control efficiency	Appendix 3, Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006. Also Appendix 4, Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for the Managed Vegetation Dust Control Measure. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. June, 2007.
9	Analysis of any environmental impacts of the dust control measure	Main body of BACM Proposal
10	Appropriate responsible agency approvals, permits and leases	Main body of BACM Proposal
	Modeling that demonstrates that the required PM <sub>10</sub> emission reductions or control efficiency can be achieved during the dust season anywhere this control measure may be implemented on Owens Lake, and the NAAQS can be met at all times everywhere along the historical shoreline	Appendix 3, Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006. Also Appendix 4, Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for the Managed Vegetation Dust Control Measure. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. June, 2007.
	Documentation of compliance measurement methodology	Appendix 2

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In Appendices 3 and 4, it was shown that 99% control efficiency was achieved at between 11 and 20 percent vegetative cover based on digital point frame (DPF) images assessed by the spectral method. Subsequently, vegetative cover monitoring methods transitioned to visual interpretation of DPF images, which was found to result in about 9% greater vegetative cover (site-wide average). This is equivalent to finding that 99% control efficiency was achieved at between 20 and 29 percent vegetative cover based on visual interpretation of the DPF images. The average vegetative cover on the existing Managed Vegetation site in November 2004 (according to a calibrated vegetation map based on visually interpreted DPF) was about 42%. Therefore, the average vegetative cover on the site at the reference date exceeds the vegetative cover level demonstrated in Appendices 3 and 4 to produce 99% control efficiency. Part of this margin accounts for wintertime reductions in vegetative cover levels due to leaf senescence. The remainder is a margin of conservatism that is protective of public health.

Details of the nature of Managed Vegetation and associated performance specifications are described in Appendix 1. The general approach to the Managed Vegetation DCM management is described in Appendix 5, relating DCM conditions to actions by LADWP.

### **Analysis of any environmental impacts of the dust control measure**

The changes to performance specifications contained in this proposal are not of a nature that would significantly alter the environmental impacts of Managed Vegetation relative to research and full-scale facilities that have been constructed and operated previously on Owens Lake.

None of the previous environmental analyses, or any aspect of operation of the full-scale, existing Managed Vegetation site since planting in summer 2002, has brought to light a significant environmental impact. On the contrary, as originally envisioned, Managed Vegetation successfully mimics existing plant communities in the Owens Lake area while controlling dust. Some of the existing area serves as mitigation for predicted project impacts to dry alkaline meadow habitat, and the remainder incidentally provides many of these same environmental benefits.

### **Appropriate responsible agency approvals, permits and leases**

Managed Vegetation BACM was analyzed in each approved California Environmental Quality Act (CEQA) analysis for the 1997, 1998, 2003, and the 2008 SIPs (all by GBUAPCD), and for Phase 2 South (existing Managed Vegetation) dust control (by LADWP). It has been successfully permitted and leases obtained for construction and operation of Phase 2 South on Owens Lake. In addition, GBUAPCD operated pilot Managed Vegetation research facilities at 6 locations on the playa, one of which continues under LADWP operation (the Vegetation on Sand, or VOS, site north of T32-1).

New Managed Vegetation facilities would likely have regulatory requirements similar to the existing site including the existing Waste Discharge Requirements and other existing permits, and leases. Where new facilities are to be built or existing facilities are to be modified, pertinent aspects of new facilities would be described in project-specific CEQA analyses, lease applications, permit updates, and the like.

## **CONCLUSION**

As documented, this Proposal contains the following assurances that DCM effectiveness will be adequate in the future:

1. DCM management is an active program to promote development and maintenance of adequate vegetative cover and to minimize and restrict areas of sparse vegetative coverage. Benefits of improved management and greater maturity to vegetative cover levels and DCM effectiveness for any particular site are cumulative.
2. The Proposal commits LADWP to actively manage potential problem areas (see Appendices 1 and 5).

(Final BACM Proposal.doc)

3. Vegetative cover thresholds are based on the end of the second season during which no significant sand motion was measured on the existing Managed Vegetation site, and future vegetative cover levels must meet or exceed these thresholds. Further, vegetative cover levels lower than those specified in this BACM application were shown to provide 99% control efficiency (Appendix 4).
4. The existing Managed Vegetation site was effective even when surrounded by uncontrolled playa. New Managed Vegetation areas will in many cases border on controlled areas, reducing sand mass moving into margins of Managed Vegetation areas. These areas would thereby be subjected to less intense erosive forces than was the existing Managed Vegetation site upon which the proposed performance specifications are based.
5. This Proposal is based on six years of DCM management experience, the firmest foundation yet for a set of DCM performance specifications.

By all of these means, this Proposal provides amply for robust DCM performance and the protection of public health.

## ACKNOWLEDGEMENTS

During development of the ideas in this Proposal, GBUAPCD and their consultants provided valuable comments and suggestions. The contributions of all team members are appreciated by the authors and LADWP, and were essential to the successful completion of this work.

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## **APPENDIX 1.**

### **DESCRIPTION OF MANAGED VEGETATION FOR PM<sub>10</sub> CONTROL (SIP SECTION 5.3.1, PROPOSED)**

Vegetated surfaces are resistant to soil movement and thus provide protection from PM<sub>10</sub> emissions. Vegetative cover that is sufficiently dense and uniform (particularly avoiding large, contiguous expanses of barren playa) provides a very effective barrier that traps sand and sand-sized soil particles and keeps wind speeds from reaching the threshold friction velocity required to generate emissions at the playa surface. Vegetation has naturally become established where sufficient water quantity and quality is available on or near the playa surface to leach the salty playa soils and sustain plant growth. Natural saltgrass meadows around the playa margins and the scattered spring mounds found on the playa are examples of such areas (Figure 5.13). Observation of these naturally vegetated areas has shown that very little dust emissions are generated from them. The Managed Vegetation strategy is modeled on these naturally protective saltgrass vegetated areas. Dust control using Managed Vegetation is a mosaic of fields with soil conditions suitable for plant growth. These conditions may (usually are) created by minimal irrigation and, where necessary, artificial subsurface drainage. Aerial and ground-level views of existing Managed Vegetation PM<sub>10</sub> controls constructed by the City are shown in Figures 5.14, 5.15a and 5.15b.

To date, the Managed Vegetation control measure has been implemented by constructing and operating farm-like facilities to transform the naturally barren playa. The saline soil is first reclaimed with the application of relatively fresh water, and then planted with salt-tolerant plants that are native to the Owens Valley. Thereafter, soil fertility and moisture inputs are managed to encourage plant development first to rapidly achieve, and then to maintain, required levels and patterns of vegetative cover. Existing Managed Vegetation controls on the lake bed are irrigated with buried drip irrigation tubing and drained during wet weather by surface overland flow and a network of buried tile drains that capture excess water for reuse on the Managed Vegetation area or in Shallow Flooding areas.

Future Managed Vegetation facilities may also include habitat enhancement and/or recreation features unrelated to dust control, such as watering points to promote wildlife reproductive success in a manner that does not compromise components required for plant establishment and maintenance.

The root zone is the soil volume in which active rooting, and uptake of water and nutrients, occurs. Managed Vegetation is sustainable at Owens Lake only if salts present in unreclaimed lake bed soils and the naturally occurring shallow groundwater are prevented from reaching critically high concentrations in the root zone. Leaching with rainfall and irrigation water applied to Managed Vegetation serves to generally move salts down and away from the root zone of the planted vegetation. The subsurface drainage system facilitates this process, and may be essential in some areas. Water must be applied to satisfy the plants' uptake needs and the soil reclamation requirements. Excess applied water may exceed that which can practically be moved downward through the soil. When that occurs, the soil can become waterlogged, and salinity may accumulate at concentrations that can damage plants. The two main approaches to avoiding this circumstance are (a) minimizing the volume of applied water and (b) providing artificial subsurface drainage. Approach (a) involves promoting good surface drainage (to avoid surface flow of stormwater and applied water to low points within the control area) and by monitoring of site conditions and scheduling irrigation to avoid exceeding drainage capacity of the soil. Approach (b) involves constructing subsurface drainage facilities of various designs, each of which collect subsurface water into perforated pipes or gravel channels, and removal of collected water for recycling, usually with pumps.

Water is pumped from the subsurface drain system and placed into brine storage ponds where it can be recycled and used for Shallow Flooding, or mixed with fresh irrigation water for re-application to Managed Vegetation. However, depending on local site conditions and compliance requirements, alternative irrigation and drainage configurations, water supply quality, irrigation scheduling regimes, and plant communities may be employed, so long as the dust-controlling vegetative cover requirements are achieved. Drains installed near naturally occurring wetlands are operated so as not to cause significant groundwater drawdown or loss of surface water extent in the adjacent wetland

areas. Drainage systems are to be operated with the goal of not decreasing the amount and or changing the type of existing natural wetlands.

In some cases, it is possible to reduce root-zone salinity to levels that are too low. In clay dominated soils, irrigation with low-salinity or fresh water may cause soil structure to collapse, altering future water infiltration and salt leaching. The City's existing Managed Vegetation site has a target applied water salinity of approximately 9 deciSiemens per meter (a measure of electrical conductivity—seawater has a salinity of about 35 deciSiemens per meter). Needed salt is collected in drain water. Prolonged irrigation of clay soils on Owens Lake with freshwater, where attempted, has not been observed to cause dramatic immediate effects. Over time, however, there does appear to be a consolidation of very large soil prisms, limiting most water flow, aeration, and rooting to the surfaces of those prisms. Therefore, where this is considered a risk on Owens Lake, irrigation water salinity may be controlled to avoid creating this undesirable condition.

Operational experience indicates that applied water of approximately 1.2 feet per year (net of recycled drainage water) is required to maintain sufficient protective vegetative cover. A somewhat greater depth of applied water is required for land reclamation and establishment (primarily before and during the first growing season). Thereafter, the appropriate applied water depth varies widely around this average depending on local soil and drainage conditions.

At the end of 2009, the City had about 3.5 square miles of Managed Vegetation PM<sub>10</sub> controls on the lake bed. This 2009 Managed Vegetation area is in one contiguous block near the south end of the lake bed. Initial site planting occurred in the summer of 2002 and the City has worked since that time to improve and maintain vegetative cover.

Once 3.5 square miles of Managed Vegetation was established, the District and City engaged in relatively intense monitoring and analysis of control efficiency. This collaborative effort has formed the basis for refinement of the initial performance specifications for Managed Vegetation. The required control efficiency for the site has been 99%, and new performance specifications are for that level of control. However, other vegetative cover levels could be similarly determined where lower control efficiency levels are required. The refined specifications and their basis are described next.

Tests by LADWP have shown that the 3.5-square-mile site, as a whole, has achieved a high level of PM<sub>10</sub> control. Air quality modeling conducted in conjunction with the 2008 SIP revision confirmed that the site achieved its required level of PM<sub>10</sub> control. In addition, two studies were produced based on a control efficiency study on the existing Managed Vegetation facility on Owens Lake:

- Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006 (Appendix 3 of this BACM Proposal).
- Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for the Managed Vegetation Dust Control Measure. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. June, 2007 (Appendix 4 of this BACM Proposal).

The 2006 study determined that 99% control was achieved on the existing Managed Vegetation site with between 11 and 20% vegetative cover (as measured by methods in use at the time. This is equivalent to 20 to 29% vegetative cover measured with the updated remote sensing approach).

The 2007 study verified, on the basis of the Dust ID model and sand motion data collected by the GBUAPCD and LADWP, that the entire Managed Vegetation site did not cause or contribute to an exceedance of the federal 24-hour PM<sub>10</sub> standard at the shoreline. Vegetative cover performance specifications (average vegetative cover and spatial distribution requirements) for Managed Vegetation at Owens Lake have been developed based on effectiveness monitoring results from the existing Managed Vegetation facility. An appropriate margin of safety has been incorporated into these specifications and is reinforced by selection of a 99% PM<sub>10</sub> emissions control efficiency for many areas; lower vegetative cover levels would be acceptable where lower control efficiencies are required, and where evidence indicates that the lower target vegetative cover levels could achieve that lower control efficiency.

Pursuant to the 2006 Settlement Agreement between the District and the City (Chapter 8, Attachment A, 2006 Settlement Agreement, Paragraph 6) the City prepared, and the APCO approved a Managed Vegetation Operation and Management Plan that ensured the 3.5 square-mile site continued to achieve control sufficient to prevent emissions that caused or contributed to NAAQS violations. With respect to determination of compliance, that Plan will be superseded by this BACM Proposal upon APCO approval, except where it is cited herein.

Vegetative cover requirements cannot be met until vegetation has had time to develop. Initial development may take at least two growing seasons, after which substantial control efficiency should be achieved. Resolution of site-specific drainage challenges and compliant levels of vegetative cover may require another several seasons for resolution. Vegetation of some of these areas may or may not be required for compliance, but their improvement will in any case render the facility more robust, and is therefore desirable where practicable. Some areas of the playa, however, may prove extremely hard to vegetate and must either be controlled in the context of an otherwise vegetated site, or by some other means.

Any Managed Vegetation area will be considered compliant when the vegetative cover requirements in Table 1.1 are maintained on the area by the City. Vegetative cover compliance is to be determined on a **fall satellite image of the area and ground-truthed, calibrated, and validated by reference** to measurements made by point frame or by equivalent methods (including digital point frame [measurement of vegetative cover on downward-looking, high-resolution digital images of vegetative cover taken a few meters from the land surface]). Vegetative cover provided by any locally adapted native plant species will count toward compliance in any Managed Vegetation area.

TABLE 1.1

Managed Vegetation DCM Vegetative Cover Criteria without Adjustments Based on Absolute Fractional Bias of the Cover Measurement  
*Managed Vegetation BACM*

<b>Grid Scale</b>	<b>Average</b>	<b>5 cover</b>	<b>10 cover</b>	<b>20 cover</b>
(acres)	(minimum % cover)	(minimum % of DCM area)		
0.1	37	92	83	65
1	37	94	87	68
10	37	95	89	74
100	37	95	90	77

<sup>a</sup>Note that in the measured reference condition, no whole, 1- to 100-acre grid cells had <5 percent vegetative cover. The associated criteria are not intended to imply or to allow whole 10-acre or 100-acre grid cells to have < 5 percent vegetative cover. Rather, they are intended to allow for smaller grid cell fragments (e.g., at the DCM's edges) with this level of vegetative cover.

DCM areas will be subdivided by grids imposed at four scales, beginning at 0.1 acre, and increasing tenfold in area for the three subsequent grids (to 1, 10, and 100 acres). Vegetative cover distributions among these grid cells (average vegetative cover in each cell, and the distribution of those average values for each grid scale) will be characterized. Average cover thresholds in Table 1.1 will be adjusted for uncertainty of the vegetation map for that particular date, based on the vegetative cover map validation results. Adjustment of each of these thresholds will be made as follows:

$$\text{Threshold}_{\text{adj}} = \text{Threshold} * (1 - (\text{AFB}/2.5)) \quad (1)$$

where AFB = half of the Absolute Fractional Bias (ranging from 0 to 2, with 0 indicating no error in the calibrated model prediction of vegetative cover at independent validation points), *Threshold* = any average % cover threshold from Table 1.1, and *Threshold<sub>adj</sub>* is the adjusted criterion against which an average cover measurement for the date and parameter in question would be evaluated.

Table 1.2 contains a summary of responses in the event that one or more of the following occur in a Managed Vegetation area:

- Vegetation shows signs of decline over significant areas that could result in future failures to meet vegetative cover requirements
- Vegetative cover levels are shown to be less than those required in Table 1.1

TABLE 1.2

Tabular Summary of Managed Vegetation Operation and Management

Site condition	Management requirement	Regulatory requirement	Range of site management responses
1. Vegetation and soil conditions	No 10-acre grids with predominantly orange or brown aboveground saltgrass and insignificant new growth during an entire growing season (as determined by ground observations and subsurface investigation).	See item 2.	a) Site-specific evaluation of plant health and determining factors, and surrounding conditions, b) develop and implement steps to address determining factors identified in Step a, c) if actions were required under Step b, then monitor and verify that these actions achieve their stated goals.
2. Vegetative cover	No 10-acre grids with <5% cover; 1-acre grids with <5% cover (subject to site-specific review).  Assess green cover annually during the August-September period. Identify and evaluate areas with low rates of green cover generation.	Cover levels > threshold shown in Table 1.1.  Process and results documented, and reviewed annually with GBUAPCD.	a) Site-specific evaluation of plant health and determining factors, and surrounding conditions, b) develop and implement steps to address determining factors identified in Step a, c) if actions were required under Step b, then monitor and verify that these actions achieve their stated goals.  Employ primarily as "early warning". Consider green vegetative cover in the context of total vegetative cover, in relation to the size and surroundings of the area being considered. Develop management responses to remedy low levels of green vegetative cover replacement when and where this evaluation indicates that such action is needed.

The following portions of the areas designated for control with Managed Vegetation are exempted from the vegetative cover requirements:

1. portions of the site that are consistently inundated with water, such as reservoirs, ponds and canals,
2. roadways and equipment pads necessary to access, operate and maintain the control measure which are otherwise controlled and maintained to render them substantially non-emissive, and
3. portions of the site that are used as floodwater diversion channels or desilting/retention basins.

"Substantially non-emissive" shall be defined to mean that the surface is protected with gravel, durable pavement or other APCO-approved surface protections sufficient to meet the requirements of District Rules 400 and 401 (visible emissions and fugitive dust).

## **APPENDIX 2. VEGETATIVE COVER MEASUREMENT**

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*Final Report*

# **Methods Used for Verification of Vegetative Cover on the Managed Vegetation Dust Mitigation Site**

Prepared for  
**The Los Angeles  
Department of Water and Power**

August 2007

## **NewFields Agricultural and Environmental Resources**

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**ACRONYMS AND ABBREVIATIONS**

<b>AGL</b>	<b><i>above the ground level</i></b>
<b>CT</b>	<b><i>calibration target</i></b>
<b>DCM</b>	<b><i>dust control measure</i></b>
<b>DN</b>	<b><i>digital number</i></b>
<b>DOS</b>	<b><i>Dark object subtraction</i></b>
<b>DPF</b>	<b><i>digital point framing</i></b>
<b>GBUAPCD</b>	<b><i>Great Basin Unified Air Pollution Control District</i></b>
<b>GC</b>	<b><i>Geometric correction</i></b>
<b>HB</b>	<b><i>HydroBio</i></b>
<b>DPF</b>	<b><i>Hi-Pod digital point frame</i></b>
<b>LADWP</b>	<b><i>Los Angeles Department of Water and Power</i></b>
<b>MV</b>	<b><i>managed vegetation</i></b>
<b>MVL</b>	<b><i>Managed Vegetation Land</i></b>
<b>NDVI</b>	<b><i>Normalized Difference Vegetative Index</i></b>
<b>Plan</b>	<b><i>Managed Vegetation Operation and Management Plan</i></b>
<b>PMP</b>	<b><i>performance and monitoring plan</i></b>
<b>SAVI</b>	<b><i>Soil Adjusted Vegetative Index</i></b>
<b>TOA</b>	<b><i>top-of-atmosphere</i></b>

## SECTION 1.0 INTRODUCTION

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### 1.1 Background

Contained within the November 2006 Settlement Agreement between Great Basin Unified Air Pollution Control District (GBUAPCD) and the Los Angeles Department of Water and Power (LADWP) is a provision requiring the development of a *Managed Vegetation Operation and Management Plan* (Plan). Essential to the Plan is accurate verification of current and historic vegetative cover levels across the managed vegetation (MV). A *performance and monitoring plan* (PMP) submitted on an annual basis will be used to compare specific criteria related to historic conditions that achieved 99 percent control efficiency at the site. The most appropriate methodologies to quantitatively verify vegetative cover are, therefore, essential to both the Plan and annual PMP.

Following the establishment of the MV dust control measure (DCM) in 2003, both GBUAPCD and LADWP independently developed remote sensing techniques to quantitatively verify vegetative cover. Detailed evaluation of the two methods revealed that the basic foundations from which both methods are derived contain several similarities; each uses independent ground truthed data (in the form of measured vegetative cover) to calibrate remotely sensed imagery, resulting in a quantitative assessment of cover. Although several similarities exist, slight differences between the two methods are apparent and stem from the methods involved in ground truthing vegetative cover and remotely sensed image calibration/validation. Differences between the two methods are noteworthy and warrant a closer examination to quantify the strengths and weakness of each respective method.

### 1.2 Purpose

The purpose of this memorandum is to provide a detailed description of both remote sensing vegetative monitoring methods, identify areas of agreement and disagreement between the two methods, outline a study methodology to collaboratively address areas of disagreement, and use the results from the collaborative study to determine methodology for future vegetative compliance monitoring. This report is organized as follows:

- Section 1.0 - Introduction
- Section 2.0 - LADWP's Monitoring Methodology
- Section 3.0 - GBUAPCD's Monitoring Methodology
- Section 4.0 - Proposed Plan of Action and Future Vegetative Compliance Methodology
- Section 5.0 - Conclusions
- Section 6.0 - Work Cited

## SECTION 2.0

**LADWP MONITORING METHODOLOGY**

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With any intensive remote sensing analysis effort, concurrent collection of representative ground truth data and remotely sensed imagery is necessary to ensure proper image calibration. It is essential that ground truth data be gathered at a scale that is appropriate for the desired image calibration and validation. Several methods for estimating vegetative cover for ground truth sites have been developed by plant ecologists, agronomists, and remote sensing experts. Contemporary methods of assessing vegetative cover for ground truth sites; such as a reference frame, quadrant siting frame, and point-frame transects, can be considered subjective in nature and do not facilitate recreation or checking after the initial field evaluation. These methods can also be time consuming, and results are drawn from a few points located systematically in relatively small unit areas. To overcome the restricted sampling area of these methods, measurements located at random in larger areas of interest must be repeated many times over.

These methods are, however, well established, and cover measurements by point frame in particular are the method by which vegetative cover in the MV at Owens Lake was previously defined. It is therefore desirable that vegetation cover ground truthing be easily related to this method. To achieve this, LADWP developed a new method that is somewhat more rapid, readily reproduced (checked), that takes in more points in a relatively large quadrant, and that can be readily analyzed for site-specific trends and accuracy through time.

**2.1 Ground Truthing Tool**

Digital photos of the ground surface provide a means of quantitatively estimating vegetative cover. LADWP's method for capturing digital photos to quantify vegetative cover evolved as digital photo technology (especially resolution and automatic exposure control) improved. The original method, termed digital point framing (DPF), consisted of photos taken with a digital camera held at eye-level, approximately 5 feet above the ground level (AGL). This height was chosen based on a maximum camera resolution at that time, which was 3.1 mega pixels or 2560 x 1920 lines. This 5-foot AGL height captured an image such that between the resolution of the camera and the AGL height, the pixel resolution was such that lessened the quantity of grass blade and soil mixed pixels, though these mixed pixels certainly still exist. This lessened the mixed pixel effect, thus improving spectral discrimination results. To get a representative vegetative cover estimate in a quadrat extending from inter-row to inter-row, sets of four slightly (~20 percent) overlapping photos were taken to cover a combined area of 1.5 feet by 5 feet. The four photos were then mosaicked (digitally stitched together) into a single, panoramic digital image (Figure 2-1).

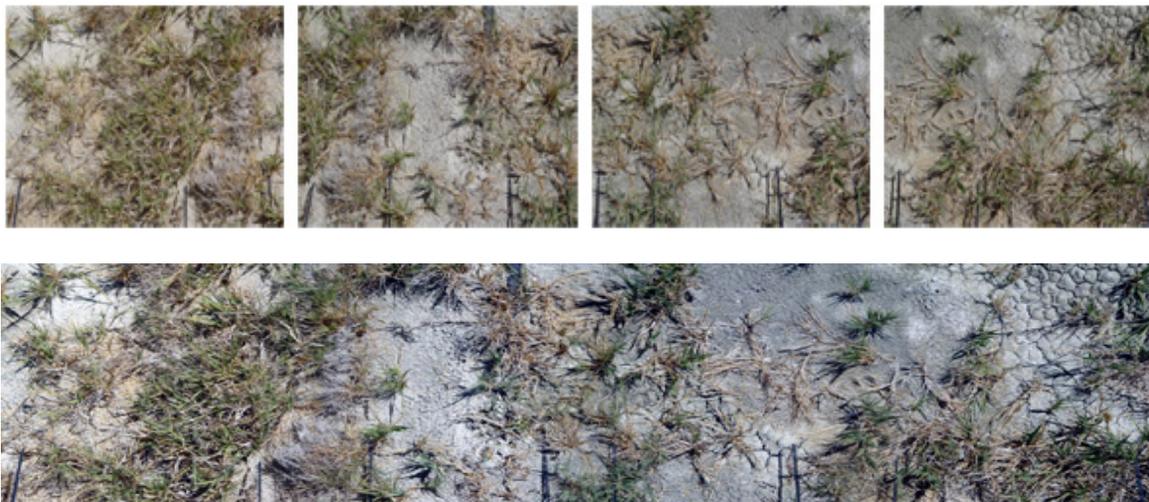


FIGURE 2-1

Figure 2-1A: Four DPF Photos

Figure 2-1B: Final DPF Mosaic

In an effort to maximize the area characterized per DPF and minimize the time associated with ground truthing, a more powerful digital camera mounted on a 15-foot Hi-Pod monopod system (Figure 2-2), was purchased in October 2006. This new device improved the efficiency of the DPF methodology. The new DPF characterized a larger ground surface area than the original DPF methodology (Table 2-1), increasing the ground surface area characterized from 2.25 ft<sup>2</sup> per photo (four photos then mosaicked together for a total area of 7.5 ft<sup>2</sup>) to one photo characterizing a total of 16.7 ft<sup>2</sup>. The single frame capture of a larger array area also eliminated the need for the mosaic process previously used on four DPF frames. Elimination of that process was significant because mosaicing of photos taken at a 5-foot AGL was never fully capable of modeling out the effects introduced by the (4) individual points of perspective. It also resulted in a significant reduction in field work associated with photo capture.

The new DPF approach had a substantial field effort savings in that (1) technician can spend 2-3 days (16-24 hrs) collecting all DPF photos, rather than the 2-3 days of (4) staff necessary for the point-frame field effort.



FIGURE 2-2

DPF Field Equipment Setup

*The new DPF equipment included the use of a high resolution camera mounted on a 15' Hi-Pod monopod.*

TABLE 2-1  
DPF and DPF Specifications

Item	Original DPF Specification	New DPF Specification
Camera Brand	Sony Cyber-shot DSC-F717	Sony Cyber-shot DSC-R1
Camera Resolution	2560 x 1920	3888 x 2560 pixels
Photo height	5' above ground surface	14.5' above ground surface
Photo Dimensions	1.5' x 1.5'; Four photos per location	5' x 3.3'; One photo per location
Surface Area Characterized	7.5 ft <sup>2</sup>	16.7 ft <sup>2</sup>

### 2.1.1 DPF Grass Classification

Two methods for classifying the amount of vegetation within each DPF have been developed by LADWP. The first method spectrally classifies each pixel within the DPF into one of three classes (green grass, brown grass, or no grass) (Figure 2-3). At one time this was done using an ISODATA unsupervised classification approach, segmenting the image into 100 spectral classes, which were then assigned to one of the three cover classes based on visual analysis. The current spectral approach, which has been found to be more successful at separating the cover classes, was adopted in late 2005. This method involves modeling of two ratios of the photo's bands to separate the cover classes (blue/red and green/red). New thresholds must be selected for each DPF event due to seasonal variation of the vegetation and illumination characteristics on the day of capture. Thresholds are selected to separate green grass, brown grass, and bare ground. The model performs the following logic:

1. (blue/red < threshold1 AND green/red > threshold2) = green grass
2. (blue/red < threshold) – green grass from above = brown grass
3. Other pixels = bare ground

This process resulted in a vegetation cover map for each photo. Each pixel is designated as one of the cover categories.

While the spectral analysis worked relatively well, selection of the thresholds (done subjectively by the analyst) is time consuming. Further, the added "silver" classification category introduces challenges due to similar spectral characteristics with the substrate. Because of the visible-range spectrum similarity between bare ground surfaces and brown/silver grass, there is also some balancing done in the threshold selection process, such that the amounts of bare ground erroneously classified brown grass roughly balances with the amount of brown grass that is classified bare ground. This threshold is also subjectively identified by the analyst. These processes are to a large extent due to the sensor's limited spectral range, rendering more automated classification techniques unusable.

From this vegetation cover map, areas within the DPF that are covered by vegetation can be readily determined by software that counts pixels in each class. Quadrats defined by DPF can be used to characterize larger areas of vegetated land (equivalent to the mean DPF results in the area). Cover levels for these areas can in turn be employed to calibrate index or ratio results in satellite imagery.

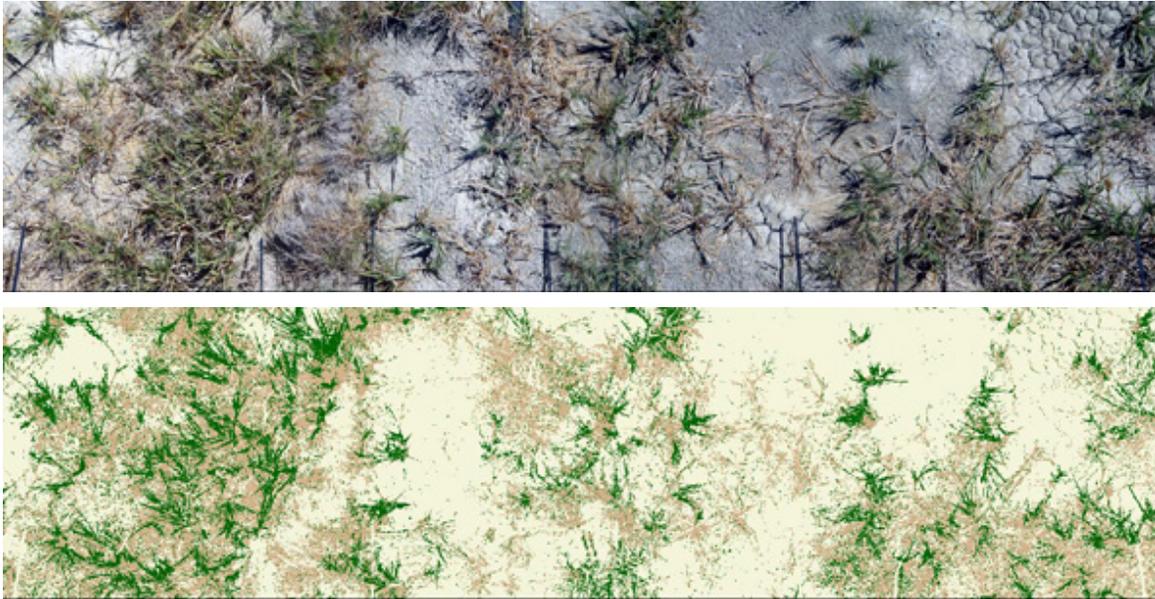


FIGURE 2-3

Figure 2-3A: Example DPF

Figure 2-3B: Example Spectral Grass Classification of a DPF

*Spectral classification divides vegetation into three classes: (1) green = green grass, (2) brown = brown grass, (3) white = bare ground surface*

In October 2006, a second non-spectrally-based method of estimating percent cover within each DPF was developed to assess the accuracy and precision of the spectral classification method. Termed digital pin classification, it visually assessed vegetative cover with computer grid points overlain on the DPF photo at regular intervals (Figure 2-4). An ESRI shapefile grid of 50 points (crosshairs) per photo was overlain on each photo. The center of each crosshair, not any other part of the crosshair, was used in the determination of vegetative cover. Each of the 50 crosshair points (per DPF) was characterized as either green grass, brown grass, or no grass (silver grass is easily added in as a category in that the visual discrimination is clearly made in the DPF image). This classification was then entered into the attribute table for the shapefile, which was then copied to an Excel spreadsheet where mean percent cover percentages were calculated for each site. Both methods will be used in future vegetative monitoring events to compare the difference between the results of the two methods. The digital pin classification method time requirements puts the level of effort into the same general amount as the conventional point-frame, once accounting for the 1-technician field data collection and subsequent DPF analysis, as compared to the 4-technician field data collection effort necessary for conventional point frame. Again, the advantage of the DPF approach is for historical record of a data collection event.



FIGURE 2-4  
 DPF "Digital Pin" Classification  
 DPF photo with the 50 point grid shapefile overlain

## 2.2 Calibration Target Characteristics

Accurate satellite image calibration is dependent on several calibration target (CT) characteristics. These include: size, shape, number, distribution, and relative homogeneity.

### 2.1.1 Calibration Target Size and Shape

Currently, the LADWP CT size is equivalent to a square 3x3 QB pixel area (9 QB pixels), which is approximately 52 m<sup>2</sup> (558 ft<sup>2</sup>). The 9 QB pixels are averaged and compared to percent cover derived from one DPF photo. One DPF photo characterizes 1.6 m<sup>2</sup> (16.5 ft<sup>2</sup>) which is approximately 3 percent of the CT area.

### 2.1.2 Calibration Target Quantity and Distribution

The quantity and distribution of CT sites is important to proper image calibration and validation. Currently, LADWP ground truths a total of 51 CT locations. When possible, the same locations have been used repeatedly year after year to develop a baseline of comparison. Depending on weather conditions and yearly vegetative growth patterns, some locations have been moved, removed, or added. Current CT LADWP CT locations are presented in Figure 2-5.

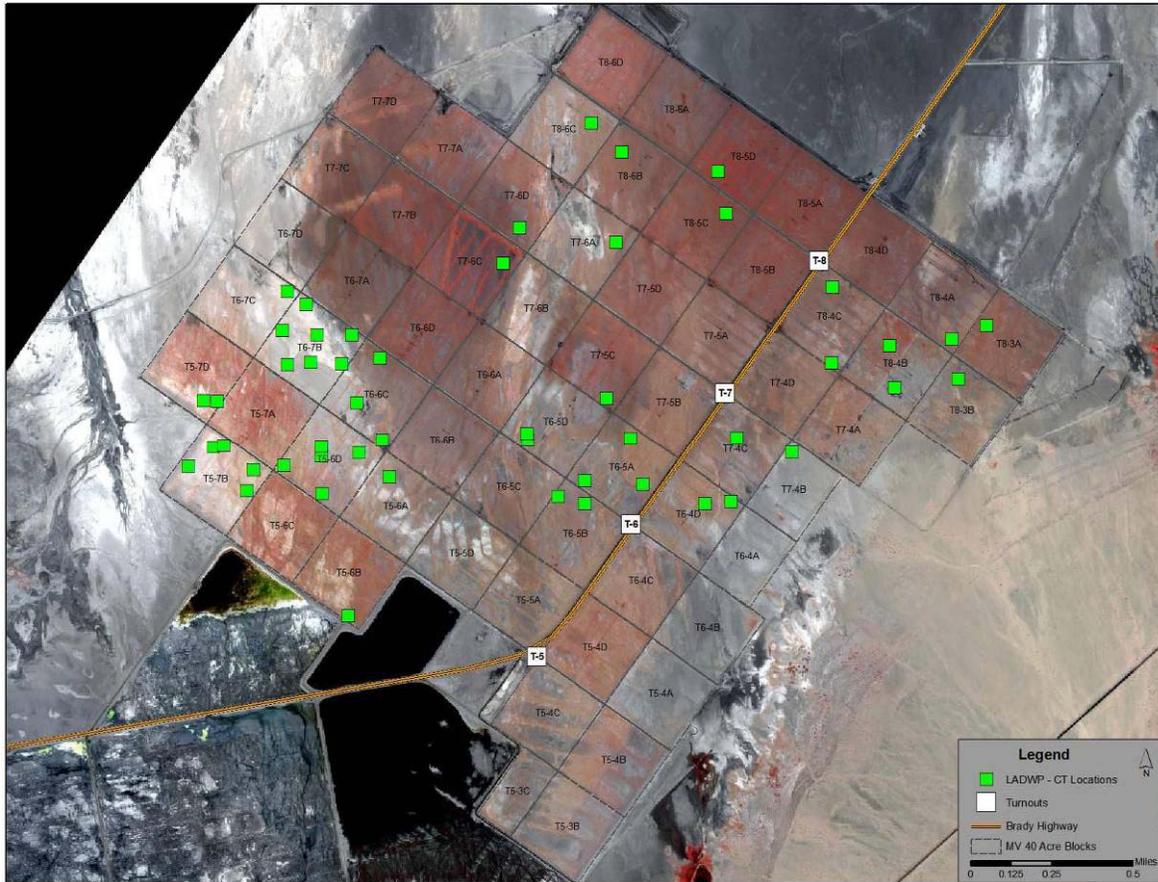


FIGURE 2-5  
Current LADWP CT Locations

Equally important to proper image calibration and validation is the distribution of those sites relative to the actual vegetative cover distribution of the MV site. Current LADWP calibration site distributions relative to the estimated MV site distribution are presented graphically in Figure 2-6. LADWP has targeted areas to be used for image calibration that fall into the less-than-30 percent vegetative cover class.

### 2.3 Remote Sensing Image Analysis

The LADWP image analysis approach uses imagery from the QuickBird satellite (DigitalGlobe, Inc). QuickBird imagery is preferred because of its spatial and spectral characteristics, as well as its cost. The approach developed by LADWP requires a high-resolution image with both visible and near-infrared spectral range, a reliable geometry and band registration, and an associated cost allowing for many

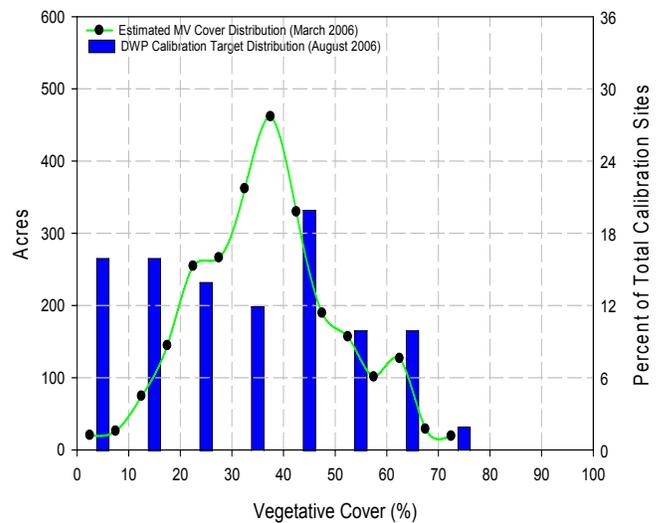


FIGURE 2-6  
Current LADWP Calibration Target Distribution Relative to the MV Cover Distribution

analyses per year at a reasonable expense. Note that cover was previously tracked by LADWP higher frequency for control effectiveness investigations. In the future, if annual assessment is sufficient, the cost of imagery is less important.

The QuickBird multispectral imagery is composed of four bands, each of which represents a specific portion of the spectrum; green, blue, red, near-infrared. The multispectral imagery is capable of a spatial resolution of 2.4m per pixel. Also included in the “standard bundle” package is the high-resolution panchromatic band. Spectrally, the high-resolution panchromatic band represents nearly all of the visible range and slightly into the near-infrared range of the spectrum. Spatially, this band is capable of 0.6m per pixel resolution.

The cost of the QuickBird imagery for the MV sites, per collection, is approximately \$2,500. For comparison, an airborne (airplane-based) sensor capable of multispectral image collection appropriate for spectral post-processing may cost \$10,000 or more per collection.

### 2.3.1 Preprocessing of the Quickbird imagery

To calculate vegetative indices or ratios to assess vegetative cover, QuickBird data must first be preprocessed or corrected to account for various environmental factors including: instrument irregularities, solar angle, distance of the sun, and atmospheric scatter. Details on the preprocessing steps used to prepare Quickbird images for mapping vegetative cover are presented in Table 2-2. An additional pre-processing step was performed when compliance assessments were being made. This included delineation of vegetated areas, which excluded roads, turnouts, irrigation equipment, and the like.

TABLE 2-2  
QuickBird Image Preprocessing Steps

Preprocessing Correction Conversion	Explanation	Method Details
Geometric correction (GC)	GC is used to rectify the satellite image to known ground control points. This essentially adjusts the image to known corresponding visual features.	Ground control points visually identified in reference panchromatic (0.6m image) and newly acquired panchromatic image, geometric model calculated and applied to both 0.6m Pan and 2.4m Multispec imagery. Image projection parameters used for Geocorrection: UTM, Zone 11, GRS 1980 Spheroid; NAD83 Datum; Nearest Neighbor Resampling; 2.4 Meter Pixel Size.
Conversion of image digital number (DNs) to top-of-atmosphere (TOA) Spectral Radiance	Conversion to TOA spectral radiance normalizes the data for the incident energy of the sun. This changes with solar angle and distance, which is a factor of time of day and year.	Each band of the image is multiplied by a K-Conversion Factor and divided by the bandwidth to obtain TOA radiance values. K-Conversion Factors and Bandwidths: Band 1 = 0.0160412, 0.068; Band 2 = 0.0143847, 0.099; Band 3 = 0.0126735, 0.071; Band 4 = 0.0154242, 0.114.
Conversion of TOA radiance to reflectance	Reflectance values are used in the calculation of some vegetative indices (e.g., NDVI, SAVI, etc.).	Reflectance calculation: (image band * earth-sun distance * pi) / (irradiance * COS(90 degrees – sun elevation) The Earth – Sun Distance is estimated from the Landsat Data User's Handbook*. Sun elevation and Exoatmospheric Solar Spectral Irradiance are provided in the image metadata from the Satellite Image Vendor DigitalGlobe.
Dark object subtraction (DOS)	DOS corrects for atmospheric scatter and other environmental conditions.	The histogram of each band of the reflectance image is observed and the value at the low end of the curve, which is at the point of having a significant number of pixels (~100) is recorded. That value is then subtracted from its source band to shift the low value close to what should be the actual lowest value.

\* Source: Table 11.4 Earth-Sun Distance in Astronomical Units in the Landsat Data User's Handbook.

### 2.3.2 Producing Vegetation Indices/Ratios from Satellite Images

Several standard vegetative indices and ratios have been calculated by LADWP to correlate to vegetative cover. Until recently, focus of the LADWP vegetative monitoring effort has been to support management activities during the growing season when green grass is the dominant vegetative color at the MV Site. Although all indices and ratios were calculated for each image, special consideration was given to those known to predict green grass vegetative cover. Recently, as the focus shifted to other time periods when green grass was not the dominant color (e.g., during wintertime), other vegetative indices or ratios more appropriate for senesced grass color were utilized. A description of each index or ratio calculated is as follows:

- Normalized Difference Vegetative Index (NDVI). NDVI is a known indicator of green vegetative activity. Green vegetative growth is easily quantified because red light is absorbed by the plant chlorophyll and other wavelengths are reflected. The NDVI standard index is produced with the following equation:

$$NDVI = (band\ 4 - band\ 3) / (band\ 4 + band\ 3)$$

- Soil Adjusted Vegetative Index (SAVI). SAVI was developed as a variation of the NDVI to remove the soil effects on index calculation. The standard SAVI index is produced with the following equation:

$$SAVI = (band\ 4 - band\ 3) / (band\ 4 + band\ 3 + 0.5) * (1 + 0.5)$$

- Simple band ratios have been tested and determined to be useful for extracting green and senesced vegetation. At times, all of these ratios have shown promise as having high correlation to percent cover for the combination of green and brown grass. Image ratios are calculated by simply dividing the bands in the ratio name (i.e., 4/2 image ratio equals band 4 divided by band 2). Ratios historically used include:
  - 4/2 Ratio Image
  - 4/1 Ratio Image
  - 3/2 Ratio Image
  - 3/1 Ratio Image

### 2.3.3 Linear Regression and Percent Cover Calibration

Percent cover was determined from the CT locations by processing of the DPF photos as described above. The ground truthed CT values were obtained through the DPF grass classification process described previously. Procedurally, the percentages were stored as values in a spreadsheet, which were related to the unique location IDs of the ground truth sites. Percent categories assessed included percent green, percent brown, and percent bare ground. The total percent vegetated was determined based on the sum of the percent green and percent brown categories.

Mean values were then obtained from each of the processed index and ratios calculated. For each of these images, a circle (equal in area to a 3x3 pixel array) was used to extract the mean value for each CT location. The values for each location, for each index or ratio calculated, were added to the spreadsheet containing the ground truth percent cover data. The geographically common DPF percent cover values and the 3x3 mean calculation values were correlated through a linear regression calculation resulting in slope and intercept values defining the relationship of the correlation. All ratios and indices calculated were regressed with percent green grass and total percent vegetated, resulting in two sets of slopes, intercepts, and  $r^2$  values.

Slopes and intercepts for the ratio or index were applied with a calibration model ((index x slope) + intercept) within the image analysis software. The output of this calibration model represented a percent cover continuum of values in the imagery (i.e., a percent cover map) (Figure 2-8). This model was run to produce maps for percent green grass and total percent vegetated. A total of 24 of the 51 "active" CT sites were used for this analysis.

Error analysis was performed with the remaining 27 CT sites by comparing percent cover values from those locations to the mean index/ratio calculation from the calibrated percent cover map for those same check points. A difference statistic was then calculated for each check site.

Final tabular results of mean vegetative cover statistics were presented at four different scales for comparison (0.1-acre, 1.0-acre, 10-acre, and 100-acre grids). Construction of the grids was performed in ArcGIS, producing grid cells in four separate shapefiles to cover the entire managed vegetation area. Grids were clipped to exclude non-grass areas such as road and turnouts. Table 2-3 presents mean percent cover statistics for each of the grid cells (0.1-acre, 1.0-acre, 10-acre, and 100-acre) extracted from the March 2005 QuickBird image. The March 2005 cover maps were

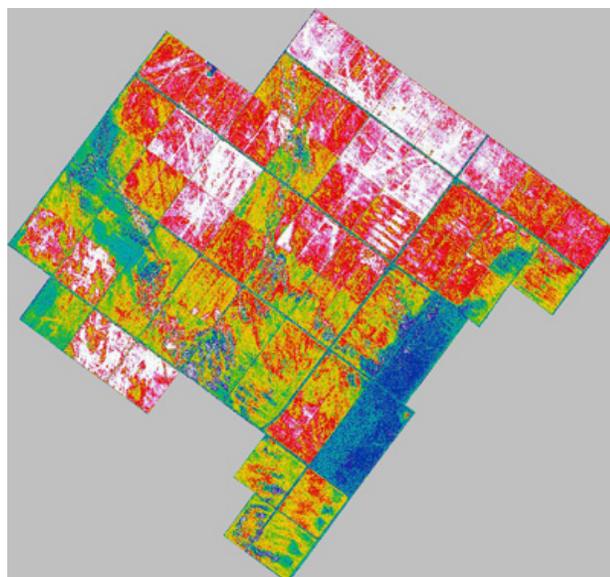


FIGURE 2-8  
Example Vegetative Cover Map

created using the 4/2 image ratio, which returned the highest  $R^2$  with the least error compared to all other indices and ratios tested.

TABLE 2-3

Tabular Vegetative Cover Statistics-March 2005

*Tabular vegetative cover statistics from the March 2005 QuickBird Image. Percent cover was assessed using the 4/2 image ratio.*

<b>Grid Scale</b>	<b>n</b>	<b>Average</b>	<b>SD</b>	<b>%&gt;5</b>	<b>%&gt;10</b>	<b>%&gt;20</b>
Reference			(measured)			
0.1	22,954	23	12	92	83	59
1	2,419	22	11	96	88	59
10	278	22	9	99	93	60
100	38	22	8	100	97	71

## SECTION 3.0

**GBUAPCD VEGETATIVE COMPLIANCE MONITORING  
METHODOLOGY**

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Procedures used by the GBUAPCD to assess vegetative cover on the MV Site have been developing since the completion of the MV DCM in 2003. The following sections briefly describe past methods while focusing largely on the current methodology. The current GBUAPCD method is implied by LADWP from collaborative field efforts in December 2003 and several subsequent reports provided to LADWP by GBUAPCD on behalf of HydroBio (HB). Reports and technical memorandum used for this evaluation include the following:

- Report 2003: Owens Lake Vegetation Compliance Report
- Technical Memorandum June 2004: Managed Vegetation Evaluation
- Report 2004: Owens Lake Vegetation Compliance Report
- Report August, 2005: 3/2 Index Versus Allgrass Methods for Evaluating Managed Vegetation at Owens Lake
- Technical Memorandum March, 2007: Preliminary Products for the Managed Vegetation Land (MVL) (With HydroBio's Initial Thoughts for Remediation)
- Technical Memorandum April, 2007: Managed Vegetation Cover-2005 Growing Season

**3.1 Ground Truthing**

Similar to the LADWP approach for assessing vegetative cover, GBUAPCD uses concurrent collection of ground truthed data (in the form of vegetative cover measurements) to calibrate Quickbird satellite images. In December 2003, a LADWP team (composed of CH2M HILL and Earthworks staff) shadowed GBUAPCD staff in the field as ground truthed data were being collected with a PF device. At that time, the PF data were being collected with the 10-pin 18-inch-wide metal device (Figure 3-1). The PF central rod was pushed into the ground so that the 10 measurement pins barely came into contact with the ground surface. The technician then analyzed each of the (10) pins of the PF by raising each pin to the full height in the PF and then lowering each slowly. As each pin was lowered, it was recorded as hitting either live, dead, or no vegetation. The results of each PF location were recorded onto standard hard copy tally-forms that were later transcribed into an Excel spreadsheet. The ground truthing activity was completed within 2 days of the satellite imagery acquisition date.

In 2006, a new PF device was used by GBUAPCD for ground truthing vegetative cover (Figure 3-1). The new PF device was 5 feet long with 14 pins compared to the old device, which was 18 inches long and only 10 pins. The new PF device improved ground truth vegetative cover characterization by improving the ability to properly characterize the 5-foot inter-row to inter-row distance.



**FIGURE 3-1**

**GBUAPCD Point Frame Device**

*The original PF device (left photo) was 18 inches wide with 10 pins. The new PF device (right photo) is approximately 5 feet wide with 14 pins.*

## **3.2 Calibration Target Characteristics**

### **3.2.1 Calibration Target Size and Shape**

Currently, the GBUAPCD CT size is equivalent to a 5.5m-radius circle, which is approximately 95 m<sup>2</sup> (1023 ft<sup>2</sup>). This area equates to 16 QB pixels, which are averaged and compared to percent cover derived from 30 PF measurements. One PF measurement characterizes approximately 0.05 m<sup>2</sup> (0.5 ft<sup>2</sup>)<sup>1</sup>. The 30 PF measurements taken per CT site represent approximately 1.5 percent of the CT area.

### **3.2.2 Calibration Target Quantity and Distribution**

The quantity and distribution of CT sites is important to proper image calibration and validation. Currently, GBUAPCD ground truths a total of 28 calibration sites. It appears that when possible, the same sites have been used repeatedly year after year. Current GBUAPCD CT locations are presented in Figure 3-2.

As stated in the previous section, the distribution of CT sites compared to the MV cover distribution is equally important to proper image calibration and validation. Current GBUAPCD calibration site distributions relative to the estimated MV Site distribution are presented graphically in Figure 3-3.

<sup>1</sup> Area characterized by a single PF measurement was estimated assuming a 5-foot PF, characterizing an area 5 feet long by 3 inches wide. Although PF measurements are usually not quantified in this manner, it is useful for quantification of area characterized for vegetative cover per CT.

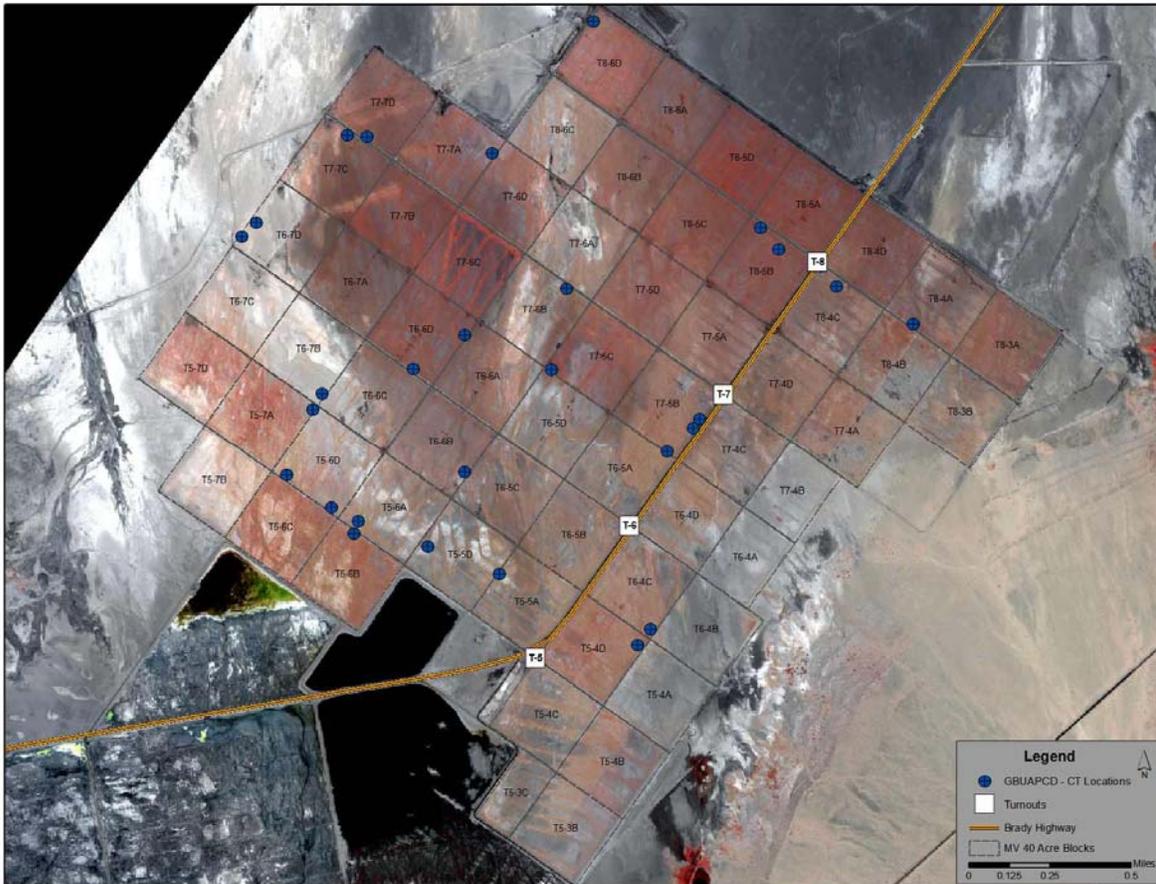


FIGURE 3-2  
Current GBUAPCD CT Locations

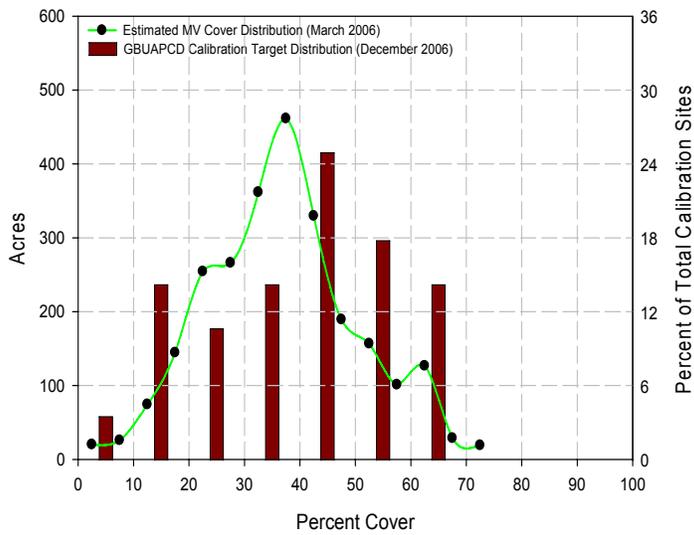


FIGURE 3-3  
Current GBUAPCD Calibration Target Distribution Relative to the MV Cover Distribution

### 3.3 Remote Sensing Image Analysis

#### 3.3.1 Quickbird Image Preprocessing and Vegetative Index/Ratio Calculation

Comparable to the LADWP approach, GBUAPCD image analysis uses imagery from the QuickBird satellite. Details described in several HB Reports and Memorandum (HydroBio 2003-2007) suggests that the standard remote sensing procedures (identical to LADWP methods) are used by GBUAPCD. The following procedures are understood to be identical to those used by LADWP and outlined in Section 2.3.

1. QuickBird image preprocessing
  - Geometric correction
  - Conversion to top of atmosphere radiance
  - Conversion to reflectance (for vegetative indices only)
  - Dark object subtraction
2. Vegetative indices/ratio calculation
  - NDVI
  - SAVI
  - NDVI Offset and NDVI\*<sup>2</sup>
  - 4/2 Ratio Image
  - 4/1 Ratio Image
  - 3/2 Ratio Image
  - 3/1 Ratio Image

#### 3.3.2 Linear Regression and Percent Cover Calibration

GBUAPCD linear regression and percent cover calibration are calculated from 28 ground control sites. The ground truth values (percent cover for each CT) are obtained from PF measurements described in the previous sections. Vegetative cover categories include percent green, percent brown, and percent bare ground. The total percent vegetated cover is determined based on the sum of the percent green and percent brown categories.

Mean values are then obtained from each of the processed index and ratio calculations. For each of these images, a 5.5m-radius circle (equal in area to a 4x4 pixel array) is used to extract the mean value for each ground truth site location. The values for each location, for each index or ratio, are added to a spreadsheet containing the ground truth percent cover data. The geographically common PF percent cover values and the 5.5m-radius circle mean calculation values are correlated through a linear regression calculation that results in a slope and intercept value defining the relationship of the correlation.

The slope and intercept from the index or ratio with the highest coefficient of determination ( $R^2$ ) are applied with a calibration model ((index x slope) + intercept) back to the satellite index or ratio. The final product of the calibration model is a percent cover continuum of values in the imagery, i.e., a percent cover map.

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<sup>2</sup> NDVI Offset and NDVI\* have been mentioned by HB in several reports and memoranda, but LADWP is not currently calculating these indices for vegetative cover assessment.

## SECTION 4.0

## PROPOSED PLAN OF ACTION AND FUTURE COMPLIANCE MONITORING METHODOLOGY

Documented in the previous sections are the current methods used by LADWP and GBUAPCD to quantitatively verify vegetative cover on the MV Site. The basic foundations from which the two methods are constructed are quite similar. Both use ground truth data to calibrate a QuickBird image, resulting in a spatial estimate of vegetative cover. While several similarities are apparent, some minor differences in the mechanics of ground truthing and image calibration do exist. This section identifies those similarities and differences and proposes a collaborative path forward for future compliance monitoring efforts. Current similarities and differences between the two methods are outlined in Table 4-1 and detailed in the following sections.

TABLE 4-1

LADWP and GBUAPCD Managed Vegetative Compliance Monitoring Methods

*Comparison of LADWP and GBUAPCD ground truthing tools, calibration target characteristics, and QB image analysis techniques.*

Specification	Current LADWP Method	Current GBUAPCD Method	Proposed Future Method
<b>Ground Truthing Tool</b>			
Type	DPF	Traditional PF	DPF Methodology
Size	1 DPF: 1.6 m <sup>2</sup> (16.7 ft <sup>2</sup> )	1 PF: 0.05 m <sup>2</sup> (0.5 ft <sup>2</sup> )	
Documentation	Photo history that can be traced and recreated; electronic database of results	Electronic Database of Results	
<b>Calibration Target Characteristics</b>			
Shape	Square 3x3 QB Pixel Area	5.5m-radius circle	5.5m-radius circle
Size	51.8 m <sup>2</sup> (558 ft <sup>2</sup> )	95 m <sup>2</sup> (1,023 ft <sup>2</sup> )	95 m <sup>2</sup> (1,023 ft <sup>2</sup> )
Area Ground Truthed	1 DPF equivalent to 1.6 m <sup>2</sup> (16.7 ft <sup>2</sup> ) or 3% of the calibration target area	30 PFs equivalent to 1.4 m <sup>2</sup> (15 ft <sup>2</sup> ) or 1.5% of the calibration target area	9.5 m <sup>2</sup> (102 ft <sup>2</sup> ) or 10% of the calibration target area
Number	51 sites	28 sites	40 sites
Distribution	See Figure 4-2A	See Figure 4-2A	See Figure 4-2B
<b>QB Image Analysis Techniques</b>			
Image Preprocessing	Geocorrection, Conversion to TOA, Conversion to RefleCTnce, Dark Object Subtraction	Geocorrection, Conversion to TOA, Conversion to RefleCTnce, Dark Object Subtraction	Geocorrection, Conversion to TOA, Conversion to RefleCTnce, Dark Object Subtraction
Index / Ratio Calculated	NDVI, SAVI, 3/2 ratio, 4/2 ratio, 4/1 ratio, 3/1 ratio	NDVI, SAVI, 3/2 ratio, 4/2 ratio, 4/1 ratio, 3/1 ratio	NDVI, SAVI, 3/2 ratio, 4/2 ratio, 4/1 ratio, 3/1 ratio

TABLE 4-1

LADWP and GBUAPCD Managed Vegetative Compliance Monitoring Methods

*Comparison of LADWP and GBUAPCD ground truthing tools, calibration target characteristics, and QB image analysis techniques.*

Specification	Current LADWP Method	Current GBUAPCD Method	Proposed Future Method
Index / Ratio Calibration	Index / ratio calibrated using linear regression on 25 of 51 calibration sites	Index / ratio calibrated using linear regression on 28 of 28 calibration sites	Index / ratio calibrated using linear regression on 25 of the 40 calibration sites
Index / Ratio Validation	Index / ratio validated using 26 of the 51 calibration sites	None	Index / ratio validated using 15 of the 40 calibration sites
Index / Ratio Selection Criteria	Strictly use NDVI	Varies based on R <sup>2</sup>	Index / ratio selection criteria based on R <sup>2</sup> and validation results
Data Format and Sharing	LADWP Only	GBUAPCD Only	Open book policy between the two parties

#### 4.1 Ground Truthing Tool

Currently, LADWP and GBUAPCD are utilizing different ground truthing tools to assess vegetative cover. GBUAPCD uses a traditional PF method; LADWP uses a novel DPF method. Both methods have merit in quantifying vegetative cover, but each has inherent advantages and disadvantages. The traditional PF method is field proven, yet can be considered subjective in nature. Checking of past PF results after field collection is impossible. DPF results can be traced through time, recreated from archived DPF images, and re-processed to validate previous measurements long after the related field conditions have passed. A recent study of sagebrush steppe vegetation by Seefeldt and Booth (2006) confirmed the advantages of ground truthing vegetative cover with 2m AGL digital images. They found that for the purpose of measuring plant cover, digital photos taken from 2m AGL performed as well or better than traditional visual estimation techniques for speed, standard deviation, and cost. They concluded that the acquisition of permanent digital photos taken at 2m AGL are an important advantage because vegetation can be analyzed retrospectively using improved software or to answer different questions; and changes in vegetation over time can be more accurately determined, particularly if quadrats are permanently located.

While DPF technology has proven successful at evaluating vegetative cover, direct assessment of its accuracy and reliability in producing comparable results to traditional PF methodology has not been attempted. For this reason, it is proposed that a side-by-side, quantitative comparison between the two methods be completed. The results of the evaluation are of interest to both GBUAPCD and LADWP, so it is proposed that the comparison be conducted in a collaborative manner, with GBUAPCD participation in field work, open sharing of data and results of analyses, and joint development of a single, shared interpretation and implications for future monitoring of vegetation. It is further proposed that the study be focused on evaluation of the DPF methodology as proposed by LADWP relative to traditional point framing. Finally, it is proposed that a single protocol should be drafted by LADWP for use in developing future PMPs, and that this protocol should then be reviewed and finalized with GBUAPCD<sup>3</sup>.

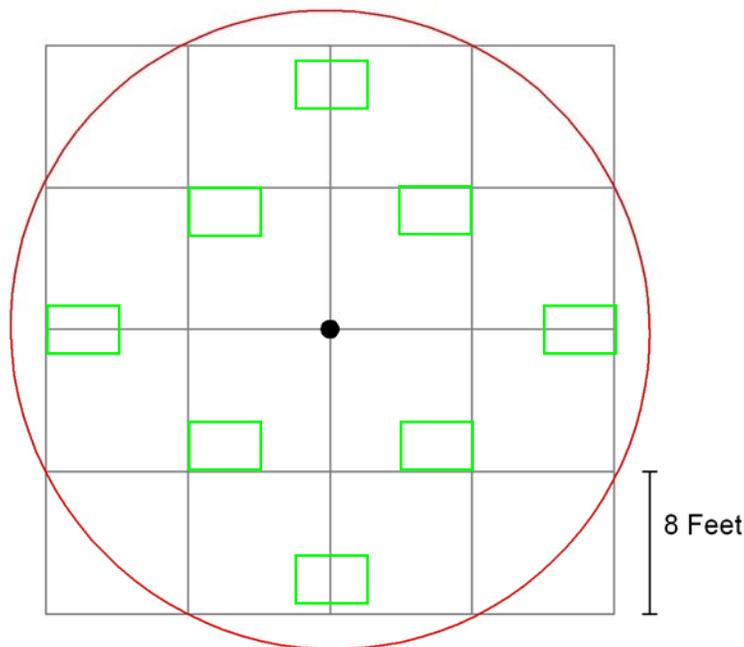
<sup>3</sup> The collaborative study proposed in this section was completed June 2007. Final methodology utilized and subsequent results of the study are attached to this document as Addendum A.

#### 4.1.1 Proposed Collaborative Study

Direct comparisons of percent cover estimates within each DPF for each CT will be evaluated for accuracy and repeatability. Within each CT area (CT) a systematic sampling grid will be assigned to indicate the sampling locations of the DPF photos (Figure 4-1). While the a-priori locations of the sampling points would be systematic, once applied in the field, these would yield conditions randomly distributed across the range of vegetation cover existing in each CT, and independent of the field technician's judgment. DPF images will be taken from inter-row to inter-row and analyzed in by three different techniques to obtain three comparable vegetative cover estimates. The three techniques consist of:

1. Analyzing vegetative cover over the entire image with spectral classification methodology, essentially sampling the entire 16.5 feet<sup>2</sup> area of the images (~17 percent of the CT).
2. Analyzing a subset of each picture by overlaying a set of grid points along several linear transects ("digital pins"). By systematically sub sampling points in the image, this methodology is the digital equivalent to the traditional PF method applied by the GBUAPCD (Section 3), except that a larger number of points are observed, and the points are in a two-dimensional grid as opposed to the PF's linear array.
3. Ground-based PF measurements will be completed within each DPF footprint. The amount and location of the ground-based PF measurements within the DPF footprint will be determined in the field by LADWP and GBUAPCD personnel. A set of random x-y locations and orientations will be available for the field team's use in locating PF observations, if desired.

The three vegetative cover estimates derived from the techniques above will be compared within and among all DPF photos per CT. Results will be used to evaluate the validity of DPF methodology to traditional PF methodology.



**FIGURE 4-1**

Conceptual Design of Calibration Target Layout

*Shown is the proposed 5.5m-radius circle used for the ground truth measurements (red circle), the 2.4m grid cells as seen by the QuickBird satellite (gray lines), and the DPF locations (green rectangles). Ground-based PF measurements will be made within each DPF footprint (green rectangles).*

## 4.2 Calibration Target Area Characteristics

As discussed previously, accurate satellite image calibration is dependent on several CT characteristics. These include CT size, shape, number, distribution, and internal homogeneity. Several similarities and relatively few differences existed between the GBUAPCD and LADWP methods (Table 4-1). Each characteristic is discussed below and if differences were identified, a plan to address the differences is presented.

### 4.2.1 Calibration Target Size and Shape

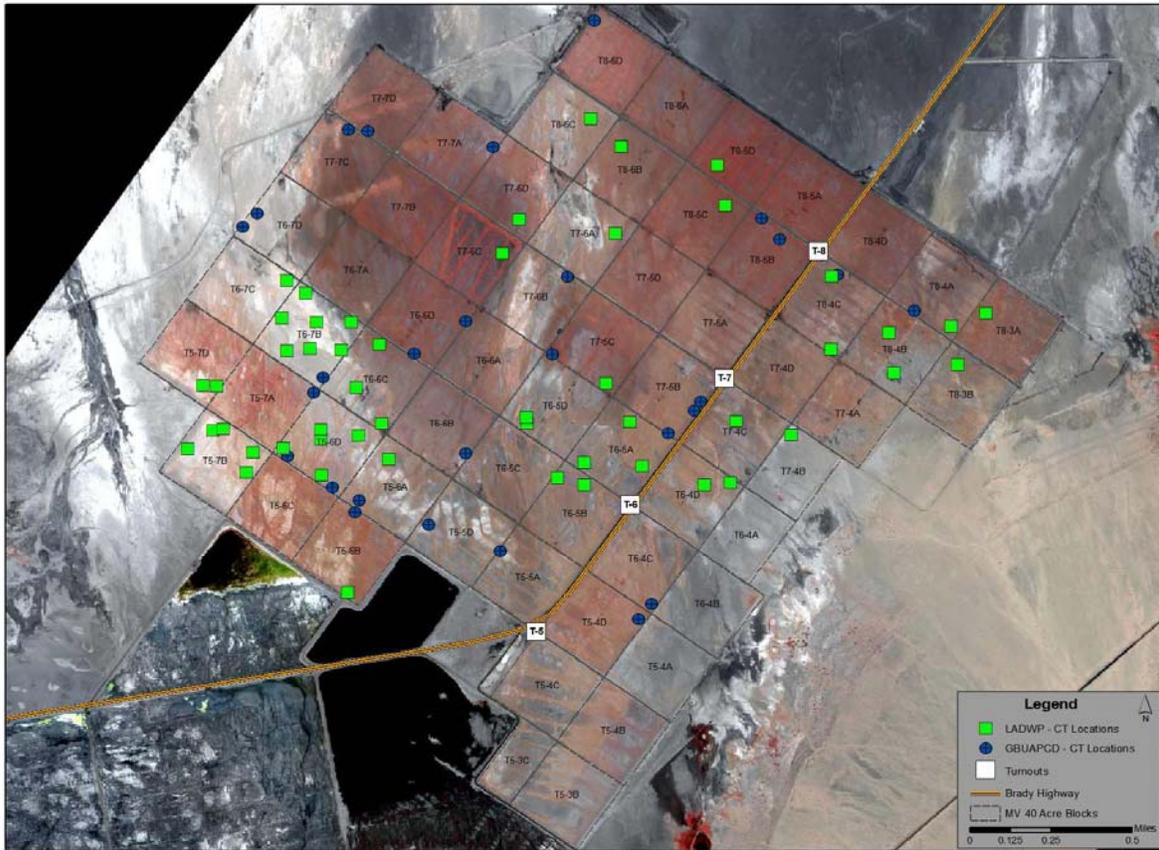
Currently, GBUAPCD CTs are sized to a 5.5m-radius circle centered on each CT site. Each CT consists of approximately 16 QB pixels and characterizes an area of 95 m<sup>2</sup> or 1,023 ft<sup>2</sup>. The 16 QB pixels are averaged and compared to a percent cover value derived from approximately 30 PF measurements. Those 30 PF measurements characterize an area of approximately 15ft<sup>2</sup>, which equates to roughly 1.5 percent of the CT area. In contrast, each LADWP CT is equivalent to a 3x3 QB pixel area (9 QB pixels), which is approximately 52 m<sup>2</sup> or 558 ft<sup>2</sup>. The 9 QB pixels are averaged and compared to percent cover derived from one DPF photo. One DPF photo characterizes 16.5 ft<sup>2</sup> which is 3 percent of the CT area.

The differences in methods explained above are relatively minor. GBUAPCD's CT area is circular compared to LADWP's square pixel method. LADWP's CT area is roughly half the size of GB's CT area. While this may seem significant, both characterize relatively small areas. It is proposed that future CT areas be sized according to current GBUAPCD methodology, equivalent to the area of a 5.5m-radius circle (95 m<sup>2</sup> or 1,023 ft<sup>2</sup>).

Both methods inadequately characterize percent cover relative to the entire area of the calibration site. GBUAPCD's method characterizes approximately 1.5 percent of the CT area with the PF device, while LADWP's method characterizes approximately 3 percent of the area using DPFs. To ensure that CT vegetative cover levels are adequately characterized, the percentage of area evaluated for vegetative cover within the each CT should be increased to minimum of 10 percent. Statistical analysis of subsampling variability can then be applied to optimize the number of subsamples, which may turn out to be different than this initial, conservative level. The optimum subsample number may change over time, so it is recommended that the 10 percent subsample be retained through several events and varying conditions, and that all of these events should be analyzed to help select an optimum long-term subsampling intensity.

### 4.2.2 Calibration Target Quantity and Distribution

As discussed in Sections 2.2 and 3.2, GBUAPCD and LADWP methods utilize different quantities of CT sites. GBUAPCD samples anywhere from 16 to 28 CT sites, while LADWP samples 51 CT sites. For future compliance monitoring events, it is proposed that a total of 40 CT sites, composed from historic LADWP and GBUAPCD CT locations, be utilized (Figure 4-2). Of the total 40 CT sites, 25 would be employed to build the QuickBird calibration curve, and the remaining 15 would serve as an independent dataset. The latter is necessary to assess the performance of the calibration model with statistics independent of the original calibration. This method provides a more meaningful evaluation of performance than the R<sup>2</sup> of the calibration itself, by assessing the success of the model in accurately mapping cover at various locations on the site. Ultimately, the coefficient of determination and the independent data set will be used together to determine which band ratio calculation is most appropriate for that particular satellite image date. This flexibility in choice of band ratio for each date is similar to the approach that has been taken by HydroBio, and differs from the consistent use of the same band ratio (despite variable performance over time) taken by LADWP.



**FIGURE 4-2**  
 Current GBUAPCD and LADWP CT Locations  
*Future CT locations should be composed of historic GBUAPCD and LADWP CT locations where possible.*

Equally important to image calibration is the distribution of CT sites relative to the distribution of vegetative cover on the MV Site. The 40 CTs will be distributed over different cover classes to: 1) Represent the full range of cover classes on the MV Site, and, 2) provide an emphasis on the cover classes of greatest interest for compliance purposes (0 to 30 percent). The cover distribution of the current GBUAPCD and LADWP sites is shown in Figure 4-3A. While the GBUAPCD CT sites overrepresent the higher cover classes, LADWP CT sites have insufficient representation in middle cover classes (20 to 40 percent cover). It is proposed that a distribution similar to that depicted in Figure 4-3B be adopted, to provide sufficient characterization in all cover classes for both calibration as well as verification purposes, and to emphasize the critical 0 to 30 percent interval.

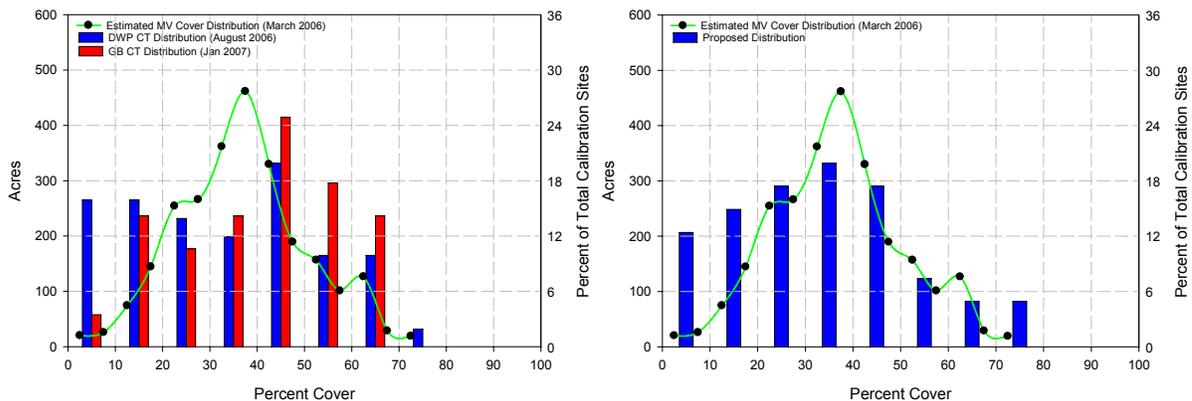


FIGURE 4-3

Figure 4-3.A: Estimated MV Cover Distribution relative to LADWP and GBUAPCD Calibration Site Distribution

Figure 4-3.B: Estimated MV Cover Distribution and Proposed Calibration Site Distribution

### 4.2.3 Calibration Target Homogeneity

DWP and GBUAPCD have made extensive efforts in the past to select CT sites that appear to be homogenous in cover. Subsampling results for vegetative cover within each CT will be analyzed for homogeneity. From these data, a homogeneity criterion will be statistically derived and used to identify suitable CTs for future monitoring efforts.

## 4.3 QuickBird Image Analysis Criteria

LADWP and GBUAPCD methods for preparation of QuickBird images for verifying vegetative cover are almost identical. Methodology for future compliance monitoring events is detailed in the following sections.

### 4.3.1 Preprocessing of Quickbird Satellite Images

Steps outlined in Table 4-2 (identical to current GBUAPCD and LADWP methodologies) will be followed to prepare Quickbird images for mapping vegetative cover.

TABLE 4-2

QuickBird Image Preprocessing Steps

*The steps outlined in this Table will be used to preprocess QuickBird imagery.*

<b>Preprocessing Correction Conversion</b>	<b>Explanation</b>	<b>Method Details</b>
Geometric correction (GC)	GC is used to rectify the satellite image to known ground control points. This essentially adjusts the image to known corresponding visual features.	Increase the quantity of differential GPS coordinates of known visual features used as GC points to visually identify in reference panchromatic (0.6m image) and newly acquired panchromatic image, geometric model calculated and applied to both 0.6m Pan and 2.4m Multispec imagery. Image projection parameters used for GC: UTM, Zone 11, GRS 1980 Spheroid; NAD83 Datum; Nearest Neighbor Resampling; 2.4 Meter Pixel Size
Conversion of image digital number (DNs) to top-of-atmosphere (TOA) Spectral Radiance	Conversion to TOA spectral radiance normalizes the data for the incident energy of the sun. This changes with solar angle and distance which is a factor of time of day and year.	Each band of the image is multiplied by a K-Conversion Factor and divided by the bandwidth to obtain TOA radiance values. K -Conversion Factors and Bandwidths: Band 1 = 0.0160412, 0.068; Band 2 = 0.0143847, 0.099; Band 3 = 0.0126735, 0.071; Band 4 = 0.0154242, 0.114
Conversion of TOA radiance to reflectance	Reflectance values are used in the calculation of some vegetative indices (e.g., NDVI, SAVI, etc.).	Reflectance calculation: $(\text{image band} \times \text{earth-sun distance} \times \pi) / (\text{irradiance} \times \text{COS}(90 \text{ degrees} - \text{sun elevation}))$ The Earth – Sun Distance is estimated from the Landsat Data User's Handbook*. Sun elevation and Exoatmospheric Solar Spectral Irradiance are provided in the image metadata from the Satellite Image Vendor DigitalGlobe.
Dark object subtraction (DOS)	DOS corrects for atmospheric scatter and other environmental conditions.	The histogram of each band of the reflectance image is observed and the value at the low end of the curve, which is at the point of having a significant number of pixels (~100) is recorded. That value is then subtracted from its source band to shift the low value close to what should be the actual lowest value.

TABLE 4-2

QuickBird Image Preprocessing Steps

*The steps outlined in this Table will be used to preprocess QuickBird imagery.*

Preprocessing Correction Conversion	Explanation	Method Details
---	-------------	----------------

\* Source: Table 11.4 Earth-Sun Distance in Astronomical Units in the Landsat Data User's Handbook.

### 4.3.2 Producing Vegetation Indices/Ratios from Satellite Images

Standard vegetative indices and ratios have been calculated by LADWP and GBUAPCD. It has been documented extensively by GBUAPCD and LADWP that the ratio or index providing the best correlation with vegetative cover varies due to environmental and atmospheric conditions. For that reason, we will test all indices and ratios to identify the most appropriate candidate for each vegetative cover estimate. Not only should indices and ratios that have been used in the past be calculated for continuity and historical reference, but others that appear to hold promise should be evaluated. A number of standard indices and ratios common to remote sensing that might produce a strong relationship to observed vegetative cover are presented in Table 4-3.

TABLE 4-3

Vegetative Indices and Ratios

*This table contains a list of vegetative indices and ratios that are currently used by GBUAPCD or LADWP. In addition, other documented indices and ratios are presented for potential use in future compliance monitoring efforts.*

Vegetative Index or Ratio	Mathematical Formula
Normalized Difference Vegetative Index (NDVI). <sup>a</sup>	$NDVI = (\text{band } 4 - \text{band } 3) / (\text{band } 4 + \text{band } 3)$
Normalized Difference Vegetative Index Offset (NDVI <sup>OFFSET</sup> ). <sup>a</sup>	GBUAPCD Formula
Normalized Difference Vegetative Index* (NDVI*). <sup>a</sup>	GBUAPCD Formula
Soil Adjusted Vegetative Index (SAVI). <sup>a</sup>	$SAVI = (\text{band } 4 - \text{band } 3) / (\text{band } 4 + \text{band } 3 + 0.5) * (1 + 0.5)$
4/2 Ratio Image. <sup>a</sup>	Band 4 / Band 2
4/1 Ratio Image. <sup>a</sup>	Band 4 / Band 1
3/2 Ratio Image. <sup>a</sup>	Band 3 / Band 2
3/1 Ratio Image. <sup>a</sup>	Band 3 / Band 1
Ratio Vegetation Index (RVI). <sup>b</sup>	$RVI = NIR/Red$
Infrared Percentage Vegetation Index (IPVI). <sup>b</sup>	$IPVI = NIR/NIR + Red$
Difference Vegetation Index (DVI). <sup>b</sup>	$DVI = NIR - Red$
Perpendicular Vegetation Index (PVI). <sup>b</sup>	$PVI = \sin(a)NIR - \cos(a)Red$ where a is the angle between the soil line and the NIR axis
Weighted Difference Vegetation Index (WDVI). <sup>b</sup>	$WDVI = NIR - g * Red$ where g is the slope of the soil line
Transformed Soil Adjusted Vegetation Index (TSAVI). <sup>b</sup>	$TSAVI = s(NIR - s * Red - a)/(a * NIR + Red - a * s + X * (1 + s * s))$ where a is the soil line intercept, s is the soil line slope, and X is an adjustment factor which is set to minimize soil noise (0.08 in original papers)

TABLE 4-3

## Vegetative Indices and Ratios

*This table contains a list of vegetative indices and ratios that are currently used by GBUAPCD or LADWP. In addition, other documented indices and ratios are presented for potential use in future compliance monitoring efforts.*

Vegetative Index or Ratio	Mathematical Formula
Modified Soil Adjusted Vegetation Index (MSAVI) <sup>b</sup>	$MSAVI = (NIR - Red / NIR + Red + L) * (1 + L)$ where $L = 1 - 2 * s * NDVI * W DVI$
second Modified Soil Adjusted Vegetation Index (MSAVI2) <sup>b</sup>	$MSAVI2 = (1/2) * (2 * (NIR + 1) - \sqrt{(2 * NIR + 1)^2 - 8(NIR - Red)})$
Enhanced Vegetation Index (EVI) <sup>b</sup>	$EVI = 2.5 * (NIR - Red) / (NIR + (6 * Red) - (7.5 * Blue) + 1)$
Green Difference Vegetation Index (GDVI) <sup>b</sup>	$GDVI = NIR - Green$
Green Normalized Difference Vegetation Index (GNDVI) <sup>b</sup>	$GNDVI = (NIR - Green) / (NIR + Green)$
Green Optimized Soil Adjusted Vegetation Index (GOSAVI) <sup>b</sup>	$GOSAVI = (NIR - Green) / (NIR + Green + 0.16)$
Green Ratio Vegetation Index (GRVI) <sup>b</sup>	$GRVI = NIR / Green$
Green Soil Adjusted Vegetation Index (GSAVI) <sup>b</sup>	$GSAVI = ((NIR - Green) / (NIR + G + 0.5)) * 1.5$
Norm NIR <sup>b</sup>	$Norm\ NIR = NIR / (NIR + Red + Green)$
Norm R <sup>b</sup>	$Norm\ R = Red / (NIR + Red + Green)$
Norm G <sup>b</sup>	$Norm\ G = Green / (NIR + Red + Green)$
Rel NIR <sup>b</sup>	$Rel\ NIR = NIR_{plot} / NIR_{reference\ plot}$
Rel Red <sup>b</sup>	$Rel\ Red = Red_{plot} / Red_{reference\ plot}$
Rel Green <sup>b</sup>	$Rel\ Green = Green_{plot} / Green_{reference\ plot}$
Optimized Soil Adjusted Vegetation Index (OSAVI)	$OSAVI = (NIR - Red) / (NIR + Red + 0.16)$
Relative Difference Vegetation Index (RDVI) <sup>b</sup>	
Relative Green Difference Vegetation Index (RGDVI) <sup>b</sup>	$RGDVI = GDVI_{plot} / GDVI_{reference\ plot}$
Relative Green Normalized Difference Vegetation Index (RGNDVI) <sup>b</sup>	$RGNDVI = DV_{plot} / DV_{reference\ plot}$
Relative Green Optimized Soil Adjusted Vegetation Index (RGOSAVI) <sup>b</sup>	$RGOSAVI = GOSAVI_{plot} / GOSAVI_{reference\ plot}$
Relative Green Ratio Vegetation Index (RGRVI) <sup>b</sup>	$RGRVI = GRVI_{plot} / GRVI_{reference\ plot}$
Relative Green Soil Adjusted Vegetation Index (RGSAVI) <sup>b</sup>	$RGSAVI = GSAVI_{plot} / GSAVI_{reference\ plot}$
Relative Normalized Difference Vegetation Index (RNDVI) <sup>b</sup>	
Relative Optimized Soil Adjusted Vegetation Index (ROSAVI) <sup>b</sup>	$ROSAVI = OSAVI_{plot} / OSAVI_{reference\ plot}$
Relative Ratio Vegetation Index (RRVI) <sup>b</sup>	$PRVI = RV_{plot} / RV_{reference\ plot}$

TABLE 4-3

## Vegetative Indices and Ratios

*This table contains a list of vegetative indices and ratios that are currently used by GBUAPCD or LADWP. In addition, other documented indices and ratios are presented for potential use in future compliance monitoring efforts.*

Vegetative Index or Ratio	Mathematical Formula
Relative Soil Adjusted Vegetation Index (RSAVI) <sup>b</sup>	$RSAVI = SAVI_{plot} / SAVI_{reference\ plot}$
Atmospherically Resistant Vegetation Index (ARVI) <sup>b</sup>	$ARVI = -0.18 + 1.17 * NDVI$
Soil Corrected & Atmospherically Resistant Vegetation Index (SARVI) <sup>b</sup>	$SARVI = Corrected\ NIR - Corrected\ rb / Corrected\ NIR + Corrected\ rb$ Where $Corrected\ rb = Corrected\ Red - \gamma(Corrected\ Blue - Corrected\ Red)$ and $\gamma$ is an analyst supplied value between 0.7 and 1.3
Simple Ratio Vegetation Index (SRVI) <sup>b</sup>	
Modified Non-Linear Vegetation Index (MNLI) <sup>b</sup>	$MNLI = (NIR2 - Red)(1 + L) / (NIR2 + Red + L)$
Modified Simple Ratio (MSR) <sup>b</sup>	$MSR = (NIR/Red - 1) / (NIR/Red)^{1/2} + 1$
NDVI*SR <sup>b</sup>	$NDVI*SR = (NIR2 - Red) / (NIR + Red2)$
SAVI*SR <sup>b</sup>	$SAVI*SR = (NIR2 - Red) / (NIR + Red + L) * Red$

<sup>a</sup> Vegetative indices or ratios historically used by GBUAPCD or LADWP.

<sup>b</sup> Other documented vegetative indices or ratios that could be useful for compliance monitoring efforts.

### 4.3.3 Linear Regression Calibration and Selection Criteria for Indices and Ratios

Linear regression will be performed with each of the processed indices and ratios. Mean vegetative cover values within each of 25 of the 40 calibration sites will be employed. The slope and intercept for each will be applied to the source index or ratio to produce preliminary vegetation cover maps. The predicted percent cover by each method will then be checked against the mean of cover results within each of the remaining 15 validation sites. The statistical comparison of the linear regression equations with this independent dataset will then be used to determine which combination of field and remote sensing methodologies produces the most accurate result, and should be retained to generate the final vegetation cover map. Specific statistical methods and their explanation are given in Table 4-4

TABLE 4-4

## Vegetative Model Statistical Performance Measures

*Statistical methods used for ranking vegetative index ratio model performance*

Vegetative Model Statistical Performance Measures	Definition / Explanation for Use
R <sup>2</sup> -calibrate	Coefficient of determination based on the linear regression between the vegetative indices / ratios and the ground-based cover measurement. The corresponding linear regression curve serves as the calibration equation based on which the cover of the entire MV-area is estimated

TABLE 4-4

## Vegetative Model Statistical Performance Measures

*Statistical methods used for ranking vegetative index ratio model performance*

Vegetative Model Statistical Performance Measures	Definition / Explanation for Use
R <sup>2</sup> -check	Coefficient of determination based on the linear regression between actual ground-based cover measurements and the estimated cover based on the calibration equation. Since this regression is based on an independent set of field sampling points that was not applied to build the calibration curve, this can be considered an independent test of the "goodness of fit" of the calibration equation.
Mean normalized bias (MNB)	MNB is defined as the difference between the predicted and the observed cover values, of the independent data set, normalized to the observed cover value. It provides an indication of the overall error in the cover prediction model, as well as the direction of the error, specifically, over- or under prediction.
Mean normalized error (MNE)	MNE is defined as the mean of absolute values of MNB, and therefore does not distinguish between under- and over predictions. This makes it a suitable indicator of the overall magnitude of the mean error, since over- and under predictions do not cancel each other out, as is the case with the MNB.
Mean fractional bias (FB)	FB is defined as the mean of the differences between the predicted and the observed cover values, of the independent data set, normalized to the sum of the observed and predicted cover values. This normalization step reduces the influence of large outlying values, either over- or over predictions, on the mean error statistic. It provides an indication of the overall error, as well as the direction of the error, specifically, over- or under prediction.
Mean absolute fractional bias (AFB):	AFB is defined as the mean of the absolute differences between the predicted and the observed cover values, of the independent data set, normalized to the sum of the observed and predicted cover values. This normalization step reduces the influence of large outlying values on the mean error statistic. Similar to the MNE, it is an indicator of the overall magnitude of the mean error, since over- and under predictions do not cancel each other out, as is the case with the FB.

As an example, the relative performance of the each ratio / index for each statistical comparison described in Table 4-4 (six per image date) for the March 2005 QB image are presented in Table 4-5. Only ratios and indices historically used by GBUAPCD and LADWP are presented in this analysis.

In the future, when a QB image is acquired for cover estimate purposes, statistical results will be used to sum, score, and ultimately rank each of the ratio / indices from Section 4.3.2 based on the following two steps:

1. Sum each of the five independent model performance measures, essentially all of the above except the R<sup>2</sup>-calibrate, by calibration method. The overall sum consists of the sum of each the error indices and the inverse of R<sup>2</sup>-check (Table 4-5). Each index will then be ranked by calibration method. The calibration method with the lowest total sum (and rank) is considered to be the best performing method by this statistical comparison.

**TABLE 4-5**  
Statistical Comparison Method Results  
*Statistical comparison results for March 2005 QB image.*

Ratio / Index	Calibrate							Overall Sum <sup>1</sup>	Overall Rank <sup>2</sup>
	R <sup>2</sup>	Check R <sup>2</sup>	MNB	MNE	FB	AFB	Abs(FB)		
NDVI	0.56	0.67	0.63	1.09	-0.16	0.49	0.16	3.9	2
SAVI	0.38	0.62	0.61	1.05	-0.11	0.49	0.11	3.9	3
3/2 Ratio	0.49	0.54	0.29	0.93	-0.29	0.62	0.29	4	4
3/1 Ratio	0.38	0.31	0.66	1.35	-0.29	0.68	0.29	6.2	6
4/2 Ratio	0.6	0.64	0.41	0.96	-0.23	0.56	0.23	3.7	1
4/1 Ratio	0.5	0.52	0.63	1.27	-0.29	0.64	0.29	4.8	5

<sup>1</sup> Overall sum equal the sum of individual ranks for respective ratio / indices.

<sup>2</sup> Overall rank determined by overall score. Lowest score = 1, highest score = 5.

- Determine the most appropriate vegetative index / ratio to be retained by ranking each of the five independent model performance measures, individually (essentially all of Table 4-4 except the R<sup>2</sup> –calibrate) from best to worst, for each statistical method (Table 4-6). The best and worst performing calibration methods are assigned the lowest and highest rank, respectively 1 and 6. Next, all five ranks will be summed over each of the six calibration methods, and the sum of the ranks will be ranked by calibration method. The calibration method with the lowest total sum (and rank) is considered the best performing method.

**TABLE 4-6**  
Statistical Ranking Scores  
*Ranking Scores for Statistical comparison of the March 2005 QB image. Results derived from Table X-X*

Ratio / Index	Calibrate R <sup>2</sup>	Check R <sup>2</sup>	MNB	MNE	Abs(FB)	AFB	Overall Score <sup>1</sup>	Overall Rank <sup>2</sup>
NDVI	2	1	4	4	2	1	14	2
SAVI	6	3	3	3	1	2	18	3
3/2 Ratio	4	4	1	1	6	4	20	4
3/1 Ratio	5	6	6	6	5	6	34	6
4/2 Ratio	1	2	2	2	3	3	13	1
4/1 Ratio	3	5	5	5	4	5	27	5

<sup>1</sup> Overall score equal the sum of individual ranks for respective ratio / indices.

<sup>2</sup> Overall rank determined by overall score. Lowest score = 1, highest score = 5.

Final ratio / index selection for each image date will be determined by the quantitative results in steps 1 and 2 above. As an example, the 4/2 ratio performed the best for the March 2005 QB image (Table 4-6). It is possible that in some cases more than one method could be considered to perform equally well (i.e. overall sum and score are equal). In this case, a qualitative judgment call will be made on which index or ratio should be selected.

## SECTION 5.0

# CONCLUSIONS

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This report outlined current GBUAPCD and LADWP vegetative compliance monitoring methodologies and proposed a methodology for future compliance monitoring efforts. Several similarities and very few differences were identified between the two methods. When minor differences were recognized, the preferred method for future compliance monitoring events was proposed. , a plan to collaboratively address the difference was proposed. Each characteristic and its associated category are summarized below.

1. Similarities between the two methods included the following:
  - Image analysis preprocessing techniques
  - Image analysis index/ratio calculation
  - Image analysis index/ration calibration techniques
2. Minor differences between the two methods included:
  - CT size and shape
  - CT number and distribution
  - Index / ratio selection criteria
  - Index / ratio validation
3. Significant differences between the two methods for which a collaborative study was proposed include the following:
  - Ground truthing tool

When finalized, the methodology presented in this report for future compliance monitoring events should provide the desired outcomes for regulatory evaluation of vegetative cover at Owens Lake.

SECTION 6.0  
**WORK CITED**

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**ADDENDUM A**

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**Quantitative Comparison of Digital Point Frame and Traditional Point Frame Ground Truth Data (June 2007)**

## 1.0 Introduction and Purpose

The Los Angeles Department of Water and Power (LADWP) and Great Basin Unified Air Pollution Control District (GBUAPCD) use different ground-truthing tools to assess vegetative cover. GBUAPCD uses a traditional point frame (PF) method; LADWP uses a novel digital point frame (DPF) method. Both methods have merit in quantifying vegetative cover, but each has inherent advantages and disadvantages. The traditional PF method is field proven, but it can be considered subjective in nature and verification of PF results after field collection is impossible. DPF results can be traced through time, re-created from archived DPF images, and re-processed to validate previous measurements long after the related field conditions have passed. While DPF technology has proven successful at evaluating vegetative cover in the past, direct assessment of its accuracy and reliability in producing comparable results to traditional PF methodology had not been completed. Therefore, in June 2007 representatives from GBUAPCD and LADWP initiated a collaborative comparison study (study) designed to compare the two methods to determine which method was appropriate for future compliance monitoring events. Comprehensive details on the two methods are presented in the main report to which this addendum is attached.

## 2.0 Methodology

This section describes the methodology used to identify and characterize vegetative cover on appropriate calibration targets for the study. Additional background information on the basis of each methodology can also be found in the main report, Section 4.0.

### 2.1 Calibration Target (CT) Selection

Historic GBUAPCD and LADWP CT sites formed the basis from which CT locations were selected for use in the study. Care was taken to identify CT locations that were distributed over different cover classes that: 1) represented the full range of cover classes on the MV Site, 2) provided sufficient spatial distribution across the MV site, and, 3) provided an emphasis on the cover classes of greatest interest for compliance purposes (0 to 30 percent). The actual vegetative cover distributions of the CT locations utilized in the study are shown in Figure A-1a. The spatial distribution of those same sites on the MV is shown in Figure A-1b.

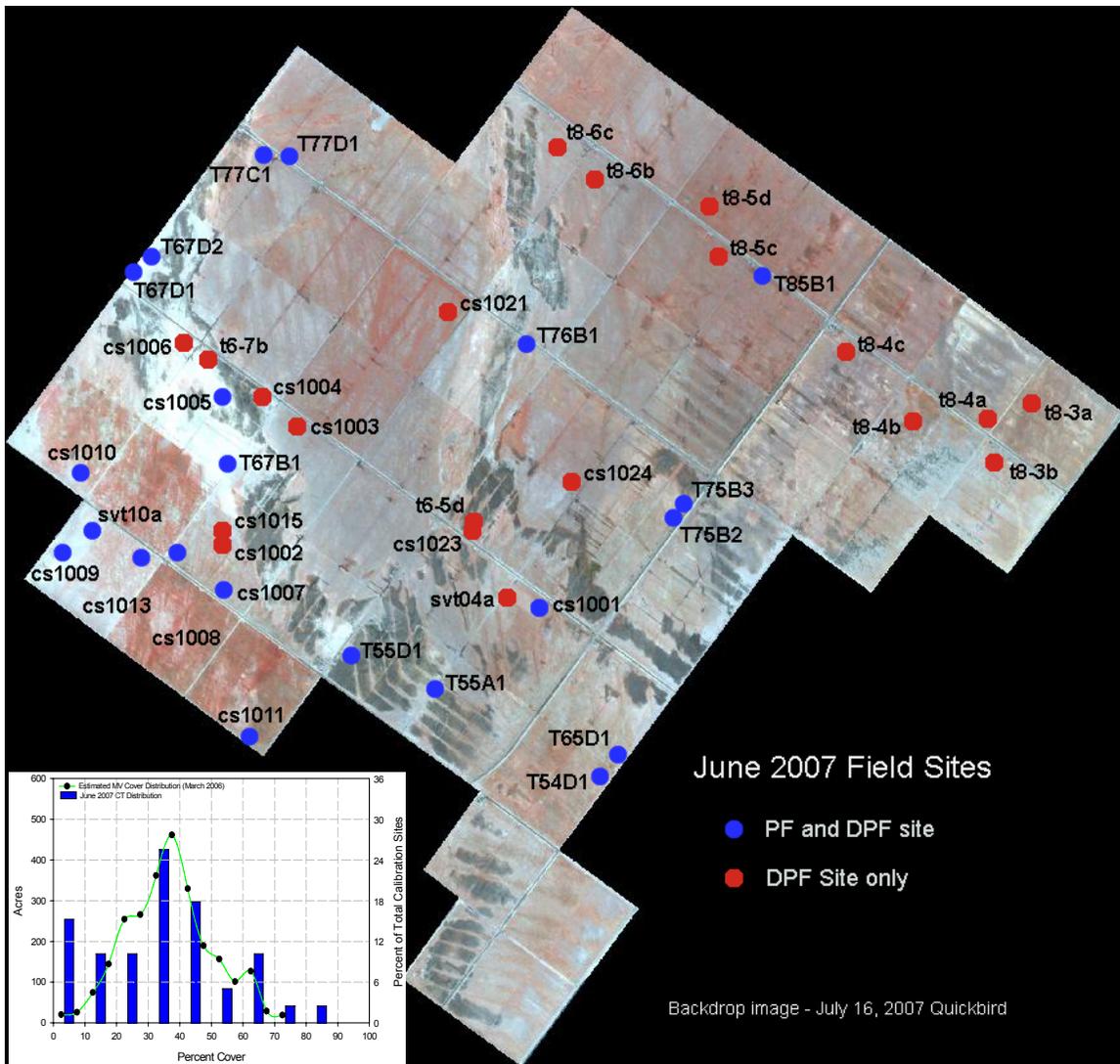


FIGURE A-1  
 Figure A-1a: Vegetative Cover Distribution of CTs Utilized in the Study  
 Figure A-1b: Spatial Distribution of CTs used

## 2.2 CT Vegetative Cover Characterization

As discussed in Section 4.0 of the main report, GBUAPCD and LADWP CT size was determined to be equivalent to a 5.5m-radius circle centered on the middle of the CT location. This size equated to approximately 16 QB pixels, which were averaged and compared to percent cover derived from the PF or DPF measurements discussed below.

### PF Characterization Methodology

Current GBUAPCD PF methodology was used in the study. The PF consisted of a 5-foot long device with 14 individual pins used for vegetative cover assessment (Figure A-2). Each pin was raised to the full height of the PF and then individually lowered into the vegetation. As each pin was lowered, it was recorded as a green, brown, silver, or no vegetation "hit".

Consistent with GBUAPCD methodology, a total of 28 PF measurements were made within each calibration target. Care was taken to ensure that the 28 PF measurements were properly distributed to characterize the entire CT area. Results from each PF location were recorded onto standard hard copy tally-forms that were later transcribed into an Excel spreadsheet.



FIGURE A-2  
GBUAPCD Point Frame Device  
*The GBUAPCD PF device is approximately 5 feet wide with 14 individual pins.*

### DPF Characterization Methodology

Current LADWP DPF methodology was utilized in the study. DPFs were captured using a Sony Cyber-shot DSC-R1 digital camera mounted on a 15-foot Hi-Pod monopod system (Figure A-3). Detailed camera settings used for DPF collection and standard DPF specifications are presented in Table A-1.

A total of 8 DPFs, which characterized approximately 134 ft<sup>2</sup>, were captured in each CT location. Within each CT area a systematic sampling grid was assigned to indicate the sampling locations of the DPF photos (Figure A-4). While the a-priori locations of the sampling points was systematic, once the points were identified in the field they were randomly distributed across the range of vegetation cover within each CT, and independent of the field technician's judgment. All DPF images were taken from inter-row to inter-row. Extreme care was taken to minimize foot traffic and subsequent stomping of vegetation at each CT location. DPFs were captured before PF measurements because significantly less foot traffic was associated with DPF capture.



FIGURE A-3  
DPF Field Equipment Setup  
*DPF equipment included the use of a high resolution camera mounted on a 15' Hi-Pod monopod.*

TABLE A-1  
Digital Camera and DPF Specifications

Item	DPF Specification
Camera Brand	Sony Cyber-shot DSC-R1
Camera Resolution	3888 x 2560 pixels
Exposure Value (E.V.)	0.0
F. Stop	Auto adjust
ISO	160
Shutter Speed	500
Photo height	14.5' above ground surface
Photo Dimensions	5' x 3.3'
Surface Area Characterized	16.7 ft <sup>2</sup>

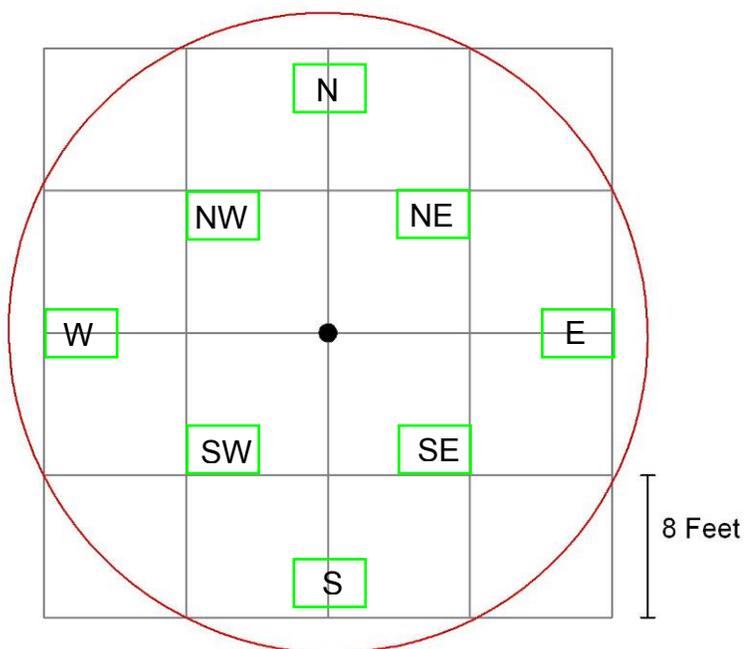


FIGURE A-4  
Idealized DPF Locations within CT Layout  
Shown is the proposed 5.5m-radius circle used for the ground truth measurements (red circle), the 2.4m grid cells as seen by the QuickBird satellite (gray lines), and the DPF locations (green rectangles). Ground-based PF measurements will be made within each DPF footprint (green rectangles).

Two methods were utilized in assessment of vegetative cover within each DPF. The first method consisted of spectral classification. Specifically, two ratios were calculated from the DPF photos: blue/red (3/1) and green/red (2/1). A threshold was visually set for the blue/red ratio to separate grass from substrate and another threshold was visually set for the green/red ratio that, when combined with the blue/red ratio, separated green grass from brown grass. The output classification image contained green, brown, and no vegetation classes.

The second method consisted of overlaying an ESRI shapefile grid of 50 points (digital pins) on each DPF photo. The center of each digital pin was used in the determination of vegetative cover. Each of the 50 digital pins (per DPF) was characterized as green, brown, silver, or no vegetation hits. This classification was then entered into the attribute table for the shapefile and copied to an Excel spreadsheet, where the mean percent cover was calculated for each site.

### **3.0 Results and Discussion**

Direct comparisons of percent cover estimates between PF and DPF measurements for each CT were evaluated for accuracy and repeatability. In addition, the number of sub-samples (individual PF or DPF measurement) and their influence on mean CT percent cover estimates were evaluated. Specific comparisons completed in the study are listed below:

- DPF Percent Cover Estimation
- PF Percent Cover Estimation
- DPF and PF CT Percent Cover Comparison
- DPF and PF Economic / Labor Analysis

#### **3.1 DPF Percent Cover Estimation**

Two methods were used to characterize vegetative cover for each DPF: spectral classification and digital pin classification.

##### **Spectral Classification**

To automate DPF classification, spectral analysis was completed on a limited number of DPFs in the study. Results from the spectral classification exercise demonstrated the difficulty in identifying and separating "silver" grass (particularly on the right side of Figures A-5a and A-5b ) from the underlying substrate. In addition, bright light-colored grass suffered the same problem as silver grass and was sometimes classified as substrate. Also problematic was the accurate separation of green grass from brown grass (i.e. shades of green appeared as brown in the classification).

Given the difficulties discussed above, spectral classification was not completed on all DPFs and it was not considered a viable option for DPF classification. That said, although spectral classification proved difficult and often inaccurate, more sophisticated remote sensing techniques that make use of additional information contained within the DPF may be the key to solving this problem. Specifically, incorporation of spectral signatures with image morphological features (shape, area, length, width, texture, etc.) will likely improve the classification of the DPFs and may result in a semi-automated approach to DPF cover characterization.

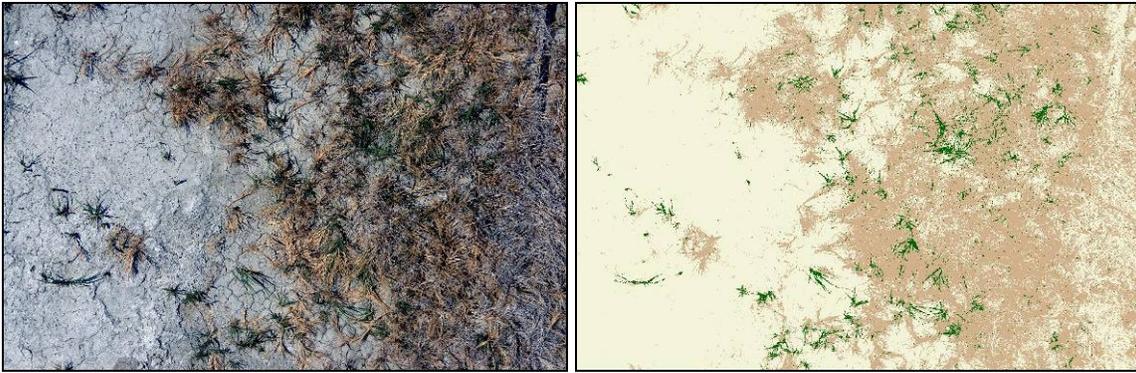


FIGURE A-5  
 Figure A-5a: DPF in Natural Color  
 Figure A-5b: DPF Spectrally Classified

### Digital Pin Classification

Each DPF was analyzed for percent cover using the digital pin methodology. DPF percent cover values are presented in Appendix A.

In order to understand the number of digital pins needed for accurate DPF vegetative cover characterization, an efficiency analysis was completed to determine the number of pins needed to reach equilibrium in mean vegetative cover within each DPF as well as the number of DPFs needed to reach equilibrium per CT. Pins were randomly and sequentially added to the analysis. Results demonstrated that the area of equilibrium, where variability in calculated percent cover diminished, was near the 30-35 pin range (Figure A-6). This area of equilibrium represented the point at which introduction of additional pins into the percent cover estimation resulted in little or no change in the mean DPF percent cover estimate. This analysis demonstrated that only 30-35 pins are needed for accurate classification, thus resulting in substantial savings of time and labor compared to the classification of all 50 pins.

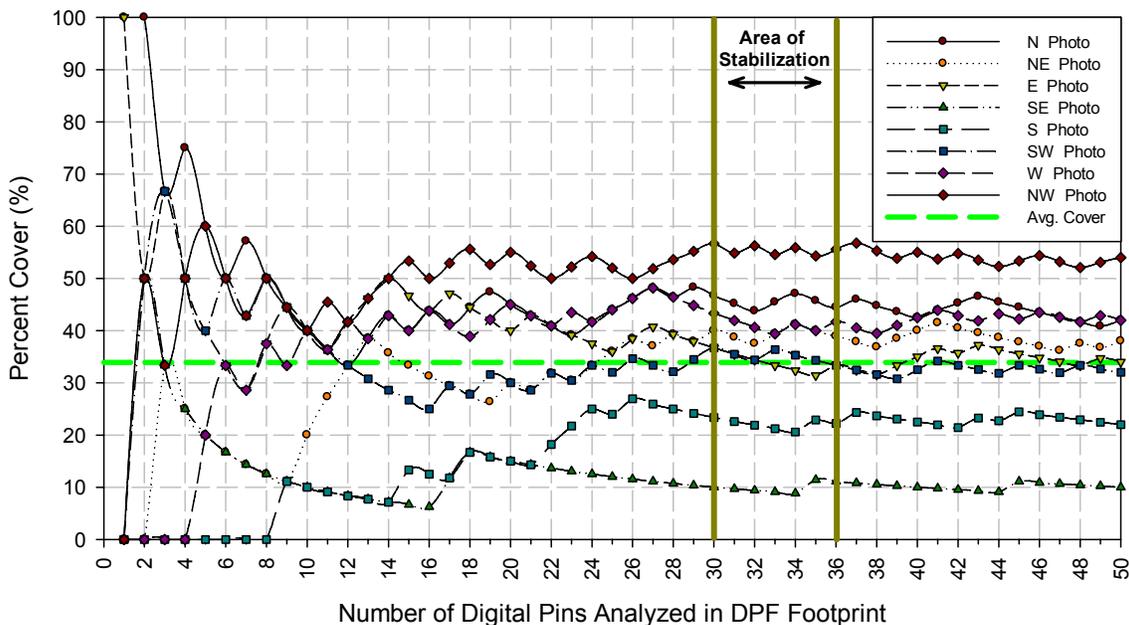


FIGURE A-6  
 Estimated Percent Vegetative Cover vs. Number of Digital Pins Analyzed for CT CS1001

The second part of the efficiency analysis was completed to determine the number of DPFs needed to reach equilibrium per CT. Results suggested that in most cases, equilibrium in the mean percent cover estimate was reached using 8 DPFs per CT. However, sparsely covered CTs (0-10%) had more cover variability and thus struggled to reach equilibrium using 8 DPFs (Appendix B). This is most likely a result of the inherent variability and non-uniformity of the sparsely covered CTs.

### 3.2 PF Percent Cover Estimation and Efficiency Analysis

GBUAPCD PF methodology was used to estimate percent cover on 21 of the 40 CTs used in the study (Figure A-1). Percent cover values from the PF methodology are given in Appendix B. Each CT was characterized by 28 PF measurements. Each position where the PF was dropped represented a sub sample used to calculate mean percent cover for the CT. An efficiency analysis was completed to determine if equilibrium in mean percent cover per CT was reached with the 28 sub samples. Results revealed that nearly all CTs reached equilibrium with the 28 sub samples (Appendix B), indicating that the CTs were sufficiently sampled to obtain a good estimate of the mean percent cover.

However, similar to the DPF efficiency analysis, results suggested that CT in the 0-10% cover range struggled to reach equilibrium. This is likely a result of the inherent variability and non-uniformity of the sparsely cover CTs.

### 3.3 Comparison of DPF vs. PF Results

A total of 21 CT locations were evaluated using PF and DPF ground truth methodology. Of the 21 CTs evaluated, 19 (91%) had less than or equal to 5% absolute difference between PF and DPF estimates (Appendix A). Regression results of PF and DPF demonstrated that the two methods tracked very well with an  $R^2$  of 0.99 (Figure A-7a). Below 50% cover, the traditional PF tended to give slightly higher cover estimates compared to DPF, on average around 3.5% (Figure A-7b). Above 50% cover, methods tracked more closely, with DPF giving slightly higher cover estimates, on average around 1.5%. Overall, negligible differences between PF and DPF percent cover estimates were observed.

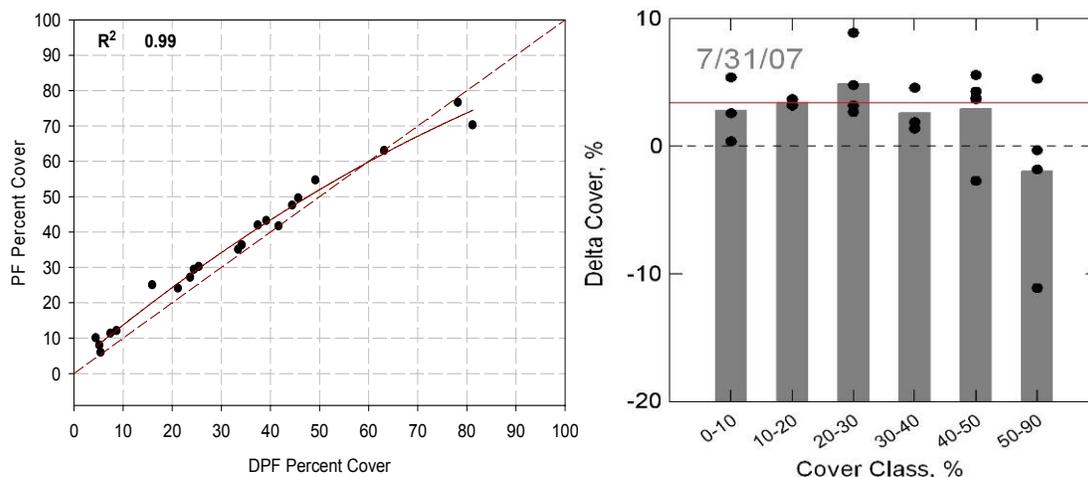


FIGURE A-7

Figure A-7a: DPF vs. PF Best Fit Regression

Figure A-7b: Change in Cover for each Cover Class

### 3.4 DPF and PF Economic / Labor Analysis

The economics of DPF and PF methodology were explored by assessing the labor required to complete a compliance monitoring event. For normal compliance monitoring events, DPF methodology required 1 person capturing DPFs for a total of 18 hours (Table A-2). Office analysis of

the digital pins required the most time, averaging 1 hour and 15 min per CT, for a total of 50 hours per compliance monitoring event. Final processing and QA /QC efforts accounted for an additional 4 hours. The cumulative time required for compliance monitoring using DPF methodology was estimated at 72 hours (Table A-2).

Traditional PF methodology required substantially more personnel for field monitoring efforts. A total of three people were needed. Two people took PF measurements while a third transcribed results onto a hardcopy form, for a total of 120 hours. Office analysis consisted of transcribing PF measurements from hardcopy forms to excel format, for a total of 2 hours. Final QA / QC efforts accounted for an additional 2 hours per compliance monitoring event (Table A-2).

Results of this analysis demonstrated that significant time savings were realized through DPF ground truth methodology. Field labor was cut by 100 hours when compared to traditional PF methodology, due largely to the decrease in staff needed per compliance monitoring event. In total, DPF methodology saved 42 labor hours per compliance monitoring event when compared to traditional PF.

TABLE A-2

## DPF and PF Economic Analysis

*Economic analysis of total labor required to complete a compliance monitoring event using DPF and traditional PF*

Category	DPF			Labor		
	Staff	Labor (Hours / CT)	Event Total (Staff x Labor x 40 Sites)	Personnel	Time (Hours / CT)	Event Total (Staff x labor x 40 Sites)
Fieldwork	1	0.45	18	3	1	120
Office Analysis	1	1.25	50	1	0.05	2
QA / QC	1	0.1	4	1	0.05	2
Total			72 hours			124 hours

#### 4.0 Conclusions

This addendum presented the results from the GBUAPCD and LADWP collaborative DPF vs. PF comparison study. Conclusions from the study clearly indicated DPF percent cover estimates accurately replicated PF estimates ( $R^2 = 0.99$ ). Specific conclusions generated from the study consisted of the following:

- Correlation between DPF and PF percent cover estimates was extremely high. DPF and PF methodologies result in essentially the same percent cover estimates.
- Spectral analysis of DPFs proved difficult and inaccurate. More sophisticated remote sensing techniques that take into account spectral signature as well as image morphological features (shape, area, length, width, texture, etc.) may be the key to successful spectral classification of DPFs.
- DPF mean percent cover equilibrium was reached using 30-35 digital pins per DPF compared to the normal 50 pins. This will result in a substantial time savings for future compliance monitoring events.
- CT mean percent cover equilibrium is reach for nearly all cover classes using 8 DPFs per CT location. The one exception is the 0-10% cover range. An increased number of DPFs per CT would result in increased accuracy, however improvement opportunity is small, considering the results already compare very well with each other ( $R^2 = 0.99$ )

- PF mean percent cover equilibrium was reached for all cover classes using 28 PF measurements per CT location. This indicates that the plot is sufficiently sampled to obtain a good estimate of the mean cover
- A substantial time savings of 50 hours per compliance monitoring event was realized using DPF methodology vs. PF methodology.

The results and conclusions from this study strongly indicate that DPF ground truthing methodology should be the preferred methodology for future compliance monitoring events.

---

**APPENDIX A**

## APPENDIX A

Estimated Percent Cover for CTs using PF and DPF Methodology

*PF and DPF percent coverage estimates*

Calibration Target	PF Percent Cover	DPF Percent Cover	Absolute Difference
CS1001	36.2%	34.3%	2.0%
CS1002	NA*	41.5%	NA*
CS1003	NA*	34.8%	NA*
CS1004	NA*	11.5%	NA*
CS1005	24.0%	21.3%	2.7%
CS1006	NA*	11.3%	NA*
CS1007	34.9%	33.5%	1.4%
CS1008	54.6%	49.3%	5.3%
CS1009	9.9%	4.5%	5.4%
CS1010	41.8%	37.5%	4.3%
CS1011	70.2%	81.3%	11.1%
CS1013	27.0%	23.8%	3.3%
CS1015	NA*	41.0%	NA*
CS1021	NA*	81.3%	NA*
CS1023	NA*	0.3%	NA*
CS1024	NA*	36.8%	NA*
SVT04A	NA*	36.3%	NA*
SVT10A	12.0%	8.8%	3.2%
T5-4D1	76.5%	78.3%	1.7%
T5-5A1	29.3%	24.5%	4.8%
T5-5D1	30.1%	25.5%	4.6%
T6-4C1	NA*	59.3%	NA*
T6-5D1	5.9%	5.5%	0.4%
T6-7B1	11.2%	7.5%	3.7%
T6-7D1	7.9%	5.3%	2.7%
T6-7D2	24.9%	16.0%	8.9%
T7-5B2	47.4%	44.5%	2.9%
T7-5B3	41.6%	41.8%	0.2%
T7-7C1	43.1%	39.3%	3.9%
T7-7D1	49.5%	45.8%	3.7%
T8-3A	NA*	68.5%	NA*

## APPENDIX A

Estimated Percent Cover for CTs using PF and DPF Methodology

*PF and DPF percent coverage estimates*

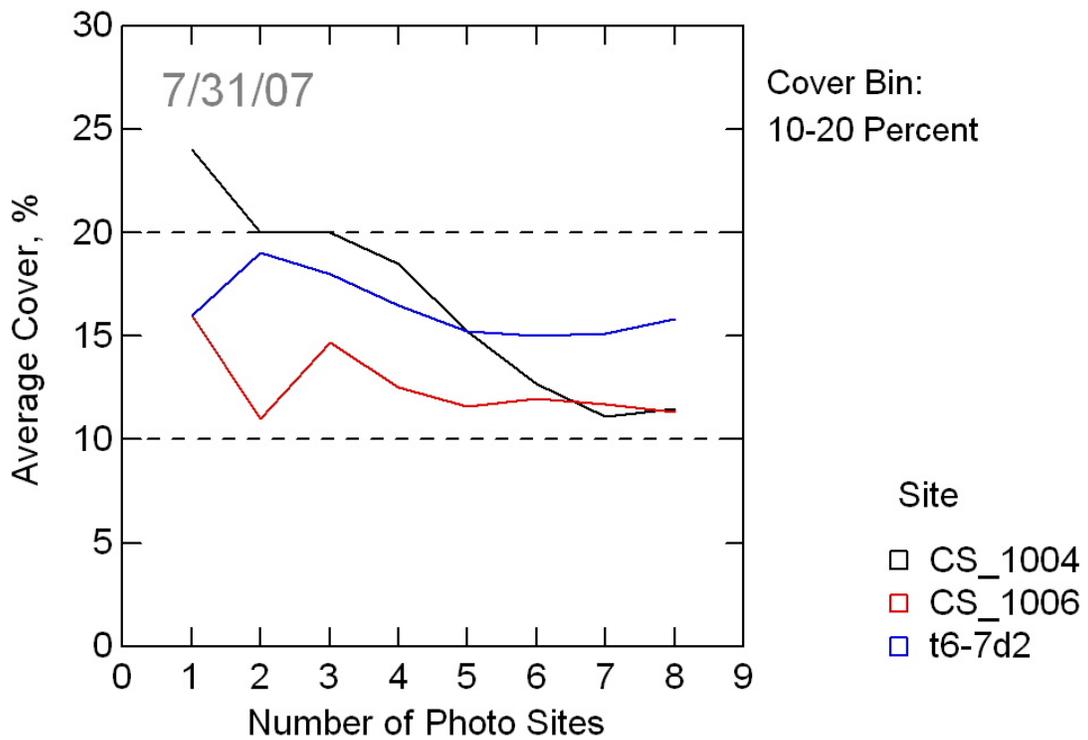
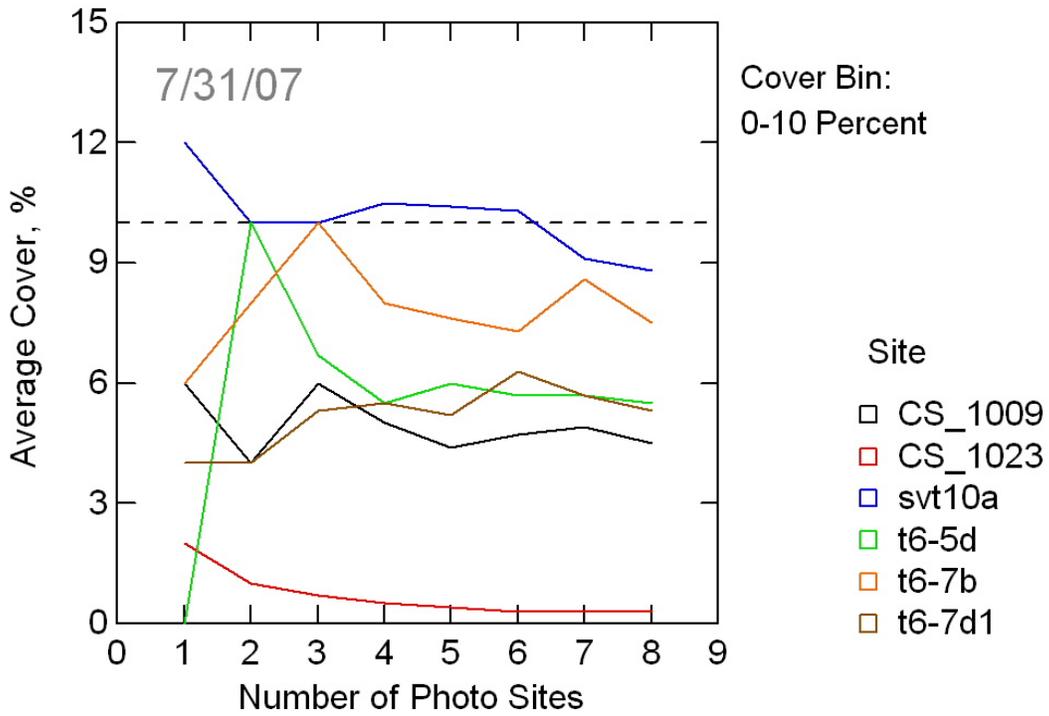
Calibration Target	PF Percent Cover	DPF Percent Cover	Absolute Difference
T8-3B	NA*	17.0%	NA*
T8-4A	NA*	45.5%	NA*
T8-4B	NA*	62.0%	NA*
T8-4C	NA*	39.5%	NA*
T8-5B1	62.9%	63.3%	0.3%
T8-5C	NA*	58.8%	NA*
T8-5D	NA*	66.3%	NA*
T8-6B	NA*	36.8%	NA*
T8-6C	NA*	36.8%	NA*

\* Site not sampled using PF methodology

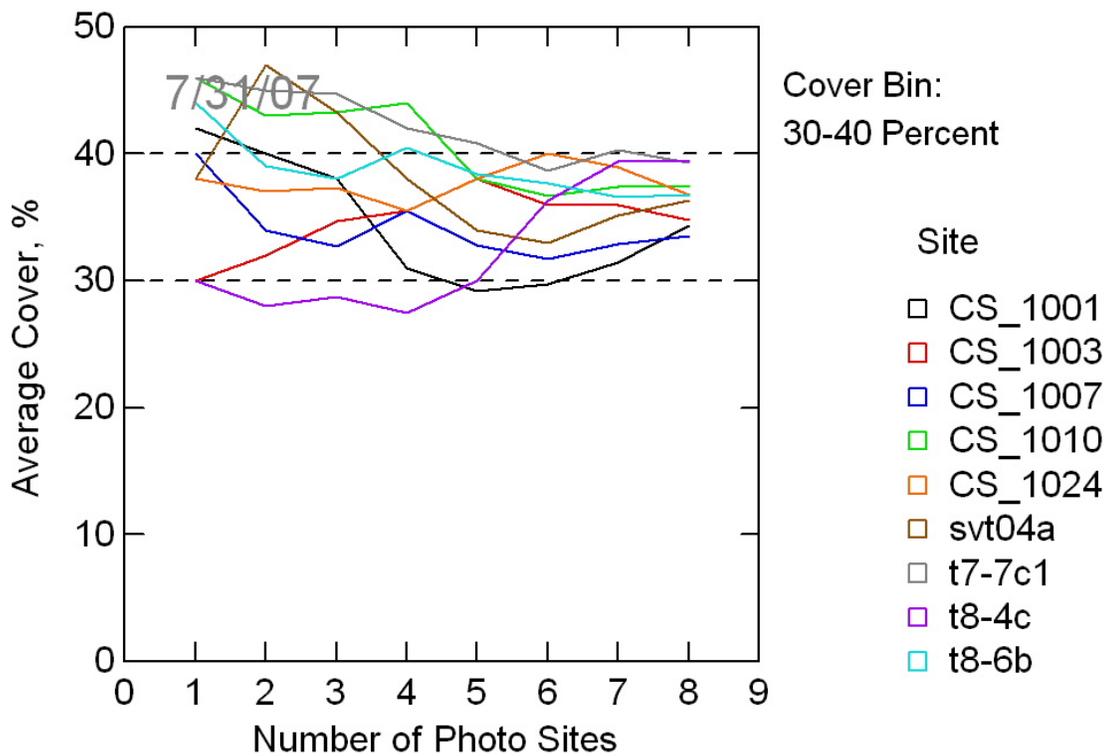
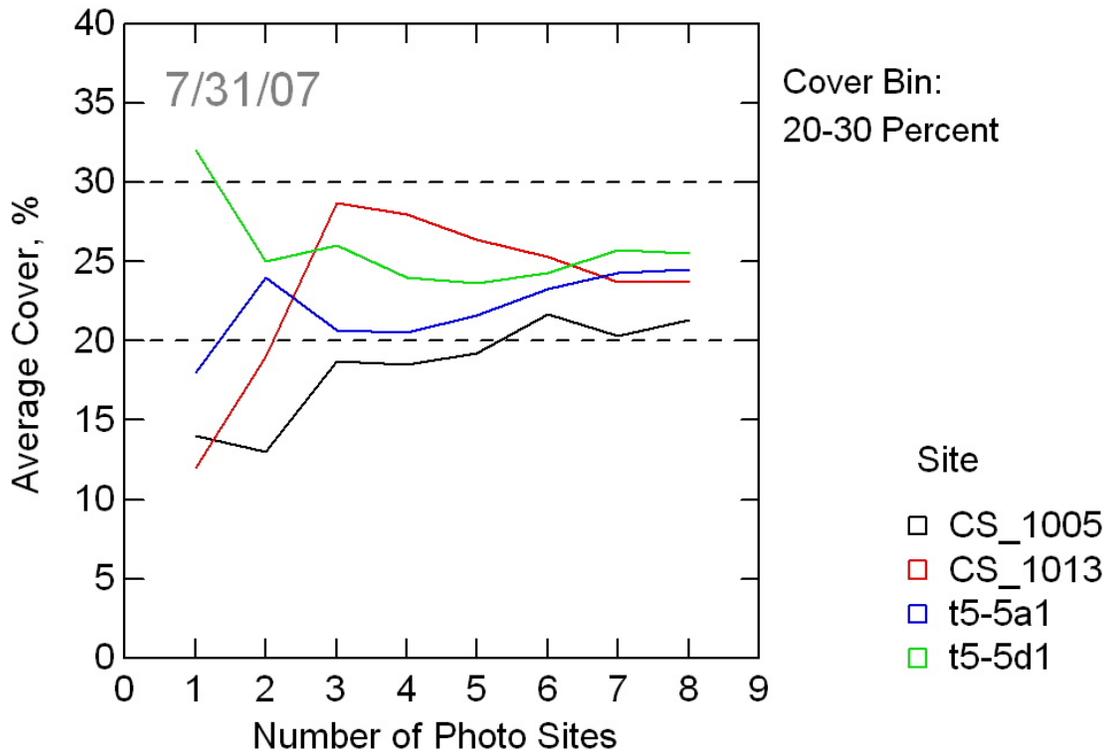
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**APPENDIX B**

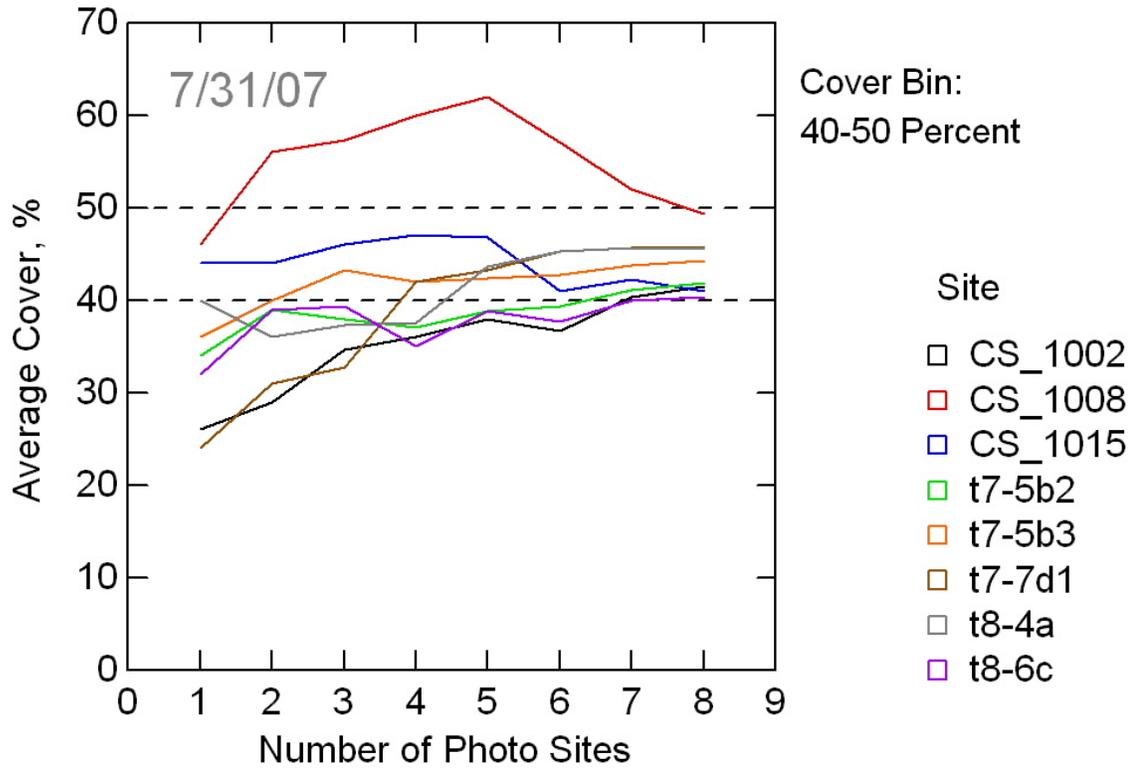
1. DPF Efficiency Analysis Graphs



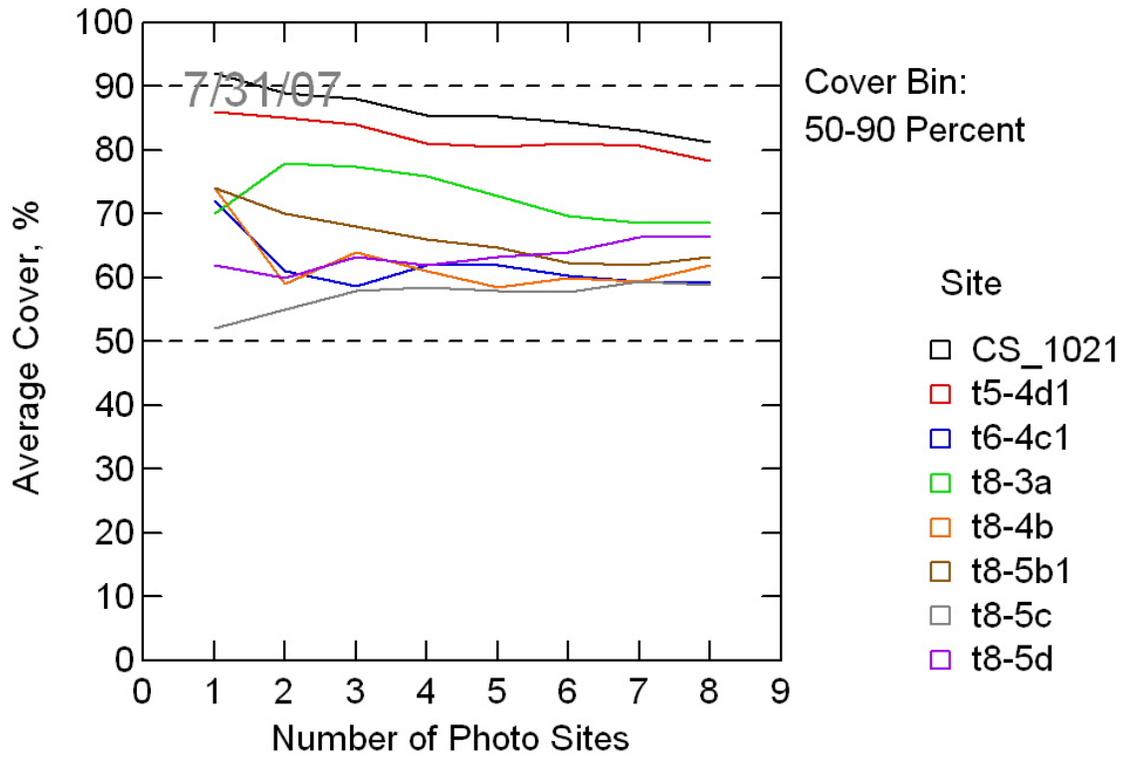
Appendix B



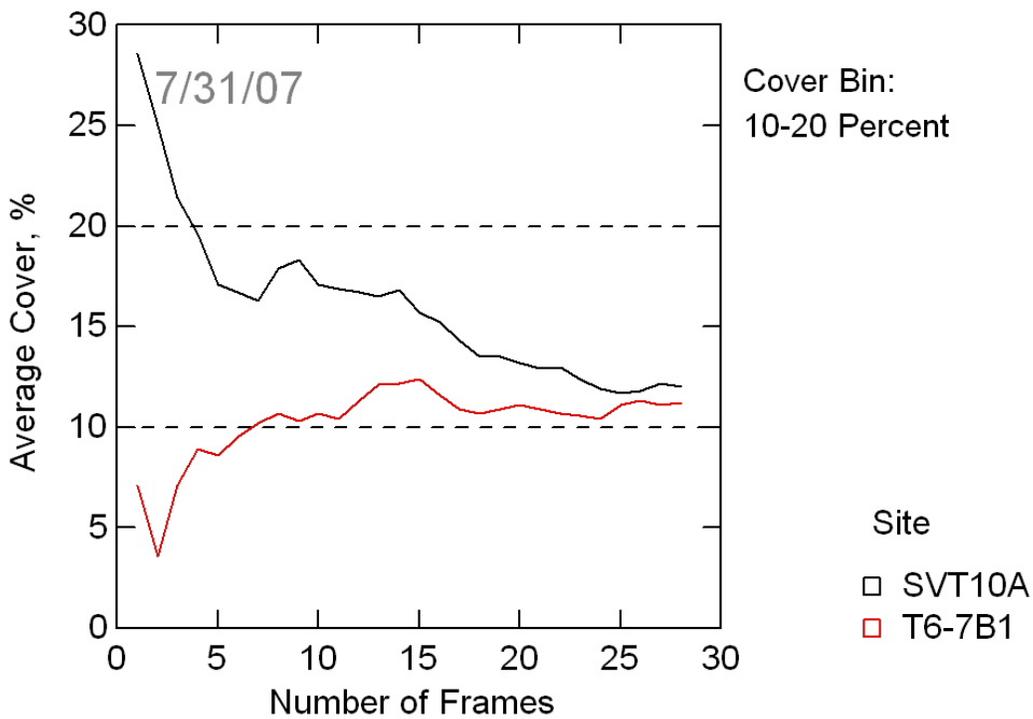
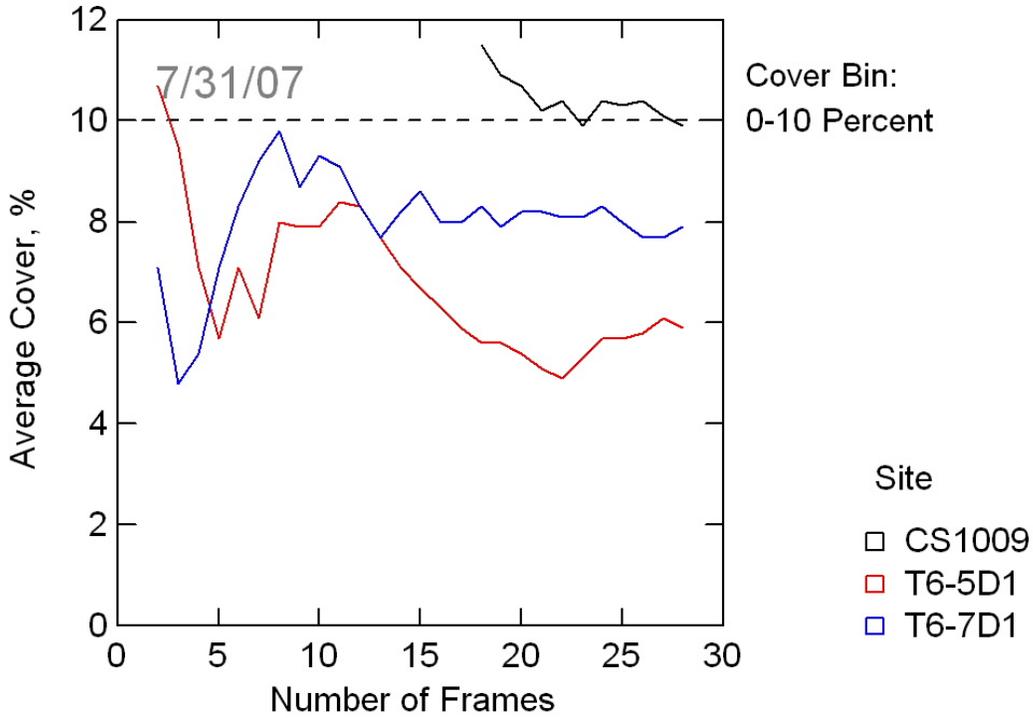
Appendix B



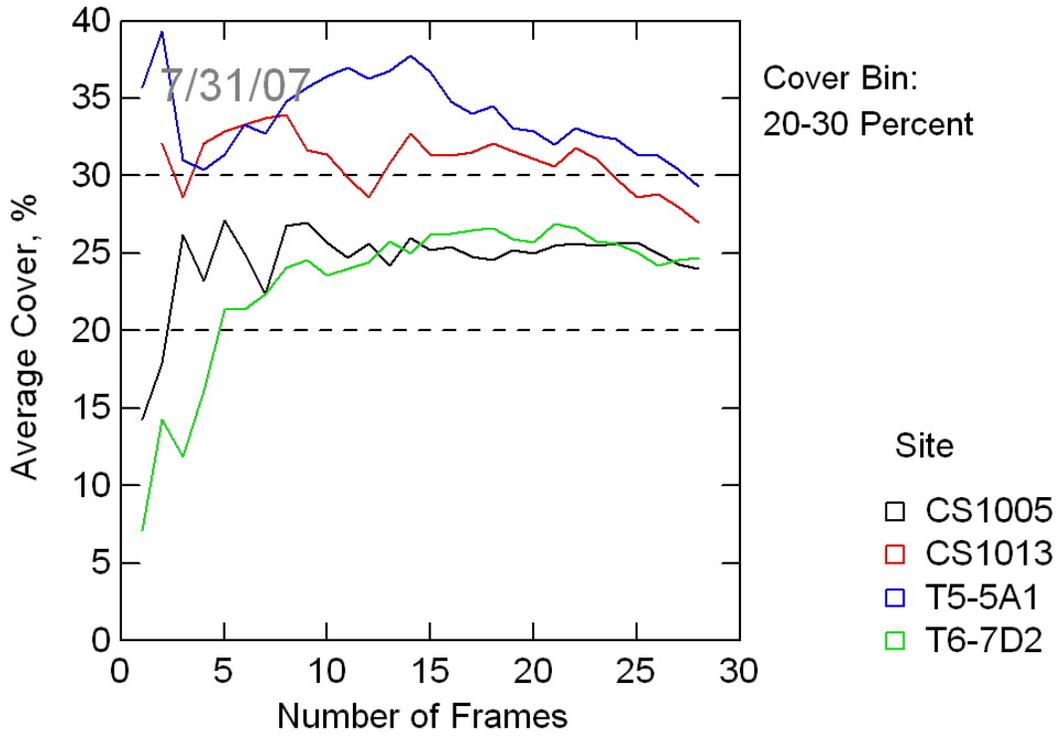
Appendix B



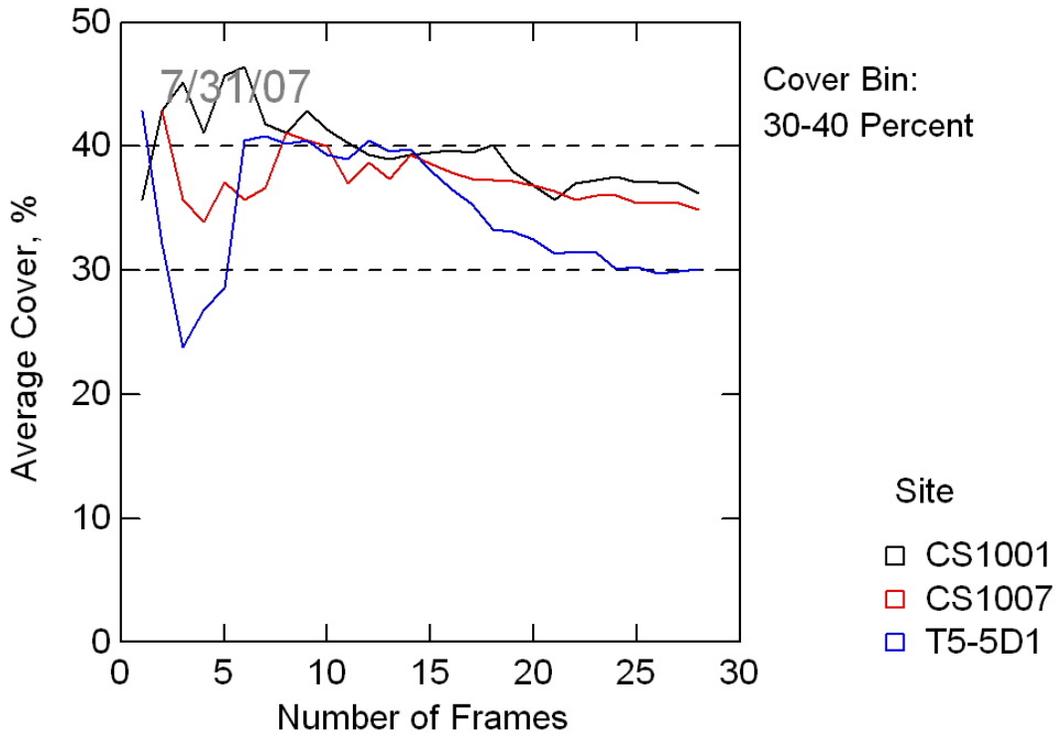
2. PF Efficiency Analysis Graphs



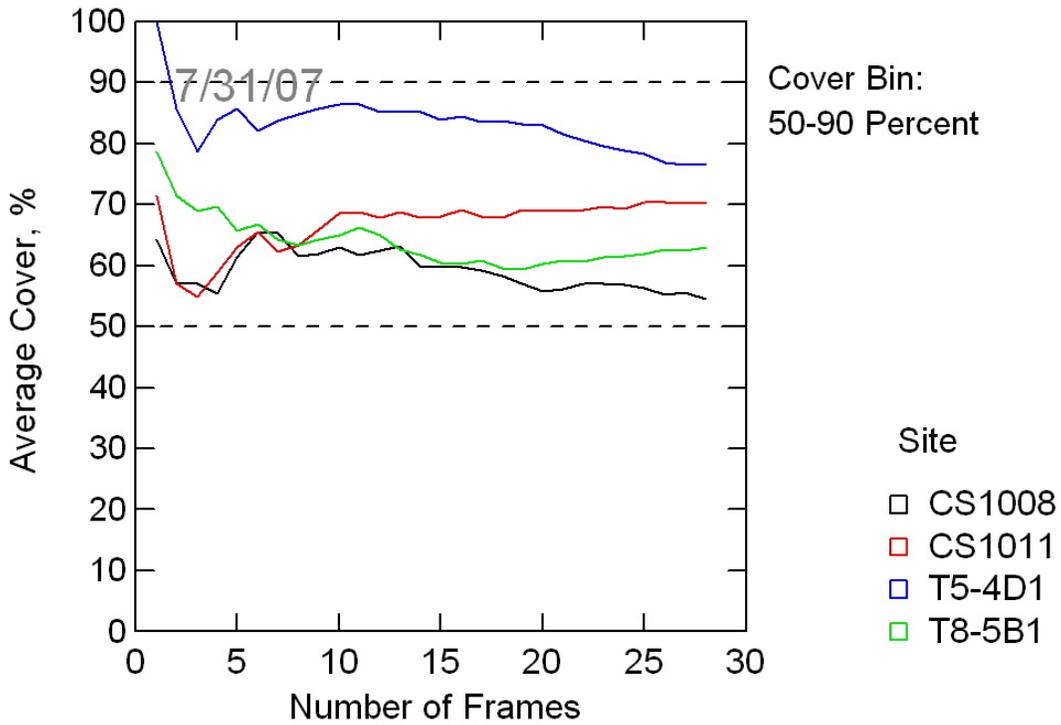
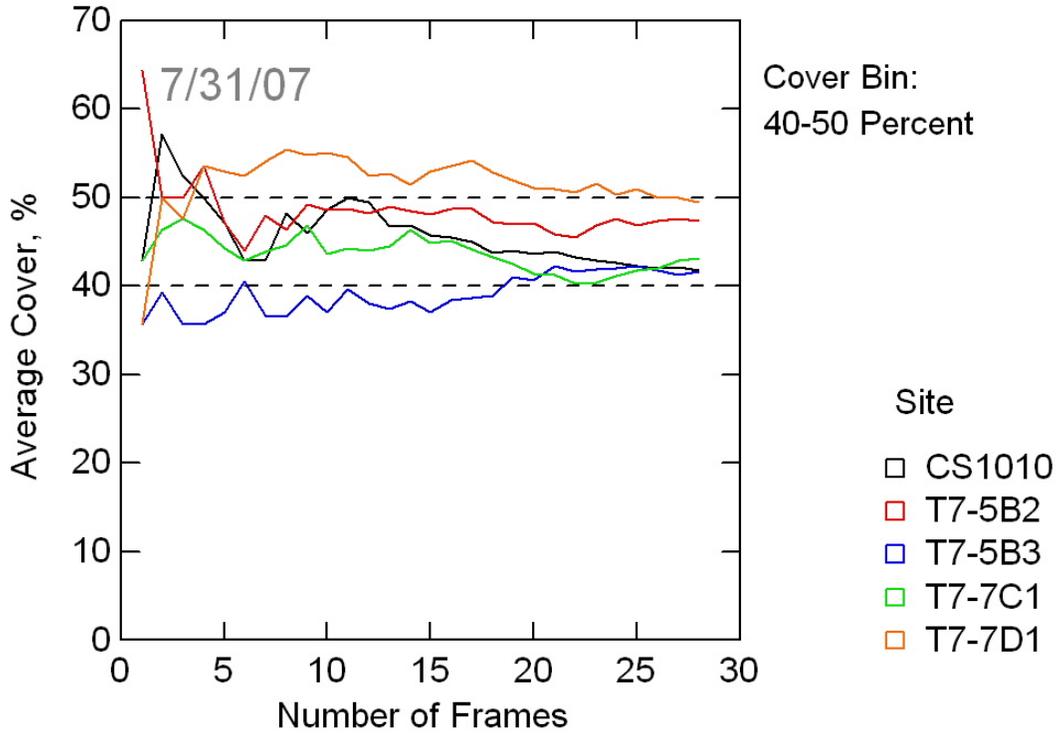
Appendix B



Appendix B



Appendix B





## MEMORANDUM

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TO: File

FROM: John Dickey

DATE: January 10, 2008

SUBJECT: Notes on the January 2008 Version of the Owens Lake Managed Vegetation Operation and Management Plan

The purpose of this memo is to summarize items that were reviewed after discussion of the August 2007 version of the Owens Lake Managed Vegetation Operation and Management Plan, and to summarize changes made to create the January 2008 version of the Owens Lake Managed Vegetation Operation and Management Plan (Plan).

Two aspects of the vegetative cover analysis that form part of the basis for the Plan were reviewed and altered: geometric correction of the imagery, and analysis of ground truth data (digital images of the plant canopy) along with associated image calibration. The review and modification are briefly summarized in the following sections.

### GEOMETRIC CORRECTION OF IMAGE

*Summary: Changes to geometric correction requested by Great Basin Air Pollution Control District (GBUAPCD) were implemented. A set of ground control points collected during fall 2007 and now used by GBUAPCD were employed to geometrically correct satellite imagery... The changes had no significant effect on cover results. No specific changes to the Plan were technically necessary from the standpoint of accuracy. Nevertheless, the revised geometric correction was employed in cover estimates in the new version of the Plan.*

LADWP had historically employed a mixture of surveyed points on the ground with engineering drawings to establish ground control points for geometric correction of images. During fall 2007, GBUAPCD collected a set of GPS surveyed ground control points (GBUAPCD Points) to use for the same purpose. So that imagery in the Plan would be corrected in a manner consistent with these new points, the geometrically corrected image used to develop the Plan was shifted (re-corrected) to match the GBUAPCD Points.

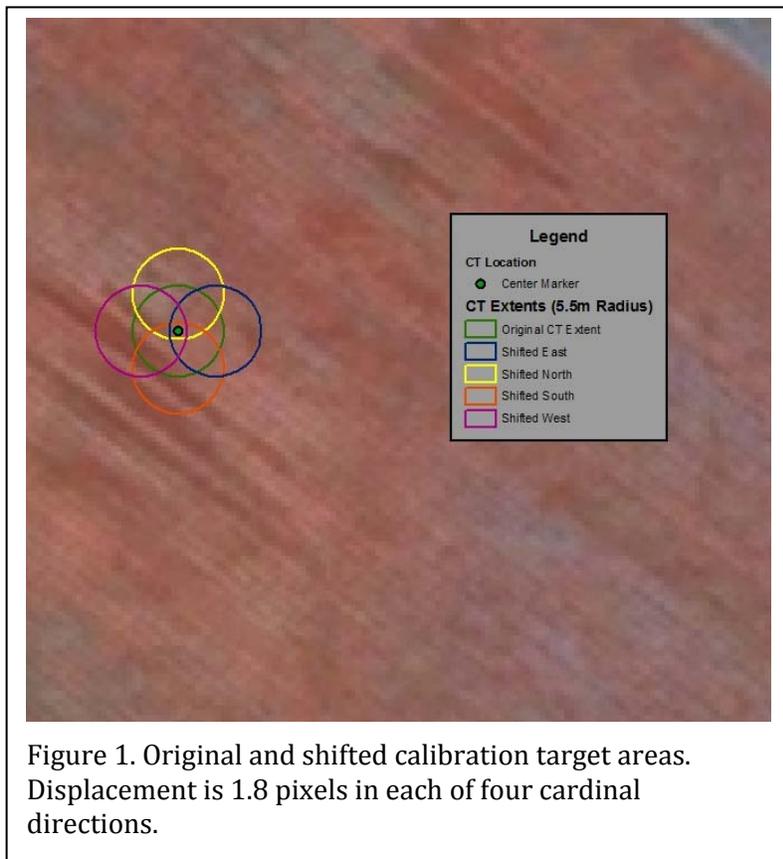
One of the concerns raised by GBUAPCD was that the method previously employed by LADWP might have resulted in very different and/or erroneous geometric correction, possibly calling into question work based on previously corrected images, including previous versions of the Plan. This hypothesis was tested, and the results suggest that the difference between previous calibrations and that achieved with GBUAPCD Points is slight, with a mean 1.8 pixel shift (with direction and magnitude varying across the study area). This shift is less than the inherent scale of error in image data. There is no evidence that either correction basis is erroneous. However, consistency between GBUAPCD and LADWP processes is preferred and so the GBUAPCD points were used for this Plan and will be used in to the future.

To further assess the potential impact of a shift on image interpretation, image analysis areas at each image calibration target location (5.5m circles) were shifted (in the cardinal directions north, east, south, and west) by 1.8 pixel, and compared to results for the original, unshifted calibration target area (see Figure 1).

The average 4/2 ratio values were extracted for each of the shifted calibration target areas, and regressed against average 4/2 values for the original calibration target area. Results are shown in Figure 2, showing a tight ( $R^2 = 0.98$ ) 1:1 relationship (i.e., practically identical ratio values for shifted and unshifted target locations with no systematic bias). Of the 49 calibration targets, only one (in T5-6D) exhibited significantly different average 4/2 ratio values when shifted in the 4 cardinal directions. This area is shown in Figure 3, where the localized effect of a drain line running close to the calibration target appears to be the source of this difference.

Another way of looking at the magnitude of change is to compare it to the range of 4/2 ratio observations across the site. A box plot of the observed changes is shown on Figure 4. The magnitude of these changes relative to the range of observations is minute.

In general, these results suggest a very close relationship between results for shifted and unshifted calibration targets, and therefore little effect of the change in geometric correction basis on calibration of images. Results developed and discussed based on previous image geometric correction would have been virtually identical had the more recent set of GBUAPCD Points been used for these analyses.



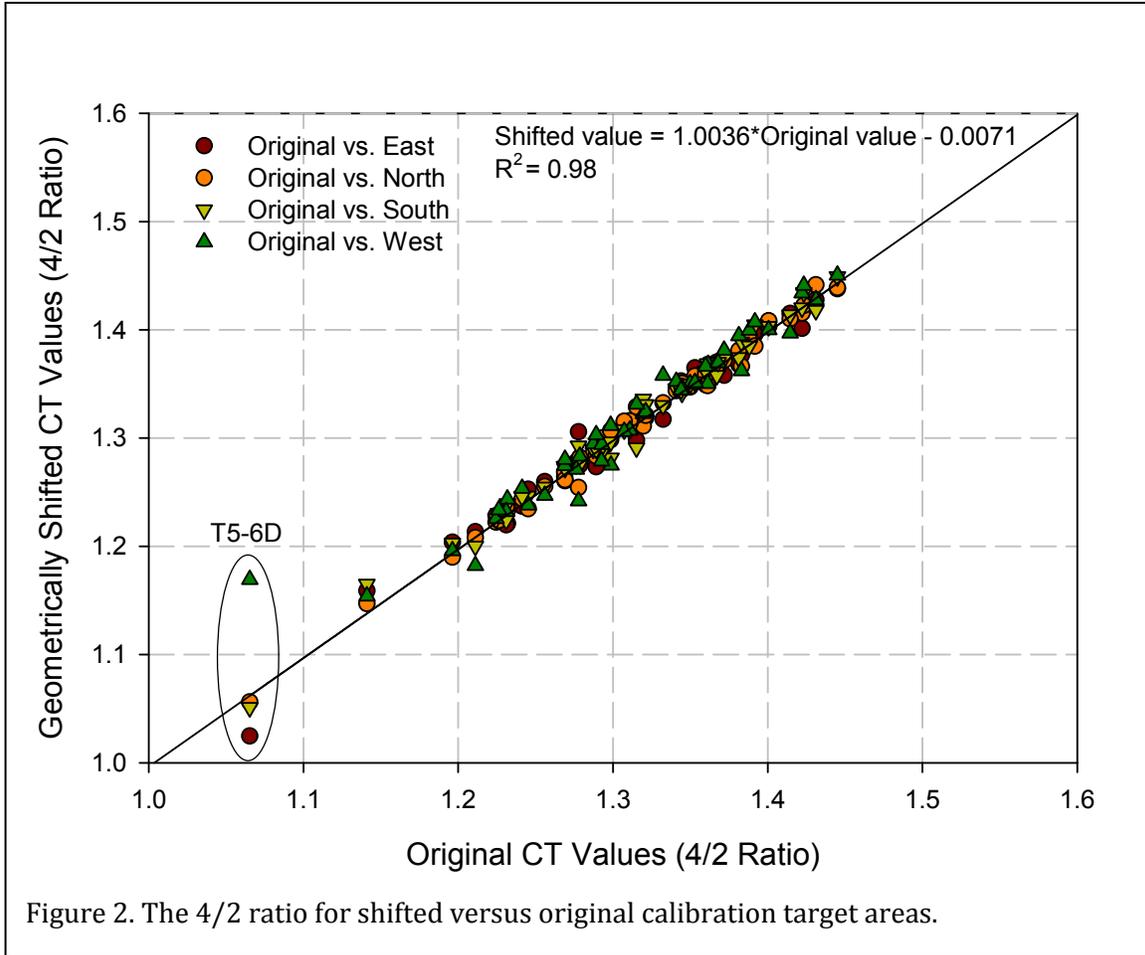


Figure 2. The 4/2 ratio for shifted versus original calibration target areas.

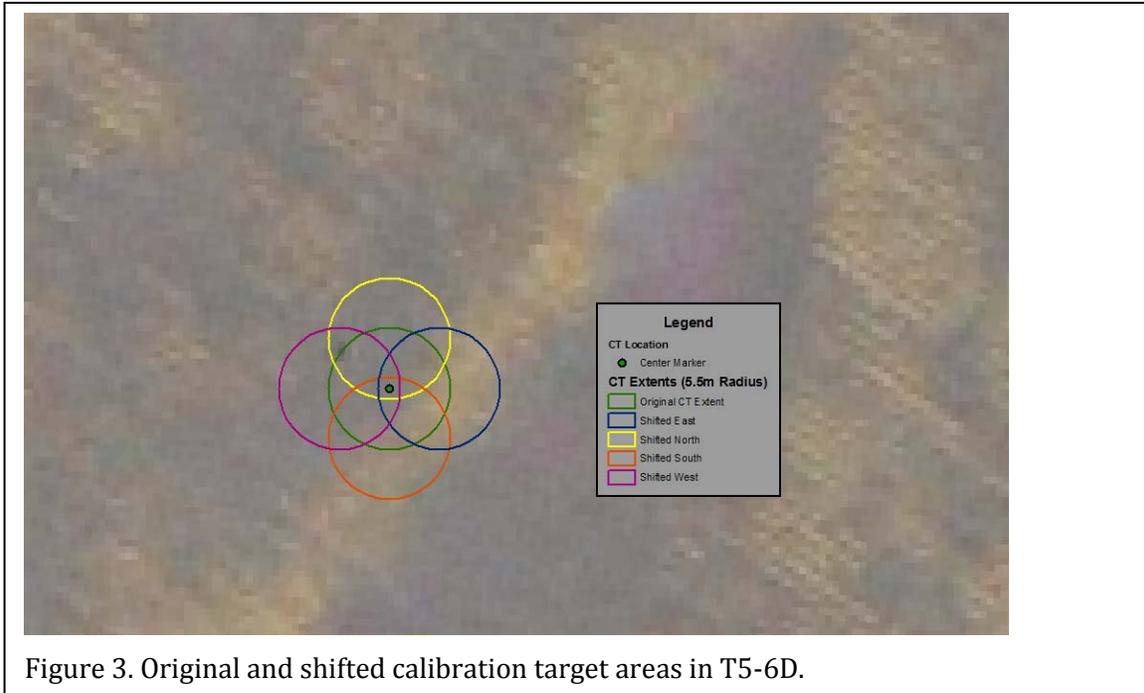
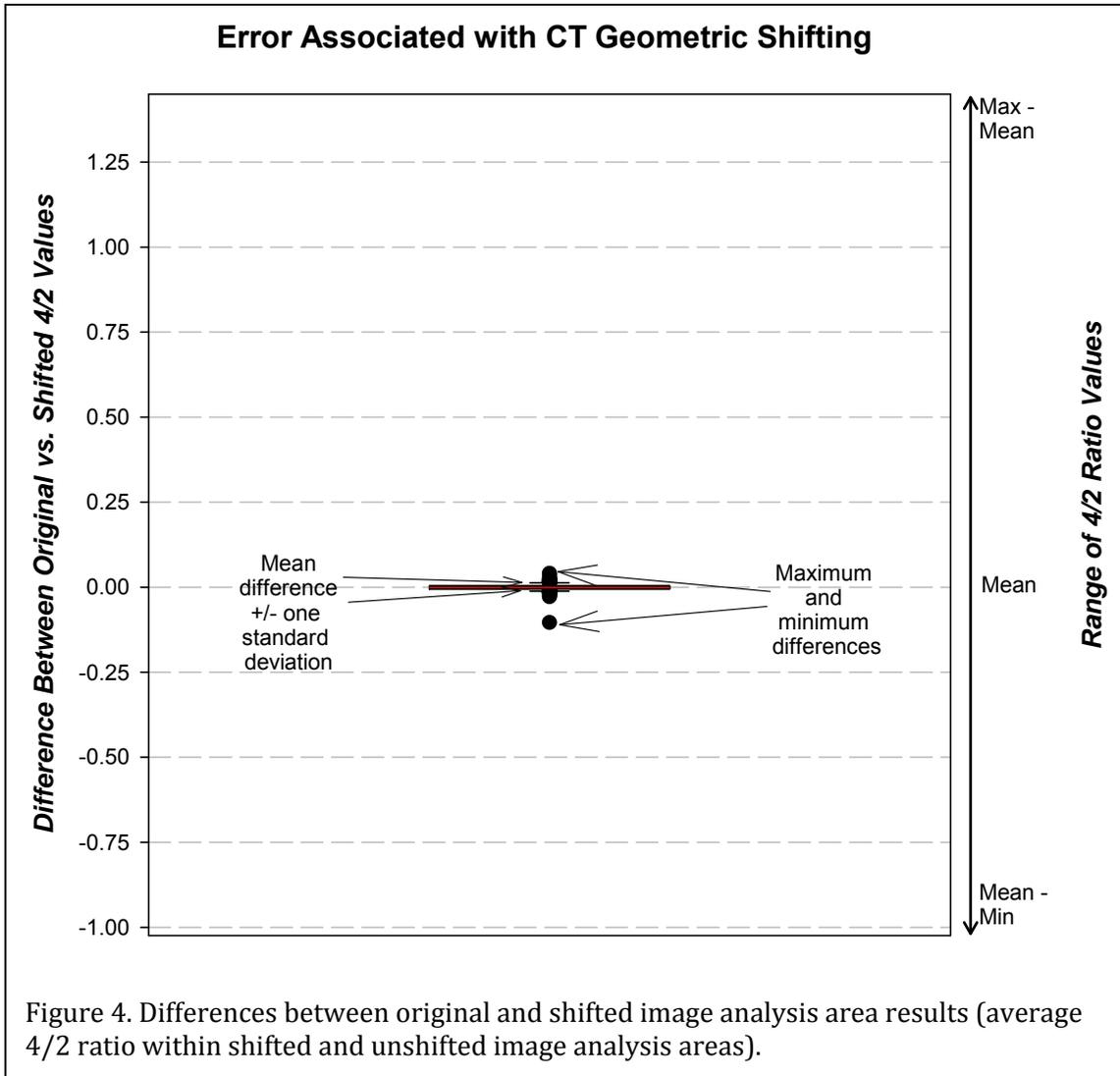


Figure 3. Original and shifted calibration target areas in T5-6D.



## GROUND TRUTH DATA RE-ANALYSIS AND RE-CALIBRATION OF SATELLITE IMAGE

*Summary: A change to ground truth digital image analysis was implemented as requested by GBUAPCD. The change resulted in a significant but relatively consistent increase in vegetative cover results. It being essential that the Plan be consistent with methods that will be used to evaluate cover in the future, it was essential to re-analyze cover data and revise the Plan to reflect new cover results.*

During discussion of image calibration that took place in spring and summer of 2007 between LADWP and GBUAPCD, GBUAPCD expressed a preference for a particular method of assessing the amount of vegetative cover in low-altitude (below 20') digital images of the plant canopy. The preferred method closely mimics a physical point frame, long the standard employed by GBUAPCD for these measurements. This "digital point frame" (DPF) method consists of a visual inspection of vegetation that is visible on the high-resolution image with a standard grid of observation points overlaid on the image, then calculating the percent of cover (vegetation hits/[hits+misses]) observed. The points and an image are shown at two scales in Figure 5. The percentage of hits is

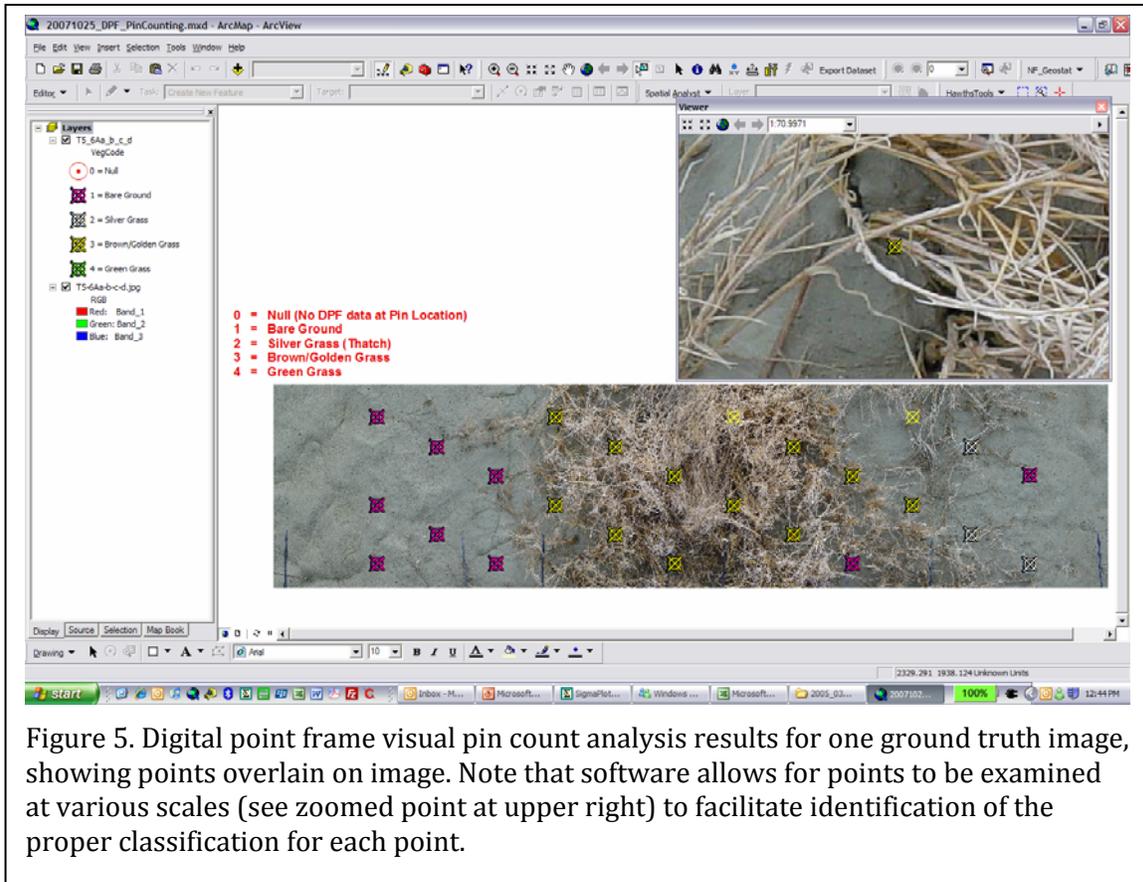
then used to represent the percent cover for the DPF location in question. These estimates of cover can then be used to calibrate satellite imagery by relating them to spectral indices representing the same points in space and time. These indices are calculated from data underlying a concurrent satellite image. Indices selected are those that are most sensitive to observed vegetation on the date in question.

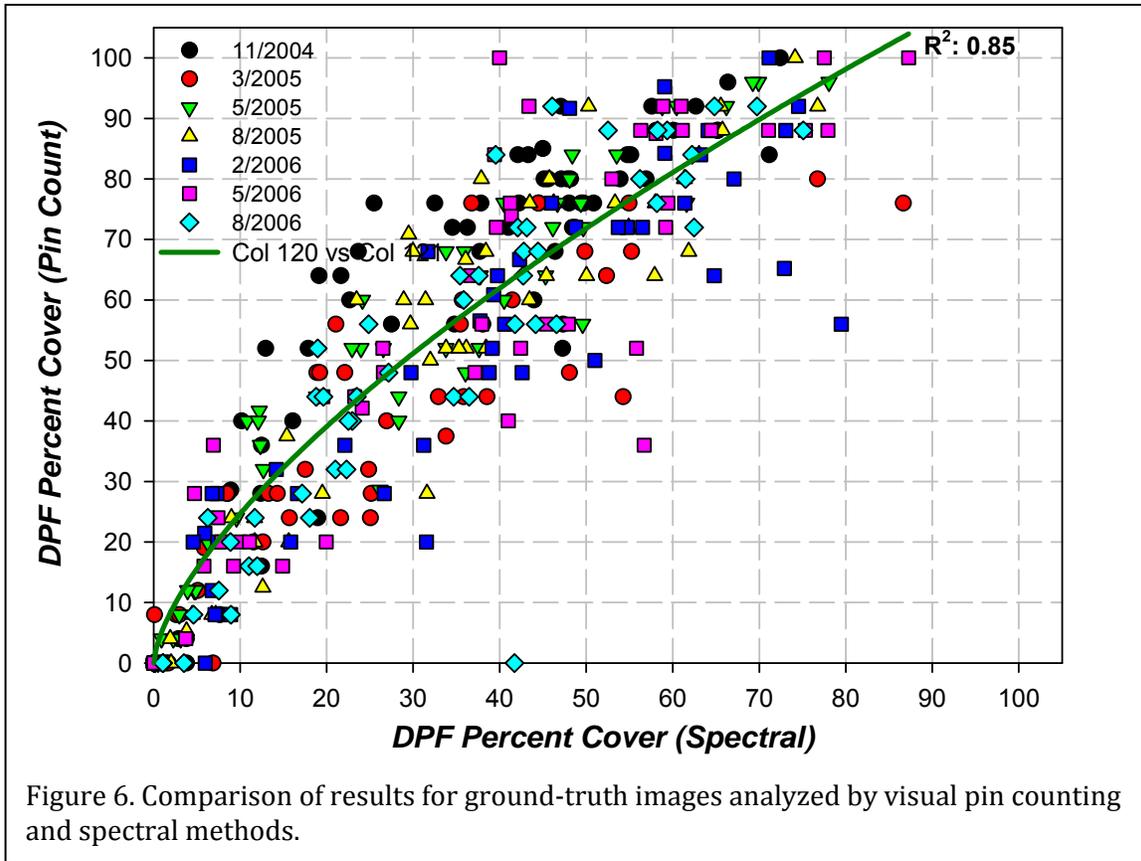
This GBUAPCD-preferred method was agreed upon as the method to be used for future ground truth efforts.

By contrast, LADWP had in the past employed a spectral technique to allow a computer to automatically differentiate between plant canopy and everything else on the DPF image, then count the “vegetation” and “not vegetation pixels on the photo. The ground truth data used to develop the August 2007 Plan were analyzed by this method. The goal of the present work was to evaluate the difference between the two methods, and to incorporate GBUAPCD’s preferred method into the image calibration used for the Plan. The method employed for this work was the following:

- Selected 7 dates to evaluate: 11/2004, 3/2005, 5/2005, 8/2005, 2/2006, 5/2006, and 8/2006.
- Visually counted vegetation hits at pins in all DPF images available for these 7 dates (25 pins per DPF, average 50 DPFs per date, and 7 dates, for a total of 8750 pins).
- Compared spectral percent cover estimates to those developed from visual pin counts.

The comparison of cover estimates from spectral and pin counting methods is shown in Figure 6. Pin counting resulted in generally higher cover estimates across the board, but the two methods show a strong relationship ( $R^2 = 0.85$ ). Where the spectral method indicated moderate to high (20 to 70 percent) cover, pin counting showed about 20 percent more cover.





A comparative review of images seemed to suggest that the reason for the lower average cover estimate by the spectral technique was the inability of the spectral technique to delineate foliage consistently and reliably over a broad range of color classes. The scatter of data is due partly to the same cause, and partly to the fact that visual pin counting samples a relatively low percentage of the available points on the image, sometimes exaggerating, sometimes underestimating the percentage of the surface covered by foliage.

Since the visual pin count method resulted in a significantly different level of vegetative cover, and since the Plan must reflect methods that will be used by the GBUAPCD to measure cover on the ground in the future, the following additional steps were taken:

- Re-calibrated three satellite images (taken on 3/2005, 2/2006, and 7/2007) based on cover estimates from pin counts. According to the calibration methodology agreed to with GBUAPCD, each time a calibration is carried out, the statistical performance of several spectral indices for vegetation are compared. The index with the best performance is selected to create a vegetation cover map. This process resulted in the selection of a different spectral index for vegetation than was previously (August 2007) employed for the March 2005 vegetation map. Best performance was achieved with the 4/2 ratio.
- Revised the Plan and the *Approach to the Managed Vegetation Operation and Management Plan* documents (i.e., the vegetative cover levels shown in both documents) based on these new cover estimates.

In general, this results in an apparent requirement of higher levels of vegetative cover. However, the more critical issue is that of consistency between cover measurement methodology used to develop the Plan (based on the 3/2005 image), and then to evaluate future conditions. With a consistent method, the real point of reference is not a number, but rather the condition upon which the standard is based. That standard remains unchanged in this most recent version of the Plan. The numeric changes should therefore result in the same protection of the land surface and of consequent dust control.



## MEMORANDUM

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**TO:** File

**FROM:** John Dickey

**DATE:** May 24, 2008

**SUBJECT:** Procedure for transforming vegetative cover grid results for regulatory comparisons under the Owens Lake Managed Vegetation O&M Plan

Under the Owens Lake Managed Vegetation O&M Plan (May 2008 Version), a set of quantitative criteria were established, including average cover, and the percentage of the area in grid cells of 0.1, 1, 10, and 100 acres that have >5%, >10%, and >20% cover. In the future, these % cover and % area results will be compared annually during the October-November period to the baseline reference criteria from November 2004. It is therefore useful to have an archiving and analysis toolset for storing cover data, making the needed calculations, and making comparisons with baseline comparisons. This memo summarizes this toolset.

**Develop vegetative cover layer:** NewFields 2007 and 2008 document agreed methods for determining total vegetative cover.

**Grid and vegetated area GIS layers:** These layers are employed to develop % cover results for grid cells across the 0.1-to-100-acre range on the Site. Vegetation map development methods are documented in NewFields (2007).

**MV cover.mdb:** This is an access database into which grid % cover results are imported as tables. A series of ten queries are then run to produce results that can be compared to the baseline reference criteria. The queries are numbered 1 to 10 for the March 2005 data, 11 to 20 for November 2004, 21 to 30 for October 2006, and 31 to 40 for November 2007. It is recommended that the most recent queries be renamed and updated for future dates, beginning with the lowest numbered query. For example, in fall 2008, the first step would be to import grid results for that period into four appropriately named tables. The second step would be to rename Query 31 to Query 41, and to update all references to reflect the fall 2008 image data sources. The user would then proceed to update queries in order through a new Query 50. The results of Query 50 would be used in the next tool.

**Reference cover for MV OM.xls:** Make a copy of the "New date template" worksheet, and then copy the data resulting from the current query (numbered a multiple of ten) where it says, "Paste data here". Insert rows so that the first line of the <5%, <10%, and <20% blocks of results occur every fourth row, as shown by the colored blocks. Then copy and paste those data into the block with cell A1 at the upper left. Where "#N/A" shows on lines 2 through 5 in columns R, S, and T, enter "0". Review the pale yellow highlighted cells and investigate any negative numbers, which indicate that cover on this date may in some areas be deficient relative to the reference cover levels.

### References:

NewFields. 2007. Methods Used for Verification of Vegetative Cover on the Managed Vegetation Dust Control Measure.

NewFields. 2008a. Notes on the January 2008 Version of the Owens Lake Managed Vegetation Operation and Management Plan (January 10, 2008 memo from John Dickey to File).

**APPENDIX 3.  
AIR SCIENCES INC. 2006. MANAGED VEGETATION CONTROL  
EFFICIENCY STUDY, OWENS DRY LAKE, CALIFORNIA**



AIR SCIENCES INC.

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## TECHNICAL MEMORANDUM

## MANAGED VEGETATION CONTROL EFFICIENCY STUDY, OWENS DRY LAKE, CALIFORNIA

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PROJECT NO.: 179-1-32

COPIES: Rich Coles, CH2M HILL, Santa Ana  
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DATE: July 24, 2006

### Abstract

This technical memorandum summarizes the results of a study designed to measure the PM<sub>10</sub> control efficiency of the managed vegetation (MV) dust control measure (DCM) on the Owens (dry) Lake, California. In its current configuration, the MV dust control measure consists of approximately 2,100 acres (851 hectares) of saltgrass on the southern end of the Owens Lake. The MV DCM was installed and planted in the spring and summer of 2002. Since the spring of 2004, the Los Angeles Department of Water & Power (DWP) has operated monitoring equipment in and over the MV area, which records the percentage of the saltgrass cover, surface moisture content, surface crust conditions, and sand motion within the DCM. The monitoring system consists of:

- Twenty-four sand motion monitoring sites, targeting six sites in each of the 4-percent vegetation cover ranges (0 to 10 percent, 11 to 20 percent, 21 to 30 percent, and 31 to 40 percent);
- Two 10-meter-tall meteorological towers within the MV area; and
- Six real-time PM<sub>10</sub> monitors (TEOMs) on the perimeter of the MV area.

This technical memorandum summarizes the measurement and calculation procedures used to assess sand motion, sand motion control efficiency, and vegetative cover for the period from May 2004 through April 2006. The monitoring results of this nearly two-year period show that MV is highly effective in suppressing sand motion, even at a low vegetation cover. The sand motion was controlled by 99 percent or more at a saltgrass areal coverage

of 20 percent or more. This level of sand motion and PM<sub>10</sub> control was achieved at far less than the 50-percent cover requirement in the 2003 Revised Owens Valley State Implementation Plan, or 2003 SIP (GBUAPCD, 2003, p. 5-8). Very high PM<sub>10</sub> control was also measured at lower percent vegetation covers within the MV area. In the zero to 20 percent cover range, sand motion was reduced by an average of 97 percent (range 75 to 100 percent). This control is thought to be achieved by a combination of factors, including:

- The saltgrass cover is effectively sheltering the surface.
- The drip irrigation is keeping the soils relatively moist for about seven months per year (April to October).
- The saltgrass furrows are aerodynamically rough, reducing the wind speed and sand motion within the MV area.
- The sand and sand-sized particles are being trapped along the margins of the area, reducing the amount of particles available to abrade surfaces within the MV area.

## Introduction

The 2003 Revised SIP included three options for controlling dust on the Owens dry lakebed (GBUAPCD<sup>1</sup>, 2003). Managed vegetation was one of those options. Based on on-site research efforts as well as literature reviews, the District concluded that "...more than 99 percent reduction of soil erosion and PM<sub>10</sub> will be achieved at Owens Lake with saltgrass cover of 50 percent" (GBUAPCD, 2003; p. 5-8). In the spring and summer of 2002, DWP implemented the MV DCM by planting native saltgrass on approximately 2,400 acres (currently 2,100 acres) north of the Dirty Socks monitoring site. The MV area was largely bare for the first year until the saltgrass cover established itself during the 2003 growing season. After the saltgrass was established, the sand motion was significantly reduced and is essentially non-existent within the MV area. The sand motion reduction trend is supported by monitoring data from the District sand motion network, Figure 1, as well as from the DWP monitoring network. The latter is the subject matter of this technical memorandum. The District's monitoring network recorded high cumulative sand fluxes during the period preceding the installation, as well as during the initial phase of construction (Figure 1). Sand motion remained high during the initial months of 2003, when saltgrass had been planted but not yet established. However, since the fall of 2003, sand motion within the MV area was eliminated at all but one of nine District monitoring locations. The exception was Sensit 7655, located on the southern fringe of the MV area and clearly not representative of the remaining area (Figure 1).

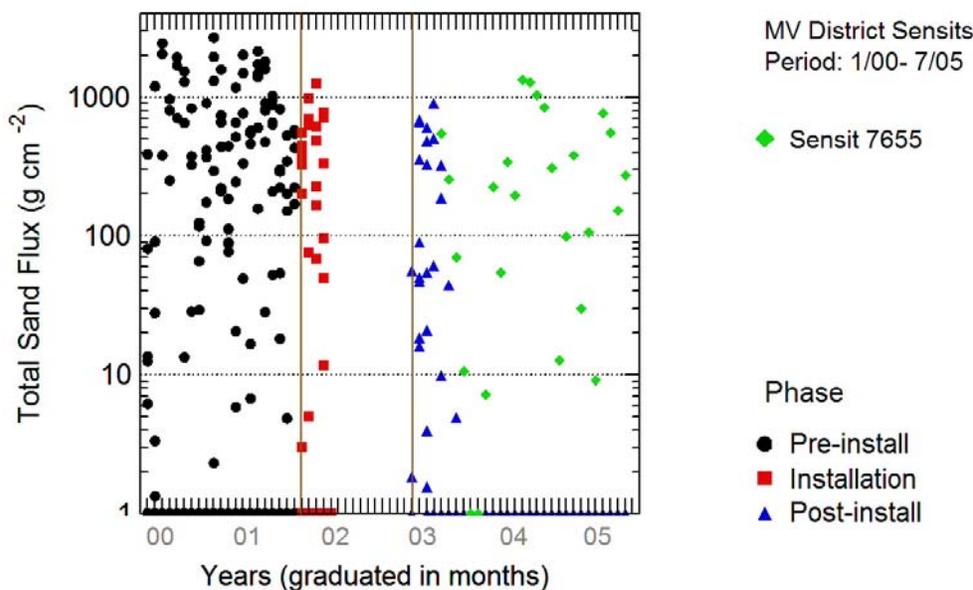
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<sup>1</sup> GBUAPCD (Great Basin Unified Air Pollution Control District). 2003. Owens Valley 2003 Revised PM<sub>10</sub> Planning Area Demonstration of Attainment State Implementation Plan. GBUAPCD, Bishop, California.

To better understand the temporal and spatial dynamics of sand motion in relation to saltgrass density and distribution, DWP has monitored vegetative cover, sand motion, meteorology, and PM<sub>10</sub> concentrations within and around the MV area beginning in May 2004. This technical memorandum summarizes the monitoring network; data collection and analysis methodologies; and resulting sand motion, vegetative cover, and sand flux control efficiencies in space and time. The data included in this analysis is from May 2004 through April 2006.

**Figure 1: Monthly total sand flux in the managed vegetation DCM from January 2000 to June 2005, as measured by the District sand motion network.**

The three phases indicate pre-installation, installation, and post-installation (black circles, red squares, and blue triangles, respectively). Sand flux values of "1" indicate marginal or no sand motion, from zero to 1 gram of collected sand mass. The absence of data points in 2002 indicates a temporary removal of sensors to accommodate construction activities. Sensit 7655 (green diamonds) is the only location to show significant sand motion after 2003. This monitoring site is located in the far southeast corner of the MV DCM, and arguably not representative for the DCM in general, since it is located less than 500 feet from the edge, close to sand dunes just outside of the MV DCM, and has a low grass cover (~10%).



## Methodology

### Approach Summary

The objective of this study is to better understand the relationship between sand motion and saltgrass cover. The monitoring instruments required to achieve this objective included: a network of 24 sand motion monitoring sites, two 10-meter-tall meteorological towers, and six real-time PM<sub>10</sub> monitors (Tapered Element Oscillating Microbalance instruments, or TEOMs). The data from these monitors were recorded and processed on an hourly time resolution basis. Hourly sand motion data were used to calculate sand flux and then matched with hourly wind speed. Baseline sand fluxes were calculated for the pre-construction data period from January 2000 through October 2001. This is the period between the start of data collection by the District and the start of construction activities in the MV DCM. This baseline, which expresses pre-construction sand flux as a function of wind speed, established the reference to calculate the control efficiency, normalized by wind speed. The control efficiency, CE, is defined as the absolute decrease in sand flux after the establishment of the saltgrass vegetation, and it is expressed as a percentage of the baseline or uncontrolled sand flux at a similar wind speed. The saltgrass cover was estimated for each month at each of the locations of the sand motion monitors. Based on this information, the sand flux control efficiency was expressed as a function of saltgrass cover.

For reasons of brevity, the discussion of the TEOM locations, data analysis procedures, and results are not included in this memorandum and will be included in a future memorandum.

### Sample Collection – Sand Motion

#### *Equipment and Network*

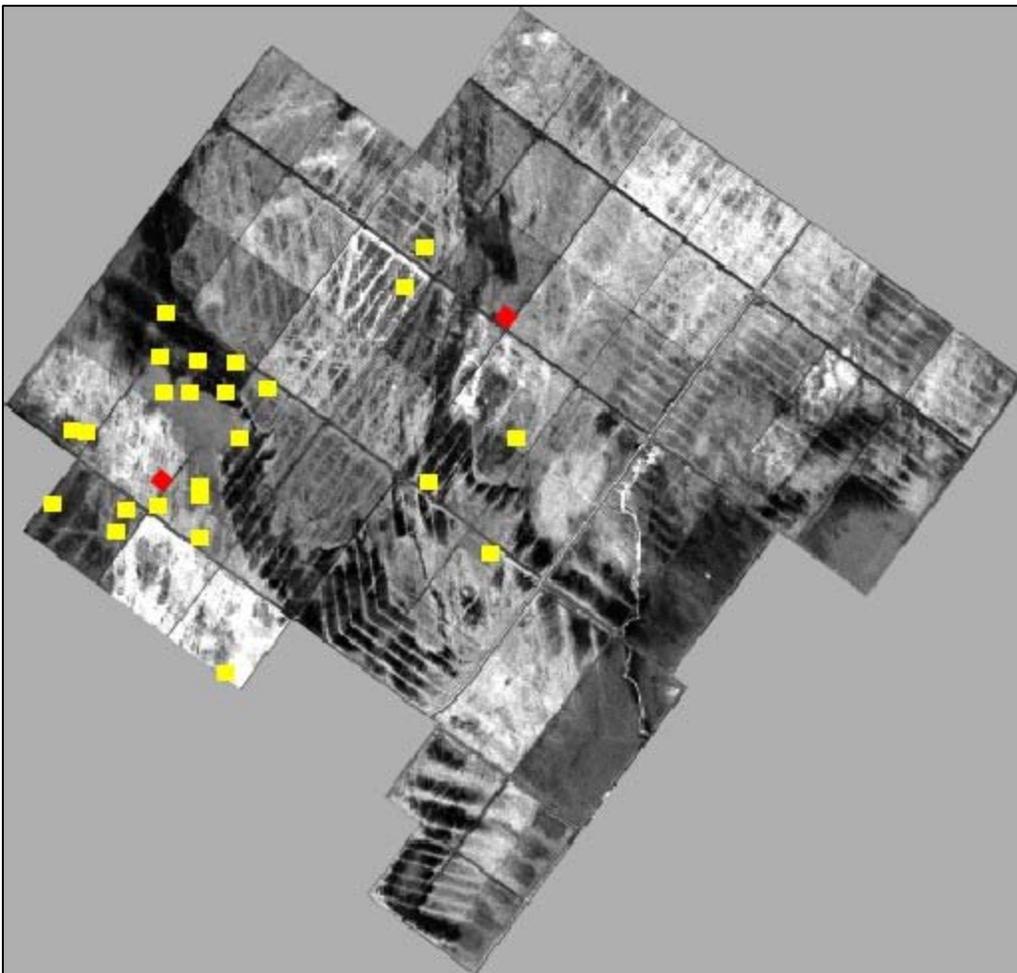
The sand motion was measured using a network of 24 monitoring locations (Figure 2a and Figure 2b). Each monitoring location was equipped with two pairs of instruments – one Cox Sand Catcher (CSC) and one Sensit in a pair – with one pair located between the rows of grass, and the other located within the grass row (Figure 3). The CSC is a passive sampling device consisting of an adjustable PVC-tube buried in the ground, and used to collect sand and sand-sized particles being transported across the site by the wind (Figure 3). Sensits are cylindrical electronic devices that record the particle counts and kinetic energy of sand and soil particles colliding with the sensor (Figure 3). Both instruments were installed with their collection surfaces at a height of 15 cm above the mean ground level. While CSC sand masses are collected on a monthly basis, Sensits provide a signal time resolved to five minutes. Using mathematical relationships between the sand mass collected by the CSC and the signal collected from the Sensits, hourly sand flux estimates

were calculated (see next section). The sand motion monitoring using the CSC-Sensit pairs in the MV DCM was commenced in May of 2004 and is ongoing.

All instrumentation was audited on a regular basis to ensure the quality of the data collected. The auditing and quality assurance procedures are documented in separate DWP documents.

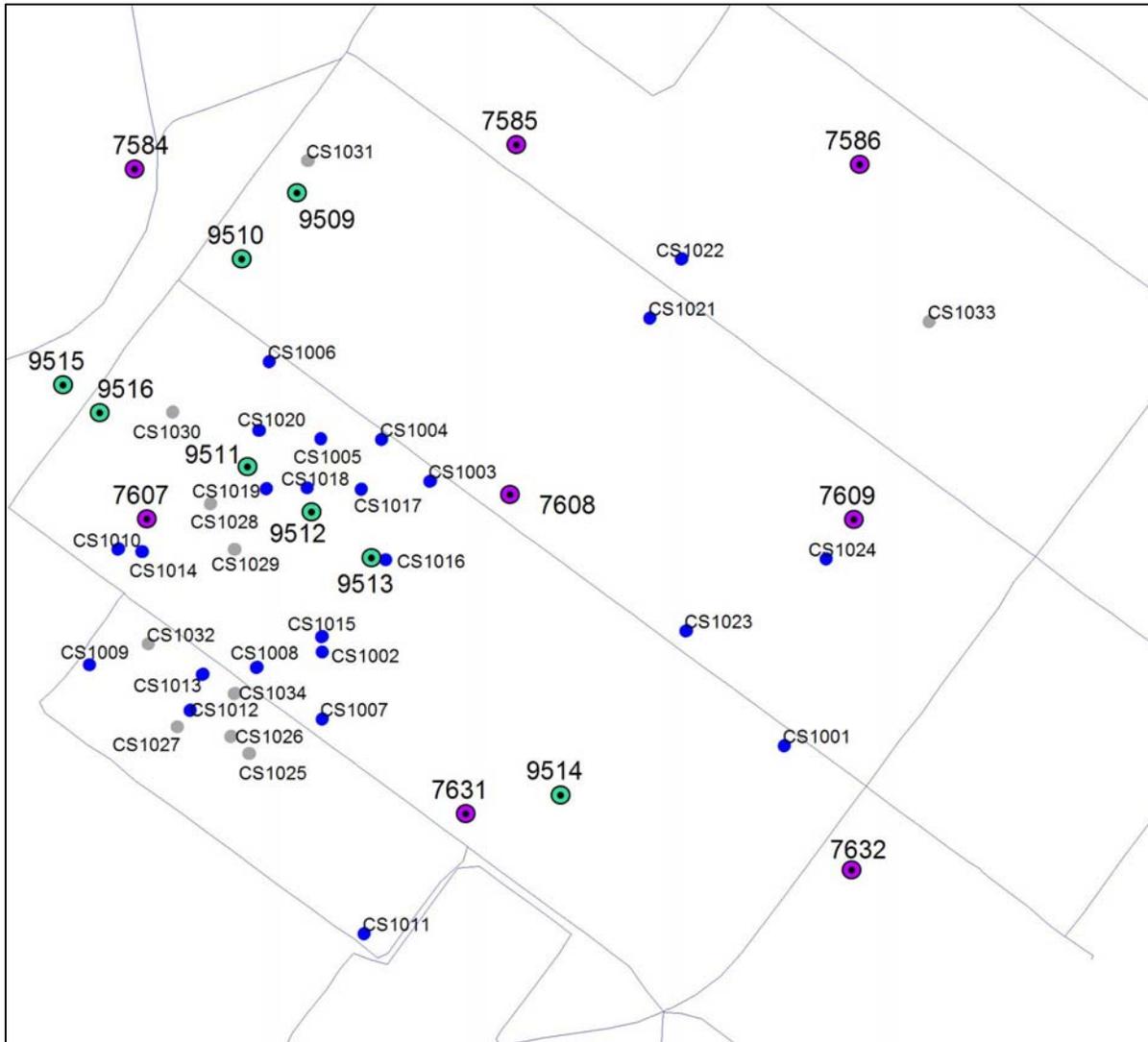
**Figure 2a: Image of the MV DCM as seen by the QuickBird remotely sensed NDVI signal, February 2006.**

Lighter colors indicate increasing saltgrass cover. The sand motion monitoring locations are indicated with the yellow squares. The meteorological towers are indicated by the red diamonds.

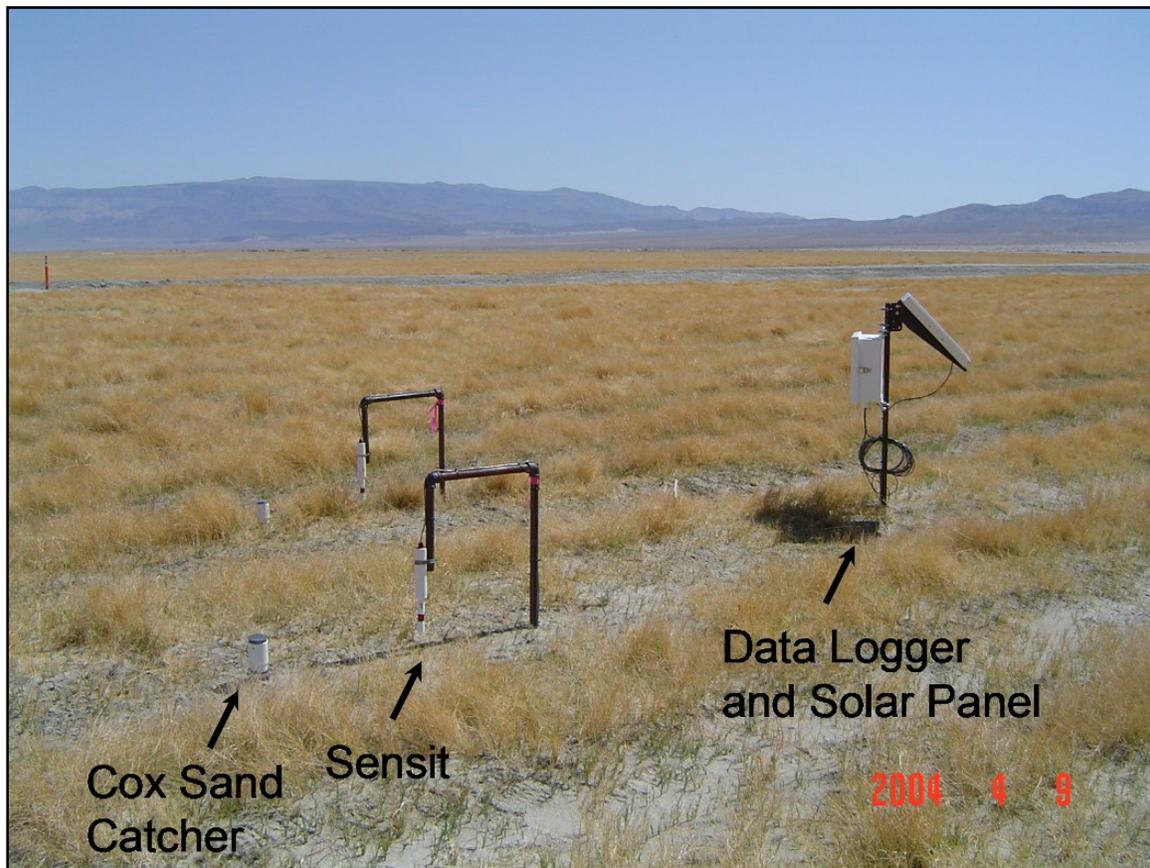


**Figure 2b: Managed vegetation map with locations of sand flux monitoring sites.**

Shown are monitoring sites operated by the Districts since 2000 and Spring of 2007, indicated as purple and green circle, respectively. Monitoring sites operated by the DWP (May 2004 to September 2006) are indicated as the gray and blue circles (colors indicate the different configuration over time).



**Figure 3: View of the Sensit-CSC collection site in the MV DCM operated by DWP.**



CSC sand masses were collected in the field approximately once a month. Samples were then transported to the laboratory in Keeler, where they were weighed and the results entered into the Site Information Management System (SIMS). Sensit and meteorological data were downloaded in the field once a week and also uploaded to the SIMS database. The data set was screened to eliminate records representing erroneous data, missing data periods, erratic Sensit data, and periods of low wind speed (hourly wind speed less than  $5 \text{ m s}^{-1}$ ).

The next step was to develop the CSC sand mass to Sensit relationships to distribute the sand mass within the (monthly) collection period, resulting in estimated hourly sand fluxes. The CSC sand mass was time-resolved into an hourly sand flux only when the total collection mass weighed more than 5 grams, or when the collection mass was between one and five grams and there was a clear relationship between CSC sand mass and Sensit observations. Sand masses less than 1 gram were typically not time-resolved because of the measurement uncertainty. Hourly sand flux is expressed in gram per square cm per hour (g

cm<sup>-2</sup> h<sup>-1</sup>). When these data are adjusted by means of a scaling factor (the K-factor), a PM<sub>10</sub> emission rate can be estimated. The hourly sand fluxes formed the basis for the sand motion control efficiency calculation described in the Data Analysis and Results Sections.

### Sample Collection – Meteorological Data

An important driving factor of sand motion on the Owens playa is wind speed. Because of this, the control efficiency calculations were normalized by the hourly wind speed (see Control Efficiency Calculation section). Wind speed and several other meteorological parameters are recorded at two 10-meter meteorological monitoring towers (for example, Figure 4) located inside the MV area (Figure 2). The hourly data provided by these towers include: wind speed at three heights above the ground (1, 2, and 10 meters), wind direction (10 meters), temperature (2 and 10 meters), and relative humidity (2 and 10 meters). Meteorological monitoring began in December 2004, and is ongoing. Meteorological data are stored on a five-minute basis and downloaded to a laptop computer in the field on a weekly basis. The data are then uploaded to the SIMS database for quality control and processing.

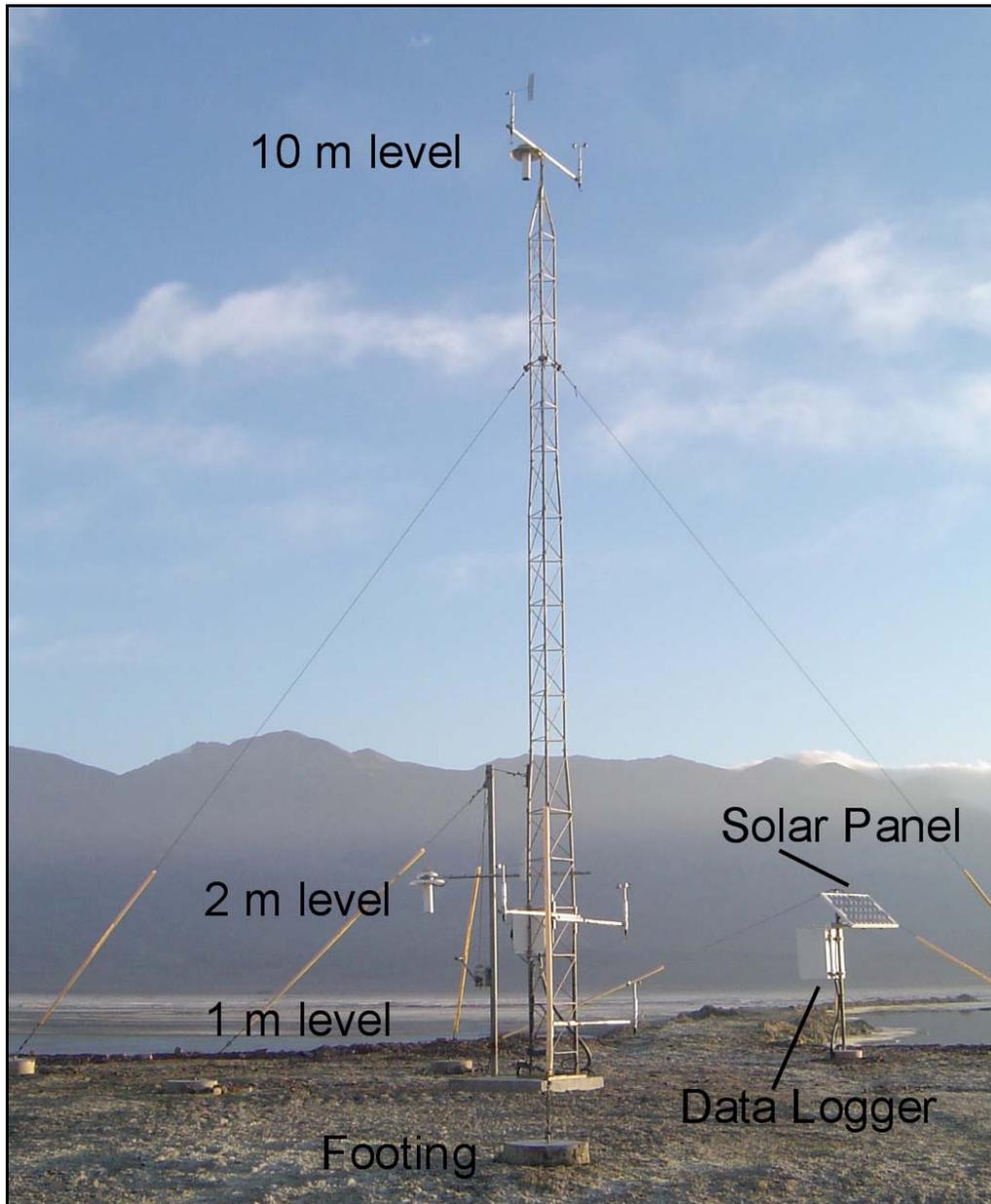
### Sample Collection – Vegetative Cover

Saltgrass cover across the MV area was determined periodically using a combination of remote sensing and ground-based sampling techniques. The remote sensing data were collected by satellite (QuickBird)-mounted sensors, and images were obtained every one or two months. The Normalized Difference Vegetation Index (NDVI) was calculated from the QuickBird data, and is shown as the gray-scale background in Figure 2. This map was used to estimate the cover over the entire MV DCM at an 8-foot by 8-foot pixel resolution. The estimated cover was transformed to a color scale to improve the visualization of its spatial distribution (Figure 5). Ground-based cover measurements were used to calibrate the NDVI map, which allows for the estimation of vegetative cover over the entire MV DCM. The calibration procedure was based on saltgrass cover measurements at 24 sites, at which sand motion also was measured. The cover measurement was based on a “digital point frame” (DPF) method.

The DPF method consists of a series of digital photographs along a fixed, representative, 5-by 1.25-foot transect located approximately 10 feet away from the sand motion instruments. The digital images from each transect were merged in the lab and electronically analyzed for both green (live) and brown (dead, senescent) grass cover, as well as bare soil. The estimated cover at these 24 sites on the ground was then linked to the corresponding remote sensing NDVI values. Based on this information a calibration equation was developed. The calibration equation is applied in two ways. First, it is used to estimate cover over the entire MV area. Second, it is used to estimate the saltgrass cover at the 24 sand motion monitoring

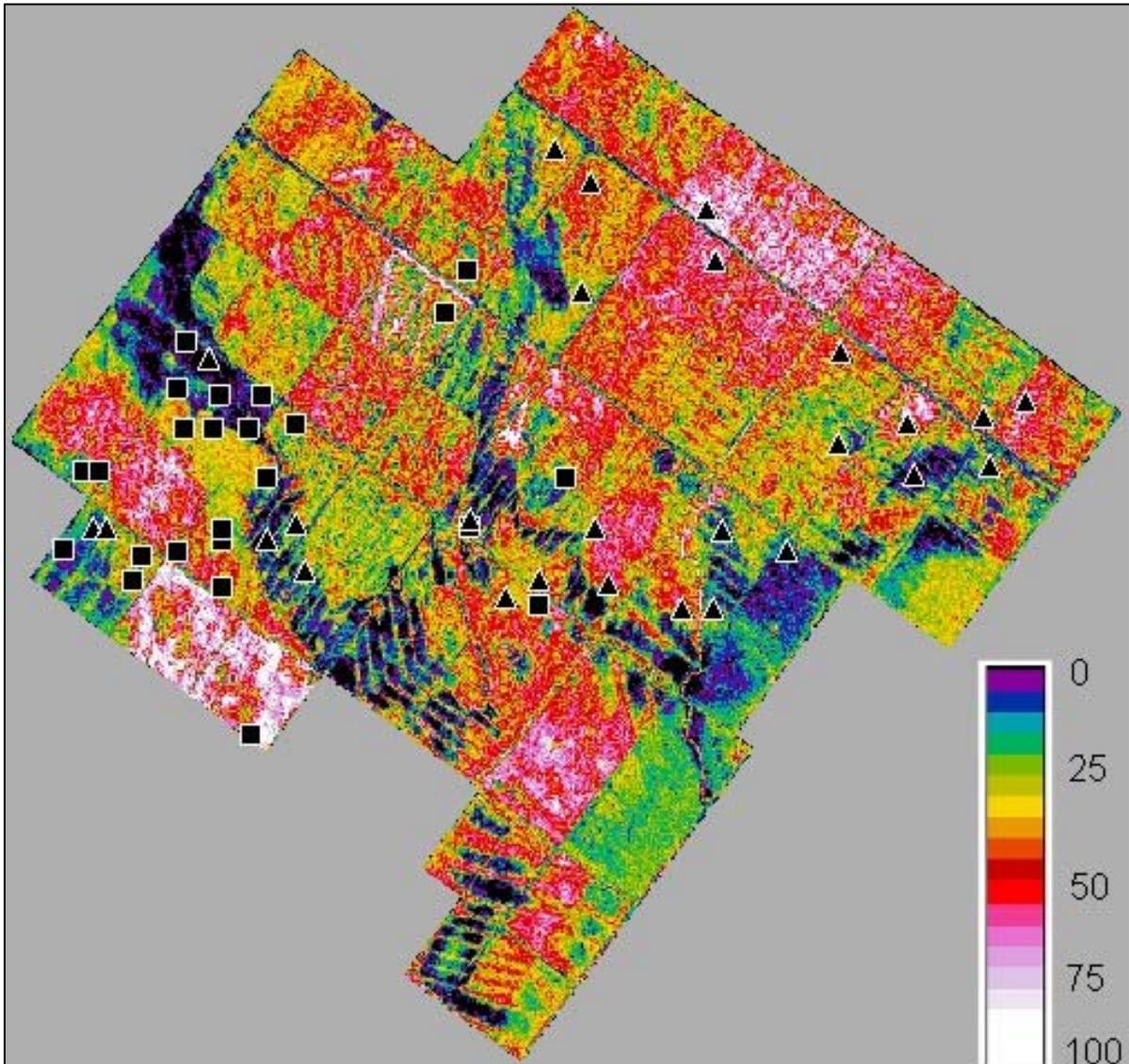
sites. A more detailed description of the cover estimates at the monitoring sites is provided in the (following) Data Analysis section.

**Figure 4: View of a 10-meter meteorological monitoring tower (located at a shallow flood DCM).**



**Figure 5: Image of the MV DCM, with the NDVI signal converted to saltgrass cover classes, February 2006.**

The lowest vegetation cover is indicated by black shading, and highest cover by white shading. Sites equipped with sand motion monitors and used to develop the cover calibration equation are indicated as black squares. Sites used to independently verify the satellite calibration are shown as black triangles.



## Data Analysis

### *Vegetative Cover by Collection Period*

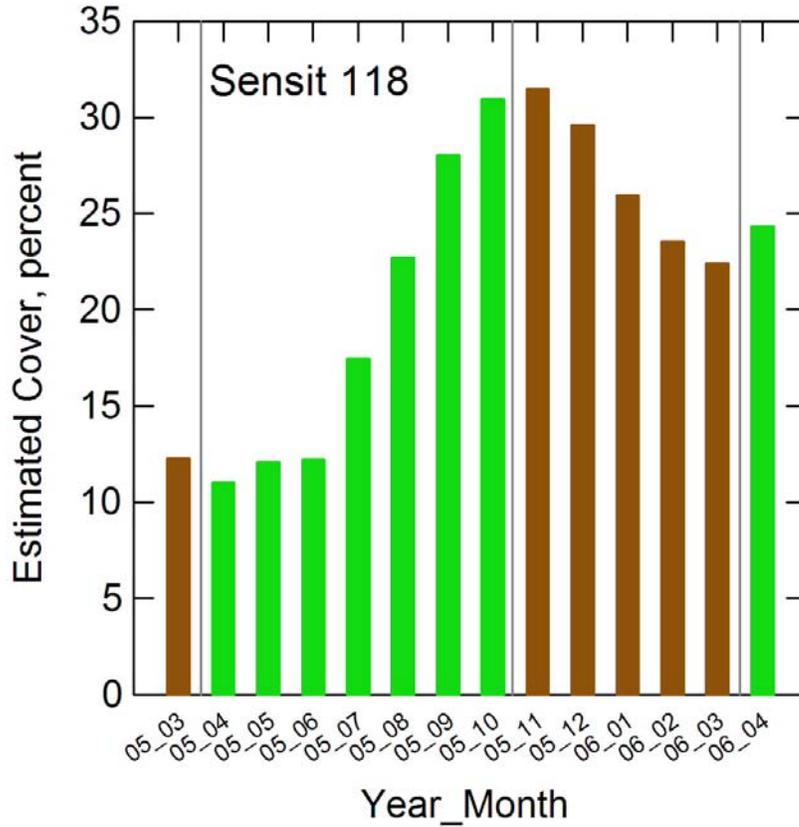
During the analysis period, May 2004 through April 2006, saltgrass cover was estimated each month based on an area of 24 feet by 24 feet around the Sensit location, equivalent to 9 pixels on the QuickBird satellite image. Since QuickBird images are not available for all months, data filling and smoothing procedures were applied. For the 24-month period, QuickBird-based cover estimates were available for 16 months, or for 66 percent of the period. For months for which satellite-based cover estimates were not available, the cover was estimated as the average cover in the months preceding and following the month with the missing cover data. Next, the three-month moving average cover was calculated. For example, the estimated cover for July 2005 was calculated as the average cover for June through August 2005. This second processing step provided a reasonably robust temporal trend in cover for each of the Sensit locations. For example, a time series of estimated cover at Sensit location 118, Figure 6, shows an increase in saltgrass cover during the growing season (April through October), and a decrease during the winter months due to senescence (dying and shrinking) of the saltgrass foliage. It should be noted, however, that since the calibration procedures of the NDVI-based remote sensing images distinguishes between green grass (live), brown grass (dead), and bare soil, the NDVI images can be calibrated during any month of the year.

The vegetative cover at each of the monitoring locations was categorized on the basis of four cover classes: 0 to 10 percent, 11 to 20 percent, 21 to 30 percent, and 31 to 40 percent. The number of sites in each cover category over time is summarized (for part of the analysis period) in Figure 7. The distribution of sites of by cover class does show variability over the 14-month period (Figure 7). The dynamics of the changes in the distribution by cover class are due to a combination of several factors, including:

- Growth during spring and summer (green bars) leads to a loss of sites in the lower two cover classes.
- Senescence of the grass in fall and winter essentially reduces the “projected area” of the (brown) grass and thereby shifts the distribution back to lower cover classes.
- Random error in the estimating procedure. The latter can result in shifts between cover classes from month to month, especially when the actual cover is close to the threshold value separating two cover classes.

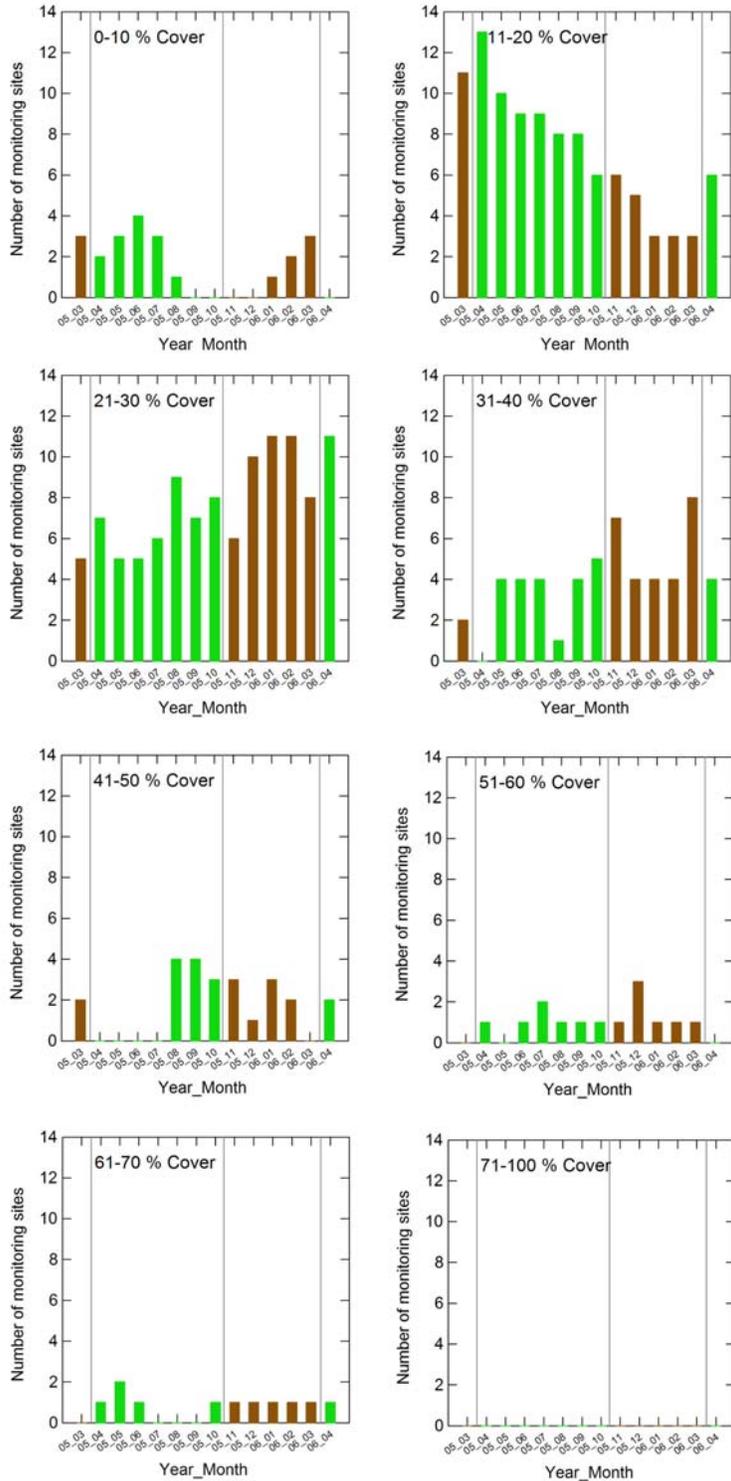
**Figure 6: Estimated saltgrass cover at Sensit 118 from March 2005 through April 2006, based on QuickBird NDVI processed values.**

Shown are months of senescent grass only (brown bars) and the growing season (green bars).



**Figure 7: Distribution of sand motion monitoring sites by cover class by month, March 2005 through April 2006, using QuickBird-based NDVI processed values.**

Shown are months of senescent grass only (brown bars) and the growing season (green bars).



### *Control Efficiency Calculation*

The control efficiency, *CE*, is defined as the reduction in sand flux with the managed vegetation DCM in place over the uncontrolled, pre-DCM sand flux:

$$CE = 100\% * \left[ \frac{(SF_{Baseline,WS} - SF_{Controlled,WS})}{SF_{Baseline,WS}} \right] \quad [1]$$

where *CE* is the achieved control efficiency in percent,  $SF_{Baseline,WS}$  the pre-DCM, uncontrolled sand flux ( $g\ cm^{-2}\ h^{-1}$ ), also referred to as the baseline, and  $SF_{Controlled,WS}$  the controlled sand flux with managed vegetation in place ( $g\ cm^{-2}\ h^{-1}$ ). Both the baseline and controlled sand fluxes are normalized by the wind speed, *WS*.

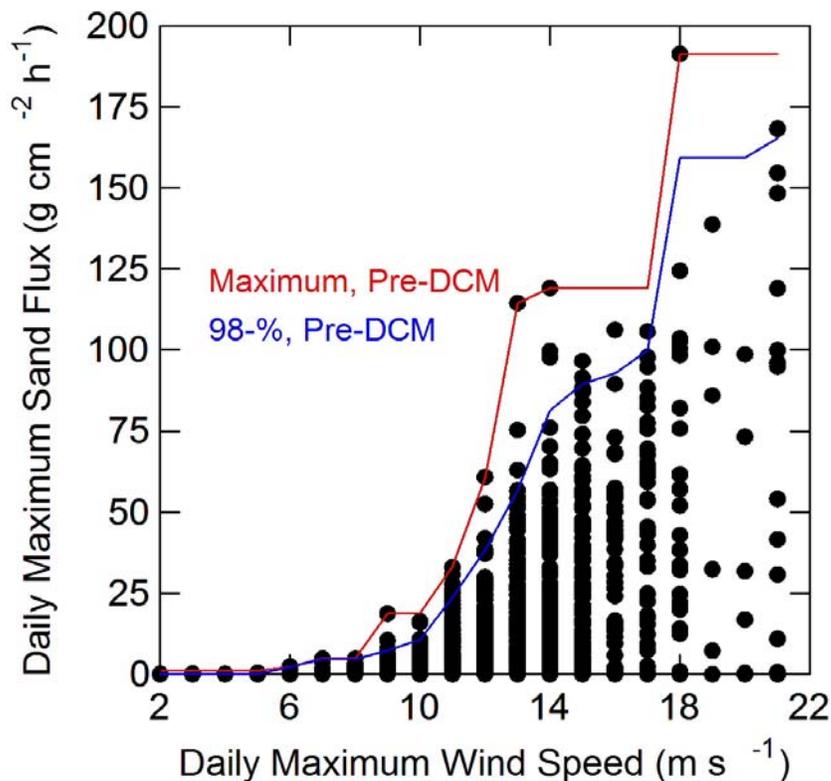
The baseline sand flux was based on the pre-construction period, January 2000 through October 2001. The construction of the MV area began in November of 2001. Hourly sand flux was calculated based on all sand motion sites operated by the District located in or right on the edge of the MV area, a total of 11 sites. For each calendar day in the pre-construction period, the maximum hourly sand flux was matched with the maximum hourly wind speed at the Dirty Socks meteorological monitor. Any sand fluxes below a significance threshold, set at a value of  $0.5\ g\ cm^{-2}\ hour^{-1}$ , were excluded from the baseline analysis. This lower threshold of “significant” sand motion is consistent with the screening procedures used by the District in the Dust ID modeling protocol (GBUAPCD, 2003). A single wind speed class, with a 1 meter per second ( $m\ s^{-1}$ ) resolution, was assigned to each day and each location with a significant sand flux. The resulting screened database was used to extract the baseline sand flux, representing the pre-DCM uncontrolled sand flux. The baseline sand flux was calculated as the 98<sup>th</sup>-percentile sand flux of all days at all locations by wind speed class. The results of this analysis are summarized in Figure 8, with the blue line indicating the baseline sand flux, the 98<sup>th</sup>-percentile, normalized by wind speed.

Sand flux and wind speed from the DWP monitoring network in the MV DCM were analyzed based on the following procedures. The maximum hourly wind speed was calculated for each day using the meteorological tower located most central (northern most) in the MV DCM (Figure 2). The District’s Dirty Socks meteorological tower was used from May 2004 through mid December 2004, until data from the DWP-operated towers became available. Hourly wind speed and wind direction between the two DWP towers tracked each other well so that no significant error is introduced into the analysis by using only one of the two meteorological towers. Similar to the procedures as described for the baseline sand flux calculation, the maximum hourly sand flux was calculated at each of the 24 sites (48 monitor pairs total: one pair in the planted row, one pair between the planted rows as shown in Figure 2) with a daily time resolution (by calendar day). Maximum daily sand

fluxes above the significance threshold of  $0.5 \text{ g cm}^{-2} \text{ h}^{-1}$  were matched with the maximum wind speed and the corresponding wind speed class. Next, CE was calculated using Equation [1], and the initial results were graphically summarized. These visual summaries assisted in identifying any periods and monitoring locations with significant sand motion. Moreover, these summaries also aided in identifying periods and locations that were likely affected by human disturbance activities and therefore should be removed from the final data set. Based on this screening analysis, sand flux data were removed for three time periods, at one or more monitoring locations. The screening analysis is discussed in more detail in the Results Section and Appendix A.

**Figure 8: Baseline sand flux in MV DCM, January 2000 through October 2001.**

The data points are daily maximum hourly sand flux as a function daily maximum hourly wind speed class. The lines indicate the maximum and 98<sup>th</sup>-percentile by wind speed (red and blues lines, respectively).



## Results

The first screening step consisted of only considering the maximum daily sand fluxes above the significance threshold of  $0.5 \text{ g cm}^{-2} \text{ h}^{-1}$ , as indicated in the previous section. The data set based on this first screening level resulted in sand fluxes (normalized by wind speed) that were considerably lower than the baseline for the period preceding the DCM installation. This data set contained several high sand fluxes during the 24-month analysis period. A closer look at the temporal and spatial distribution of these high values, linked with DWP construction and maintenance records for this area, indicated that many of the high sand fluxes were associated with unavoidable human disturbance of the surface crust near the monitoring sites, due to construction and maintenance activities. These disturbance activities consisted of three distinct periods:

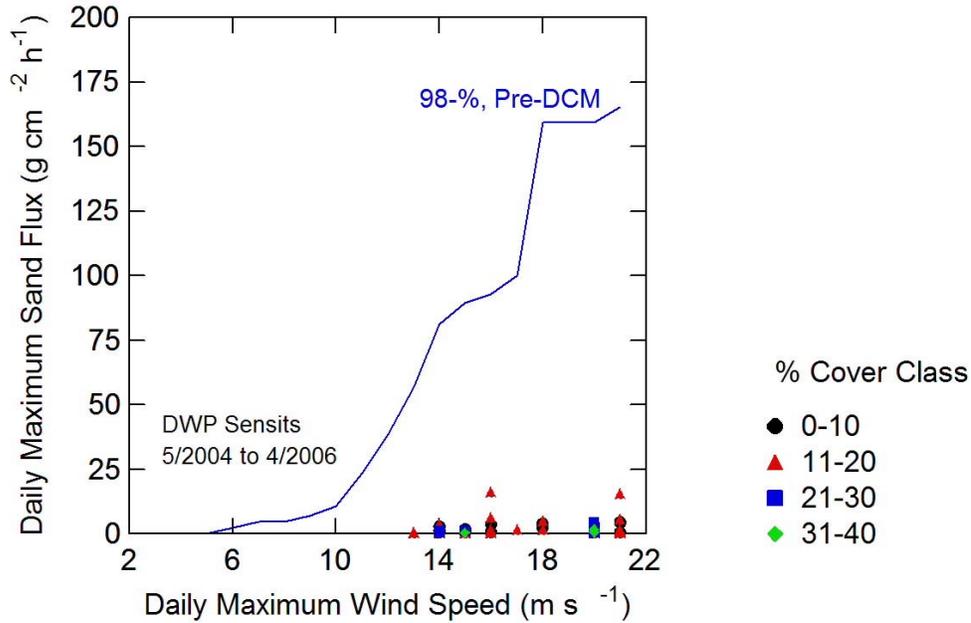
1. Saltgrass replanting over the entire MV DCM (April 2004 - May 2004).
2. Drip line replacement in a subsection of MV DCM (December 2005 - March 2006).
3. Phase V shallow flood construction adjacent to the southwest corner of the MV DCM (January 2006 - current).

Each of these activities had a distinct effect on the sand motion data (Appendix A), and the data from one or more sites were subsequently excluded from the final database.

Based on the screened database, observed sand fluxes were compared to the baseline (Figure 9). The highest observed sand fluxes occurred in the cover classes below 20 percent (Figure 9). Moreover, observed sand fluxes were well below the baseline sand flux (Figure 9). In the next analysis step the observed control efficiency, CE (Equation [1]) was calculated. The majority of CE values were well above 90 percent (Figure 10). The only CE values below 90 percent were observed at site 70/71 (Figure 10). This is not unexpected since this site is located on a sandy soil type, has low grass cover (~13 percent), and is located only 300 feet from the edge of the DCM (Appendix A). When expressed as the average CE, the control efficiency of the MV DCM is equal or greater than 99 percent at saltgrass coverage levels of 20 percent or more (Figure 11).

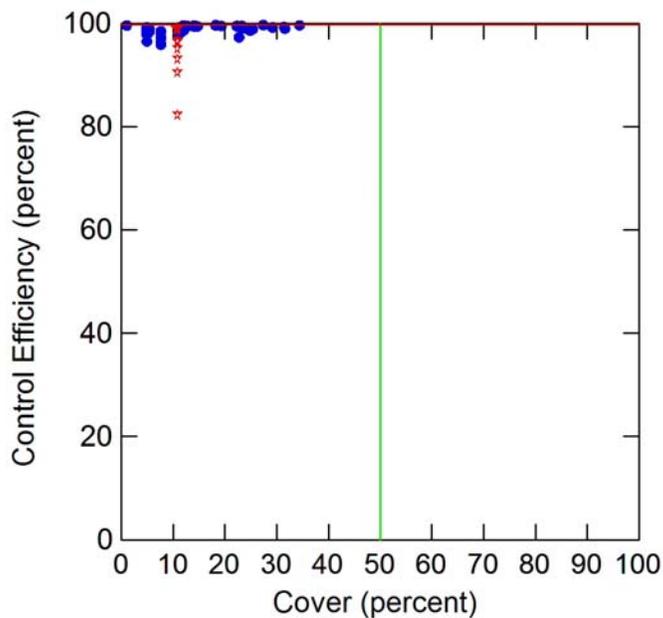
**Figure 9: Sand flux from the DWP monitoring network in the MV DCM, by cover class, normalized by wind speed.**

Cover classes are differentiated by symbols and colors. The baseline is indicated with the blue line.



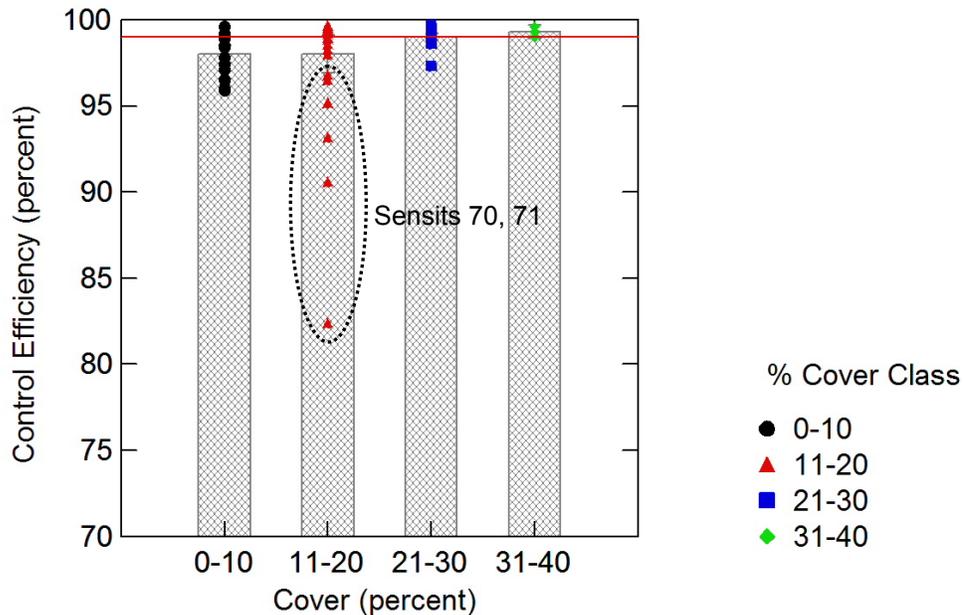
**Figure 10: Control efficiency from the DWP monitoring network in the MV DCM.**

Data are screened for valid data only. Symbols indicate monitoring sites 70 and 71 (red stars), and all other monitoring sites (blue circles).



**Figure 11: Control efficiency from the DWP monitoring network in the MV DCM, by cover class, normalized by wind speed.**

Data are screened for valid data only. Shown are the (arithmetic) mean (gray bar) and the actual values. The red line indicates the 99-percent control threshold. Sample sizes are: 0 to 10%-18, 11 to 20%- 44, 21 to 30%- 24, 31 to 40%- 6, and, >40%-zero. (No sand fluxes above the significance threshold are observed).



## Discussion and Conclusions

The data collected over the 24-month period indicate that an average of 99 percent control of sand flux is effectively achieved at saltgrass covers of 20 percent or more (Figure 11, Figure 12, Table 1). A very high level of sand flux control is also observed at lower saltgrass cover, with average control efficiencies of ~97.5 percent in both the 0-to-10- and 11-to-20-percent cover bins (Figure 11, Figure 12, Table 1). This level of control is attributed to a combination of factors, including:

- The saltgrass cover is effectively sheltering the surface.
- The drip irrigation is keeping the soils relatively moist for about seven months per year (April to October).
- The saltgrass furrows are aerodynamically rough, reducing the wind speed and sand motion within the MV area.

- The sand and sand-sized particles are being trapped along the margins of the area, reducing the amount of particles available to abrade surfaces within the MV area.

It should be noted that the control efficiency in the cover classes with a saltgrass cover above 40 percent was so high that the results were not included in the summary Figure 11. While sand motion was monitored in these cover classes during the entire period (Figure 7, Table 1), none of the sand fluxes observed in these cover classes exceeded the significance threshold (sand flux  $0.5 \text{ g cm}^{-2} \text{ h}^{-1}$ ). Only seven days with maximum hourly sand fluxes above  $0.01 \text{ g cm}^{-2} \text{ h}^{-1}$  were observed in these cover classes in the entire analysis period. Therefore, at a saltgrass cover of above 40 percent the observed and average control efficiency was effectively 100 percent (Table 1).

It should also be noted that the absence of sand motion in the higher cover classes cannot be attributed to the lack of wind. Over the analysis period of a total of 699 days, 455 days, or 65 percent, of the total number of days exceeded the threshold wind speed for sand motion (i.e.,  $7.5 \text{ m s}^{-1}$  for at least one hour per day). Twenty percent of the total number of hours in the period (16,776 hours), or nearly 3,400 hours, exceeded this threshold wind speed. This indicates that the observed wind speed distribution exceeded the sand motion frequently enough during this period to initiate sand motion if the surface in the MV area would be susceptible to erosion (Table 1). Instead, no significant sand motion was observed with a vegetation cover of 40 percent, and for vegetation covers below 40 percent very high control efficiencies were achieved (Table 1, Figure 12).

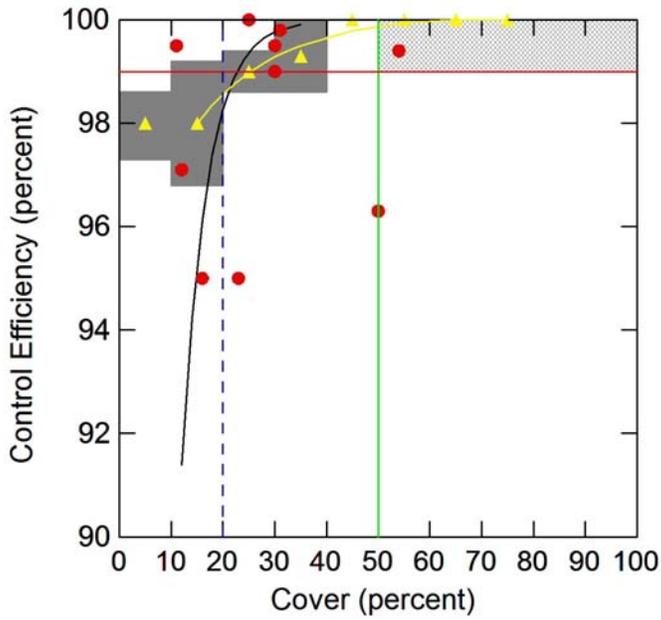
**Table 1: Number of monitoring sites and CSC-Sensit pairs by cover class and by collection period, and overall average control efficiency (CE) by cover class.**

Values represent the average number of sites by class and period (24 months total), the number of monitor pairs (48 total), and the average CE. The values in brackets represent the observed range. The “number of days by site with a significant sand flux” is derived from a total of 455 days during which the wind speed exceeded  $7.5 \text{ m s}^{-1}$  for at least one hour per day. With 48 monitors, this produced over 20,000 data points.

Parameter	Saltgrass Cover Class		
	0-20 percent	20-40 percent	>40 percent
Average and (Range)			
Number of monitoring sites	7 (2 to 15)	11 (6 to 16)	4 (1 to 9)
Number of monitor pairs	14 (4 to 30)	22 (12 to 32)	8 (2 to 18)
Number of days with significant sand flux (out of 455)	15	5	0
Number of days with significant sand flux (out of >20,000)	49	16	0
Control Efficiency	98.0% (82.4 - 100)	99.1% (97.3 - 100)	100% (99.8 - 100)

**Figure 12: Control efficiency from the DWP monitoring network in the MV DCM, by cover class, in relation to the research results referenced in the 2003 SIP (GBUAPCD, 2003).**

The DWP results are shown as the (arithmetic) mean CE (yellow triangles and regressed line) and the 95-percent confidence interval (solid gray bars). The District data (GBUAPCD, 2003) are shown as actual data points (red circles), the 50 percent cover threshold (green line) required to achieve 99-percent control of sand motion (light gray shaded box), and the control efficiency relationship developed for Owens Lake by Lancaster (1996).



**APPENDIX A**

**Data Screening Procedures**

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## Data Screening Procedures

### Step 1

The first level of data screening consisted of filtering the raw data set of hourly sand fluxes for the entire 24-month period and all monitoring pairs for values above the minimum threshold of  $0.5 \text{ g cm}^{-2} \text{ h}^{-1}$ . This threshold of “significant sand flux” is consistent with the screening procedures used by the District in the Dust ID modeling protocol (GBUAPCD, 2003). The resulting data were then compared with the baseline (Figure A.1), and the control efficiencies were calculated (Figure A.2).

### Step 2

In the second step of the screening procedures, periods during which construction or maintenance related surface disturbance occurred, in or adjacent to the MV DCM, were identified (Figure A.3, Figure A.4). This analysis consisted of a close examination of the temporal and spatial distribution of the high sand flux values. In many cases the occurrence of the highest sand fluxes was associated with unavoidable human disturbance near the monitoring sites, due to construction or maintenance activities. The timing (to a daily resolution) and location of these activities was traced back using observations from field personnel, as well as detailed construction and maintenance records and maps. The identified construction and maintenance related activities in and around the MV DCM during the analysis period consisted of three distinct activities.

#### *Replanting of Saltgrass*

In the late spring of 2004, saltgrass was replanted throughout the entire MV DCM in order to fill in areas where the initial establishment of saltgrass was insufficient. The startup period of the DWP sand motion monitoring overlapped with the replanting effort. Many of the DWP monitors showed significant sand motion only during the first month, May 2004, when replanting was recent or still ongoing (Figure A.3, Figure A.4), but no significant activity thereafter. Based on the overlapping of these two activities, the May 2004 period was removed from the control efficiency analysis for the entire MV DCM.

#### *Maintenance of Drip Lines*

In December of 2005, new drip lines were installed over a significant portion of the MV DCM. This involved heavy equipment, including tractors, which radically disturbed surface crusts in these areas. Field personnel documented the area where the surface crust was severely disturbed during these maintenance activities and developed a list of the monitoring sites potentially affected by the surface disturbance. In the early winter of 2006 most of these sites, which had not shown significant sand motion until then, became highly emissive (Figure A.3, Figure A.4). In comparison, areas where the drain line replacement

did not take place did not show any significant sand motion during this period. Moreover, the (potentially) affected sites were documented several weeks before these sites actually became emissive. Based on the insufficient time frame for the salt crust to heal after the disturbance, the period from December 2005 through March 2006 was removed from the control efficiency analysis for five monitoring sites (10 monitoring pairs) affected by maintenance activities originating in December 2005.

### *Phase Shallow Flood Construction*

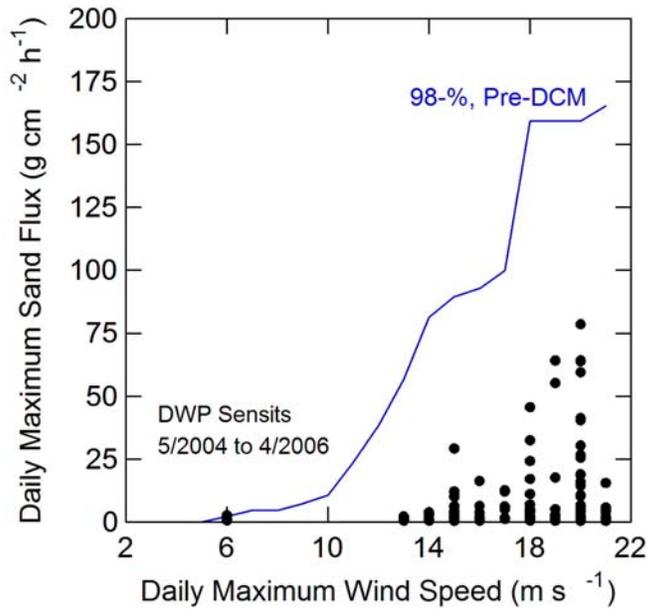
In January of 2006, Phase V shallow flooding construction activities commenced adjacent to the MV DCM near the southwest corner of the DCM (Figure A.5). One of the monitoring sites just inside of the berm of the MV DCM appeared to be strongly affected by these activities (Figure A.3, Figure A.4). This site, Site 70/71 (Figure A.5), is characterized by a low saltgrass cover, approximately 13 percent, and did show significant sand motion in 2005 before the Phase V construction commenced. However, sand fluxes increased three-fold within two weeks of the onset of Phase V construction. Based on this information, the period from January 2006 and onwards (as construction is still ongoing) was removed from the control efficiency analysis for Site 70/71.

### **Step 3**

In the third screening step the sand flux data for period and Sensit combinations affected by surface disturbance due to construction and maintenance activities, as identified in Step 2, were removed from the data set. The resulting data set indicated that the observed sand fluxes were considerably lower than the baseline (Figure A.6). Moreover, the only site with significant sand motion is Site 70/71. This is not unexpected since this site is located on a sandy soil type, has a low grass cover (~13 percent), and is located only 300 feet from the edge of the DCM (Figure A.5). The resulting screened CE values range from 75 to 100 percent at Site 70/71, and are over 90 percent at all other sites (Figure A-7). A more in depth breakdown of CE by saltgrass cover is provided in the Results Section and the Discussion and Conclusions Section.

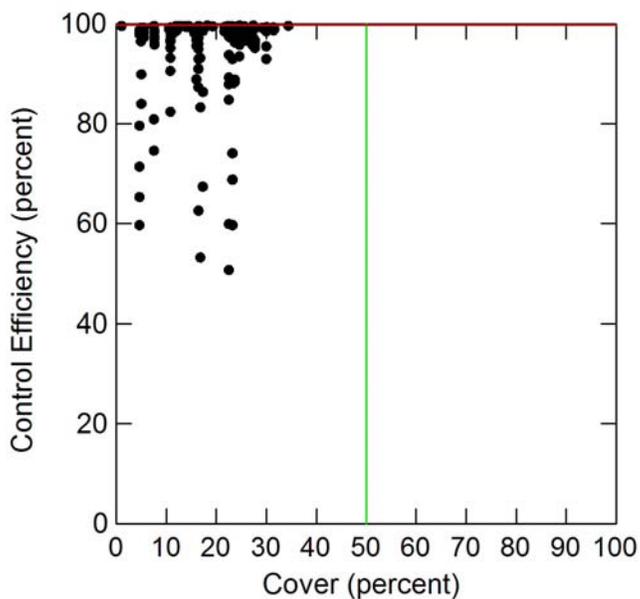
**Figure A.1: Sand flux from the DWP monitoring network in the MV DCM, May 2004 to April 2006, normalized by wind speed.**

The baseline is indicated by the blue line. Data are screened by threshold level only (Step 1).



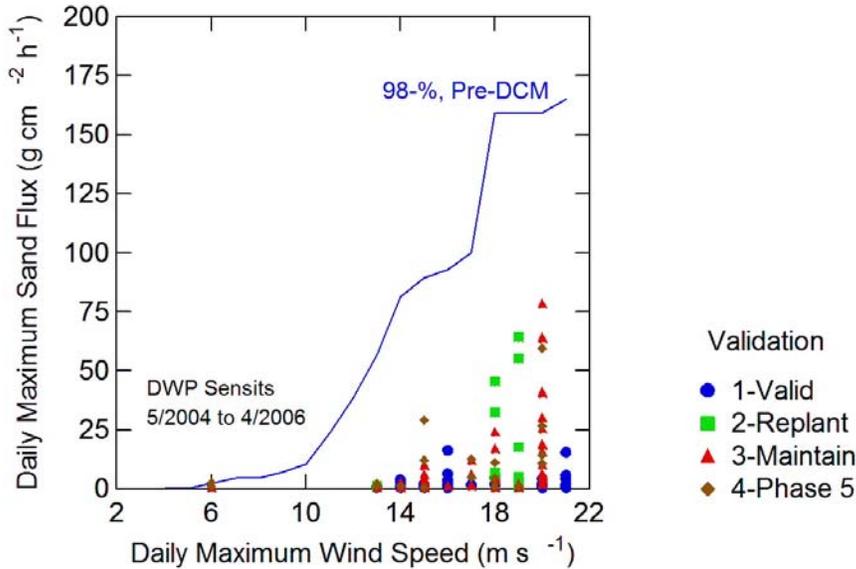
**Figure A.2: Sand flux control efficiency (percent) as a function of saltgrass cover, May 2004 to April 2006, normalized by wind speed.**

The lines indicate a 50-percent cover and the 99-percent control level, based on the 2003 SIP (respectively, green and red line). The data are screened by threshold level only (Step 1).



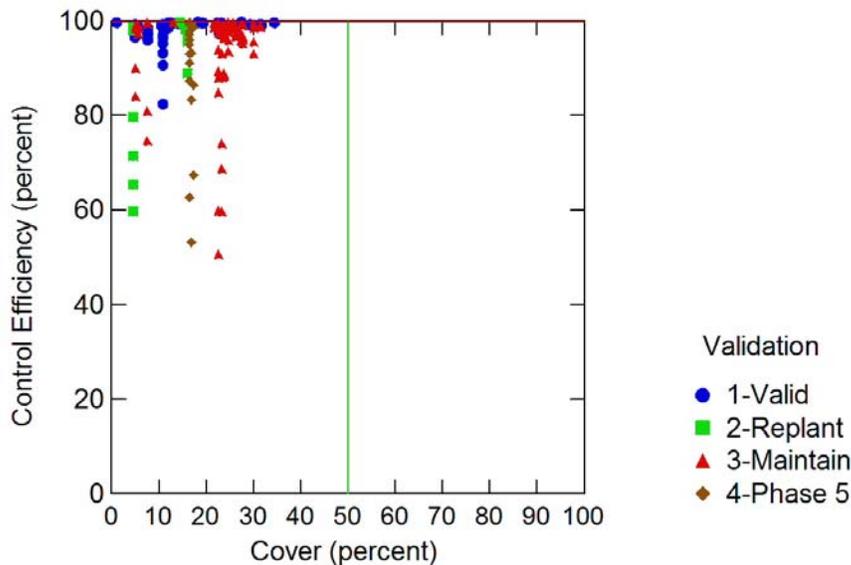
**Figure A.3: Sand flux from the DWP monitoring network in the MV DCM, May 2004 to April 2006, normalized by wind speed.**

The baseline is indicated by the blue line. The data are screened by threshold level (Step 1). The construction and maintenance periods are differentiated by symbols and colors (Step 2).



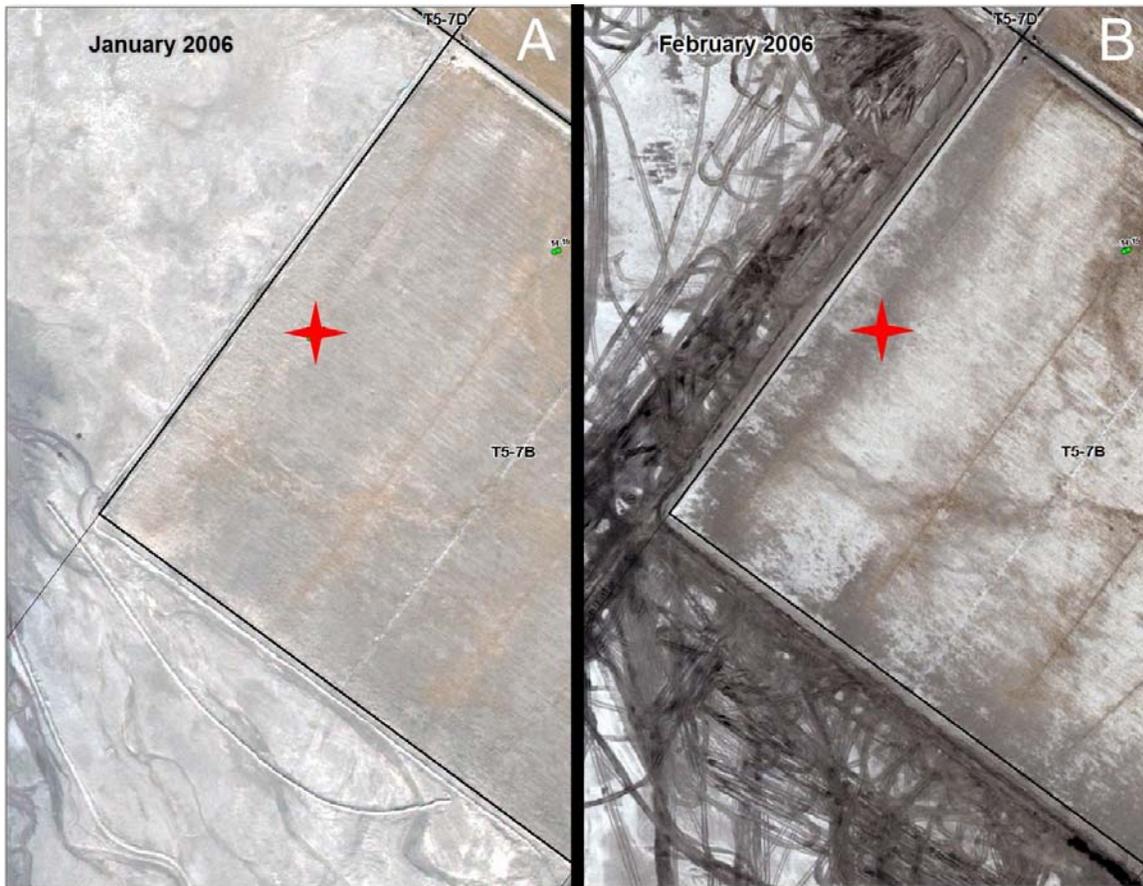
**Figure A.4: Sand flux control efficiency (percent) as a function of saltgrass cover, May 2004 to April 2006, normalized by wind speed.**

The lines indicate a 50-percent cover and the 99-percent control level (green and red lines, respectively). Data are screened by threshold level (Step 1). Construction and maintenance periods are differentiated by symbols and colors (Step 2).



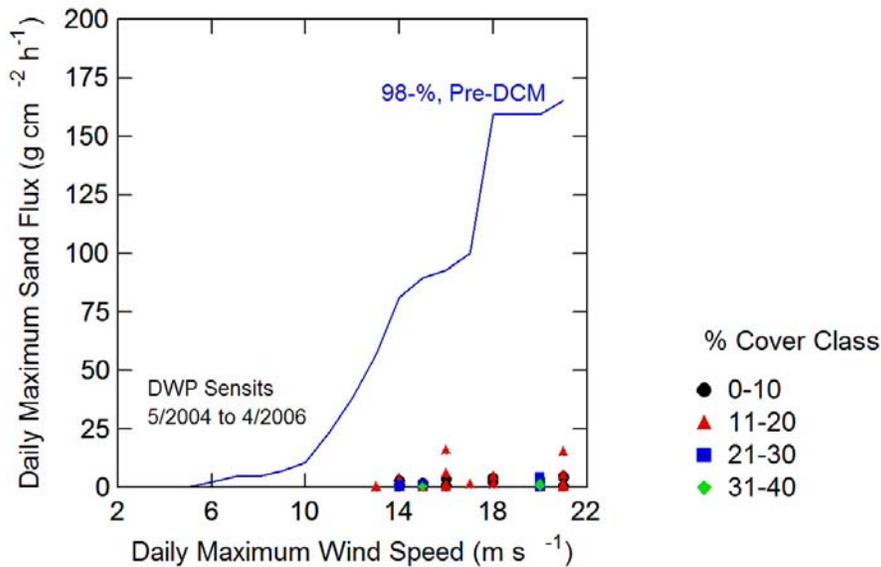
**Figure A.5: The south west corner of MV DCM as seen by QuickBird satellite imagery in January 2006 (Panel A) and February 2006 (Panel B).**

Monitoring Site 70/71, located approximately 300 feet from the edge of the DCM, is indicated as a red star. Severe ground disturbance due Phase V construction is visible in the February image, but is absent in the January image.



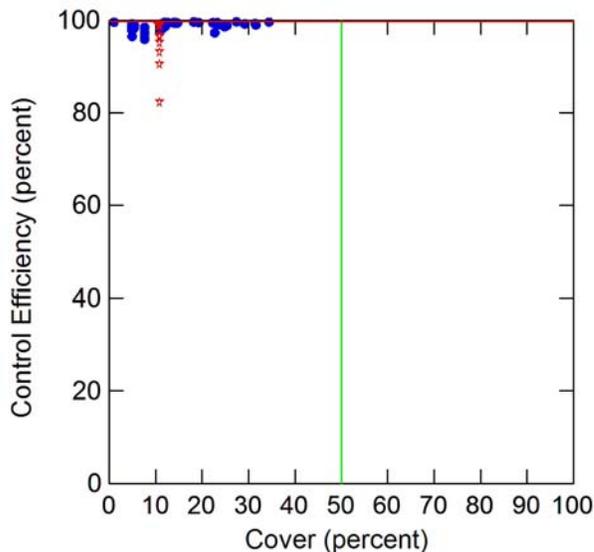
**Figure A.6: Sand flux from the DWP monitoring network in the MV DCM, May 2004 to April 2006, normalized by wind speed.**

The baseline is indicated by the blue line. The saltgrass cover classes are differentiated by symbol and color. The data are screened by threshold level (Step 1) and construction and maintenance periods (Step 2 and Step 3).



**Figure A.7: Sand flux control efficiency (percent) as a function of saltgrass cover, May 2004 to April 2006, normalized by wind speed.**

The lines indicate a 50-percent cover and the 99-percent control level (green and red lines, respectively). The symbols represent Site 70/71 (red stars) and all other monitoring sites (blue circles). The data are screened by threshold level (Step 1) and construction and maintenance periods (Step 2 and Step 3)



**APPENDIX 4.  
AIR SCIENCES INC. 2007A. DEMONSTRATION OF 99% CONTROL  
EFFICIENCY FOR THE MANAGED VEGETATION DUST CONTROL  
MEASURE.**



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TECHNICAL MEMORANDUM

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**DEMONSTRATION OF 99-PERCENT CONTROL EFFICIENCY  
FOR THE MANAGED VEGETATION DUST CONTROL  
MEASURE**

PREPARED FOR: Duane Ono, GBUAPCD  
Mark Schaaf, Air Sciences

PREPARED BY: Kent Norville, Air Sciences

PROJECT NO.: 228-7

COPIES: Richard Harasick, LADWP  
Ted Schade, GBUAPCD

DATE: June 27, 2007

This modeling report outlines the methods, data, and assumptions for the air quality dispersion analysis used to evaluate whether the Owens Lake managed vegetation (MV) area has met the required 99-percent control efficiency as defined under the Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State Implementation Plan 2003 Revision (RSIP). The approaches used in this analysis follow those outlined in the RSIP.

**Model Selection**

Following the RSIP, Air Sciences used the CALPUFF modeling system files generated for the Winter 2007 Dust ID modeling analysis. The specific model versions were CALPUFF version 5.711b (051216) and CALMET version 5.53b.

**Meteorological Data**

For this analysis, data from two calendar years (2005 and 2006) were used. The monthly CALMET data sets were already processed as part of the Dust ID program by the District's consultant.

**Sand Catches**

According to the RSIP, PM<sub>10</sub> emission rates are computed on the basis of sand flux, which is computed using data from Cox Sand Catchers (CSC) and Sensits. The CSC is a passive collection device that captures wind-transported sand and sand-sized particles. Sensits are real-time particle motion sensors used to time-resolve the mass collected by the CSC. Both instruments were installed to sample at a height of 15 cm above the surface.

## DEMONSTRATION OF 99-PERCENT CONTROL EFFICIENCY FOR THE MANAGED VEGETATION DUST CONTROL MEASURE

Within the MV area, the District operated eight long-term sand catch sites, identified as: 7585, 7586, 7607, 7608, 7609, 7610, 7631, and 7632 (Figures 1 and 2). In 2005, the resolution of the sand catches was 1 gram as the sand masses were measured in the field. In 2006, the District began weighing the sand masses in its laboratory, and the resolution is now lower than 0.1 grams. In mid December 2006, the District added six more sand catch sites: 9509, 9510, 9511, 9512, 9513, and 9514 (Figure 2). In January 2007 (outside the period covered by this modeling analysis), the District added two more sites: 9515 and 9516 (Figure 2). The 2006 sand catch masses for these 13 District sites operating during calendar year 2006 are shown in Table 1. Sites with a single collection greater than 5 grams are highlighted in yellow.

**Table 1: District sand catch sites with collected sand masses by year (largest and total).**

District Sites	2005		2006	
	Largest Collection (grams)	Total Mass (grams)	Largest Collection (grams)	Total Mass (grams)
<i>Long-Term Sensits</i>				
7585	0	0	2	2
7586	0	0	1	1
7607	1	1	1.5	1.5
7608	0	0	0	0
7609	0	0	1	1
7610	0	0	1	1
7631	0	0	0.4	0.4
7632	0	0	0.2	0.2
<i>Installed December 2006</i>				
9509	--	--	0	0
9510	--	--	0	0
9511	--	--	54	54
9512	--	--	4	4
9513	--	--	116	116
9514	--	--	0	0

## DEMONSTRATION OF 99-PERCENT CONTROL EFFICIENCY FOR THE MANAGED VEGETATION DUST CONTROL MEASURE

From February 2005 through September 2006, LADWP operated 24 sand catch sites within the MV area to support the Managed Vegetation Control Efficiency Study<sup>1</sup>, as shown in Figure 3. The 2005 and 2006 sand catch masses for the LADWP sites are presented in Table 2. Each LADWP site employed an instrument pair. The resolution of the LADWP catches was 0.1 grams.

**Table 2: LADWP sand catch sites with collected sand masses by year (largest and total). Yellow highlighted sites had a sand collection mass greater than 5 grams.**

LADWP Site	Sensit Number	2005		2006	
		Largest Collection (grams)	Total Mass (grams)	Largest Collection (grams)	Total Mass (grams)
CS1001	20054	2.0	3.9	4.9	9.0
	20055	4.2	7.2	4.9	9.0
CS1002	20056	0.6	1.8	0.9	2.2
	20057	0.5	1.3	1.9	2.9
CS1003	20058	0.3	1.1	0.8	2.1
	20059	0.2	0.9	0.6	1.8
CS1004	20060	0.7	1.9	13.7	18.2
	20061	0.5	1.5	10.2	14.2
CS1005	20062	3.0	4.2	3.0	7.5
	20063	3.0	4.1	2.1	6.1
CS1006	20064	51.8	82.1	5.5	12
	20065	44.2	89.4	3.7	6.6
CS1007	20066	0.5	1.8	0.8	2.1
	20067	0.4	1.4	0.4	1.3
CS1008	20068	0.3	0.8	1.3	2.8
	20069	0.2	0.9	0.7	1.9
CS1009	20070	139.5	148.1	167	359.5
	20071	47.2	51.6	62.9	141.8
CS1010	20018	1.5	4.0	1.8	4.9
	20019	1.5	3.2	1.6	3.8
CS1011	20032	0.5	2.2	2.0	5.9
	20033	0.4	1.7	1.6	5.0
CS1012	20008	0.3	1.1	1.9	3.6
	20009	0.4	1.8	1.0	2.7
CS1013	20012	0.1	0.8	0.8	2.2
	20013	0.3	1.2	0.7	2.3
CS1014	20016	0.7	2.1	0.9	2.7
	20017	0.7	1.5	1.0	3.1

<sup>1</sup> Managed Vegetation Control Efficiency Study, Owens Dry Lake, California, Technical Memorandum prepared for Richard Harasick, Los Angeles Department of Water & Power by Air Sciences Inc., July 24, 2006.

## DEMONSTRATION OF 99-PERCENT CONTROL EFFICIENCY FOR THE MANAGED VEGETATION DUST CONTROL MEASURE

**Table 2 (continued): LADWP sand catch sites with collected sand masses by year (largest and total). Yellow highlighted sites had a sand collection mass greater than 5 grams.**

LADWP Site	Sensit Number	2005		2006	
		Largest Collection (grams)	Total Mass (grams)	Largest Collection (grams)	Total Mass (grams)
CS1015	20040	1.2	3.4	1.1	3.8
	20041	2.1	4.6	1.1	3
CS1016	20038	0.7	3.1	209.8	481.6
	20039	0.8	3.2	271.2	543.7
CS1017	20028	2.5	5.8	77.2	155.4
	20029	1.8	3.7	58	107.3
CS1018	20026	3.9	13.3	61.6	115.4
	20027	2.5	5.6	30	62.3
CS1019	20024	2.6	6.7	49.5	91.5
	20025	2.5	6.2	49.1	91.5
CS1020	20036	8.3	13.5	46.8	84.5
	20037	5.3	11.4	47.2	82.4
CS1021	20046	3.7	5.9	3.8	6
	20047	1	3.3	3.4	5.8
CS1022	20048	0.8	1.7	1.5	2.4
	20049	1.6	2.3	1.2	2.8
CS1023	20050	1.2	3.2	3	6.8
	20051	1	2.6	2.8	6.5
CS1024	20052	0.2	0.7	0.6	1.6
	20053	0.3	0.8	0.5	1.5

DEMONSTRATION OF 99-PERCENT CONTROL EFFICIENCY FOR THE MANAGED VEGETATION DUST CONTROL MEASURE

**Figure 1: District sand catch sites within the Managed Vegetation area. The green circles are District sand catch sites operating in 2005 and 2006. The red circles are District sites that were installed in mid-December 2006.**

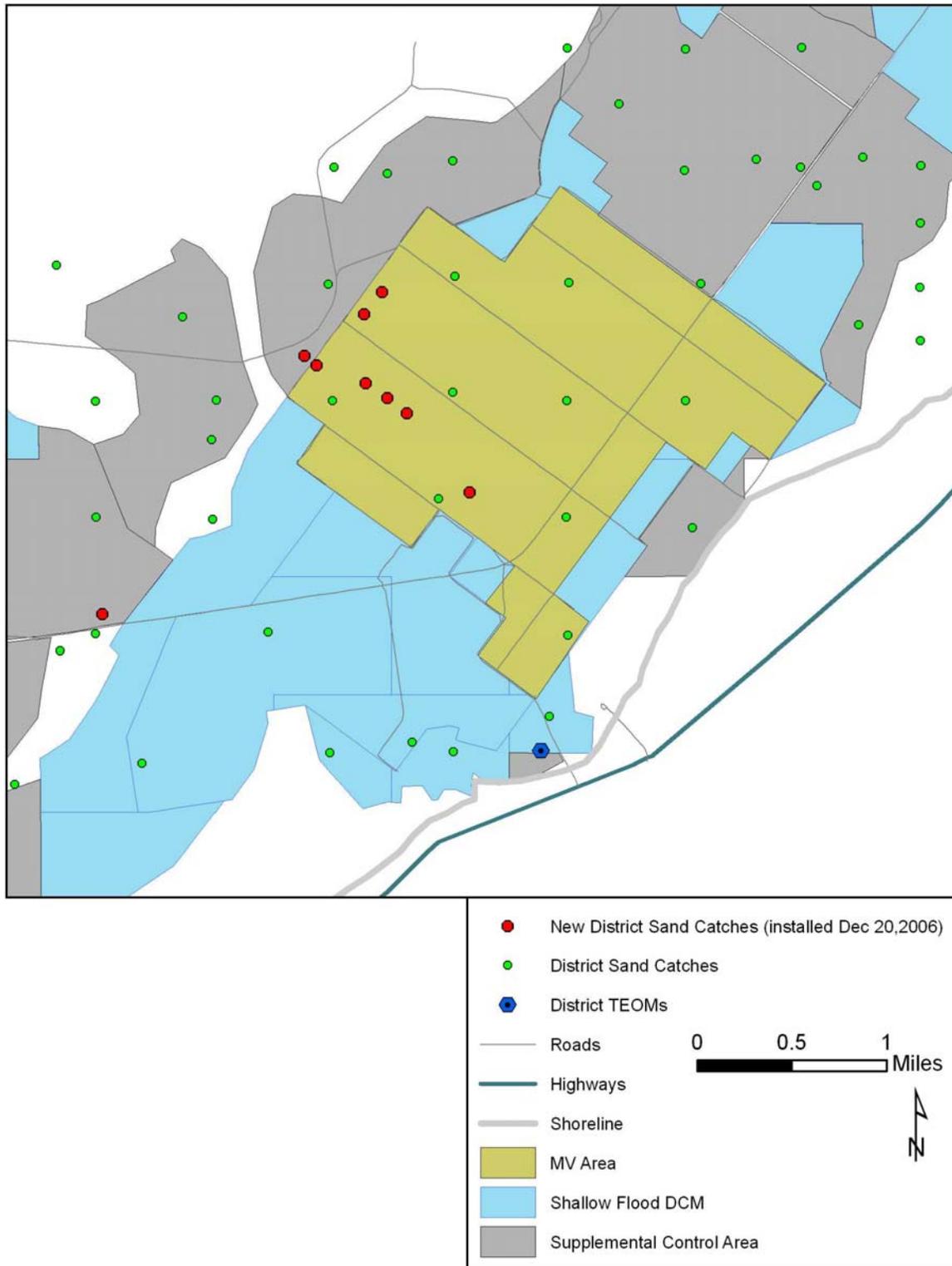
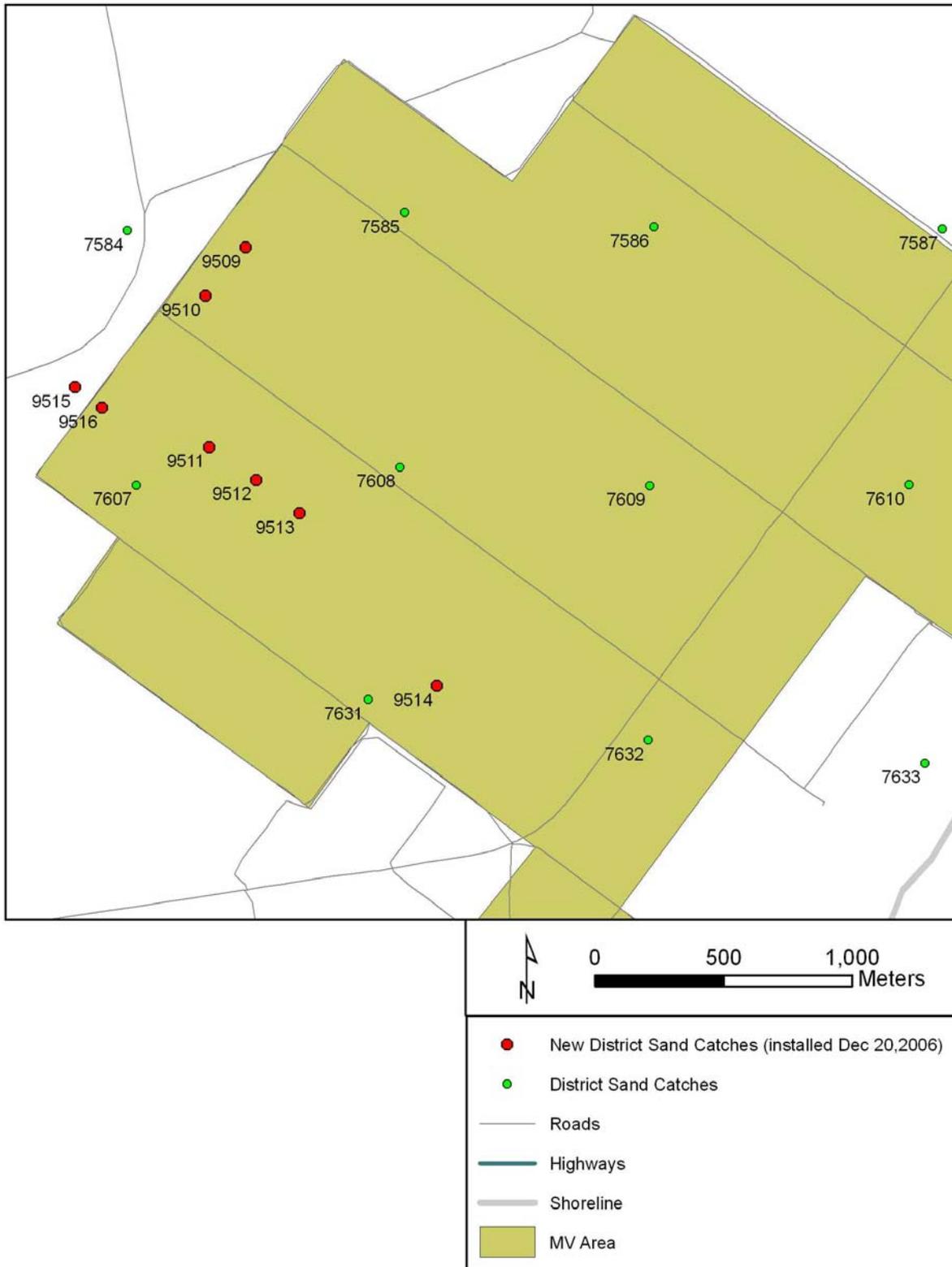
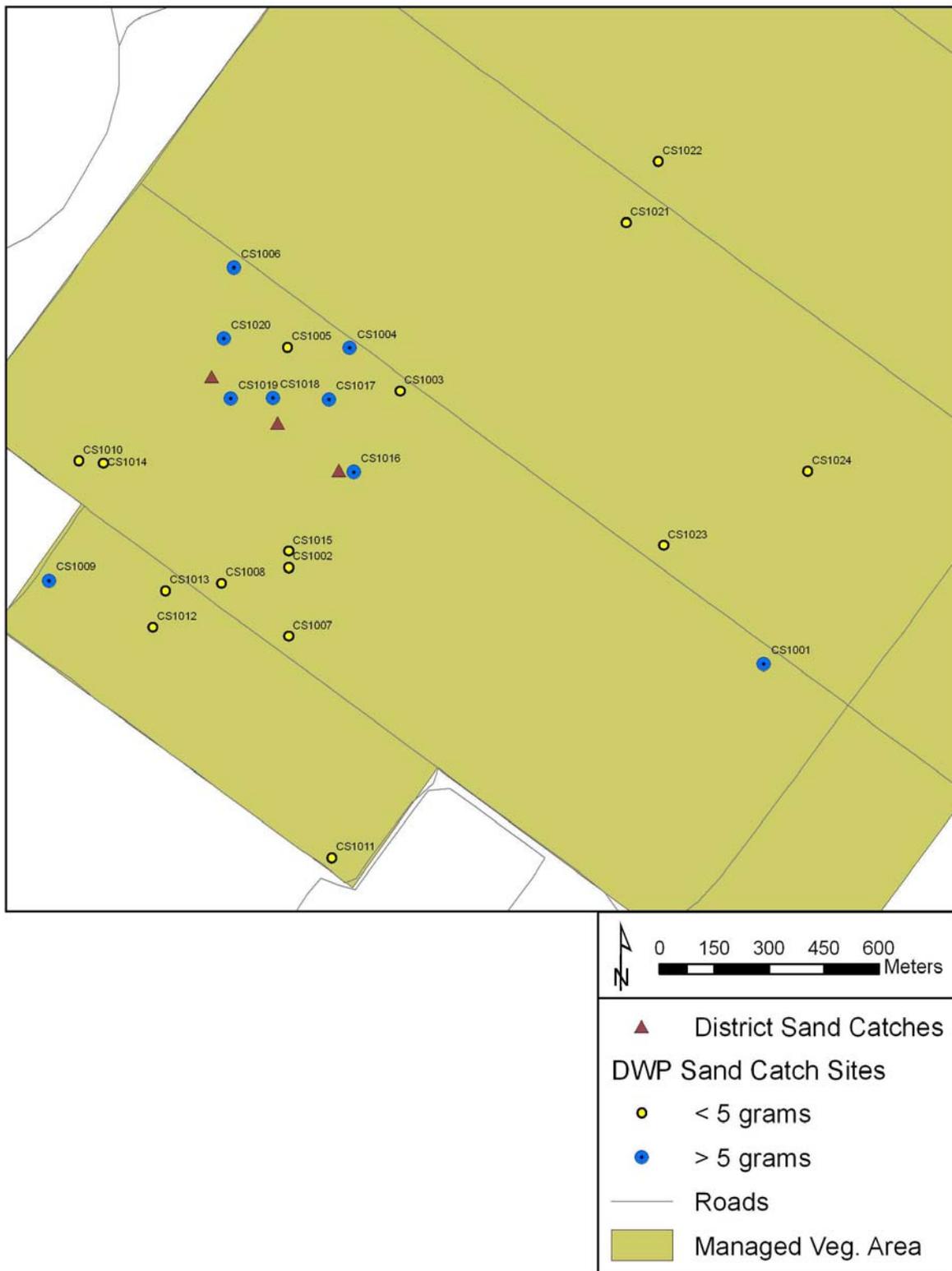


Figure 2: Closeup of District sand catches sites within the MV area.



DEMONSTRATION OF 99-PERCENT CONTROL EFFICIENCY FOR THE MANAGED VEGETATION DUST CONTROL MEASURE

Figure 3: LADWP sand catch sites within the MV area.



## Modeled Areas

For this analysis, two types of areas were considered. The first class were discrete areas associated with the higher mass sites, generally with a catch greater than 5 grams with a definable boundary. The second class was the remainder of the general MV area. The general area was represented by the scattered low mass catches which generally did not have a clearly identified emissive area associated with them.

The discrete areas with high sand masses are shown in Figure 4. Eight sand catch sites are associated with this source class: CS1004, CS1006, CS1009, CS1016, CS1017, CS1018, CS1019 and CS1020. Five of these, CS1016 through CS1020, were associated with the 34-acre area of drip tube shanking in late 2005. This area is also represented by District sites 9511, 9512, and 9513. CS1004 was associated with a 1.25-acre LADWP-delineated area. CS1009 was associated with sand intrusion coming onto the MV area from the bare playa just west of the MV area. This area encompasses approximately 4.39 acres. CS1006 was identified with a 7.5-acre area of poor subsurface drainage and sparse vegetation. The area extends to CS1005, but CS1005 was not included with this area because of its low 2006 sand masses.

These distinct areas were then characterized using the methodology from the Dust ID Program, i.e., they were modeled as rectangles with the same area as the source delineation. Because each site has two sets of instruments (one in-row and one between-row), the sand fluxes were calculated hourly and then averaged over both sets on an hour-by-hour basis to represent the site. Only collections when the sand catch was above 1 gram were considered.

The general MV area was characterized as a series of 250-meter by 250-meter squares, except around the distinct areas described above. Around these distinct areas, smaller squares or rectangles were used. For the sand flux, all of the non-distinct area catches were averaged and then time-resolved using an average flux based on a unit sand mass. This way, the modeled flux would be based on the area-wide average values and not biased toward any one site. If all of the distinct areas had sand masses less than 1 gram, then the area-wide MV emissions were assumed to be zero.

Note that the long-term District sites were not used in this analysis because the Dust ID files that Air Sciences had on hand were not resolved below 5 grams in 2005. It is Air Sciences' opinion that this omission does not have a significant impact on the results because these sites had zero or small sand catches (comparable to the LADWP set) during this time period.

## K-factors

For this analysis, the South Area default K-factors were used.

## Analysis and Results

Using the sand flux, source areas, and K-factors, the CALPUFF model was run for each source area to calculate the maximum 24-hour average shoreline PM<sub>10</sub> concentration. Table 3 shows the maximum 24-hour concentrations for each individual area and for the overall cumulative contribution.

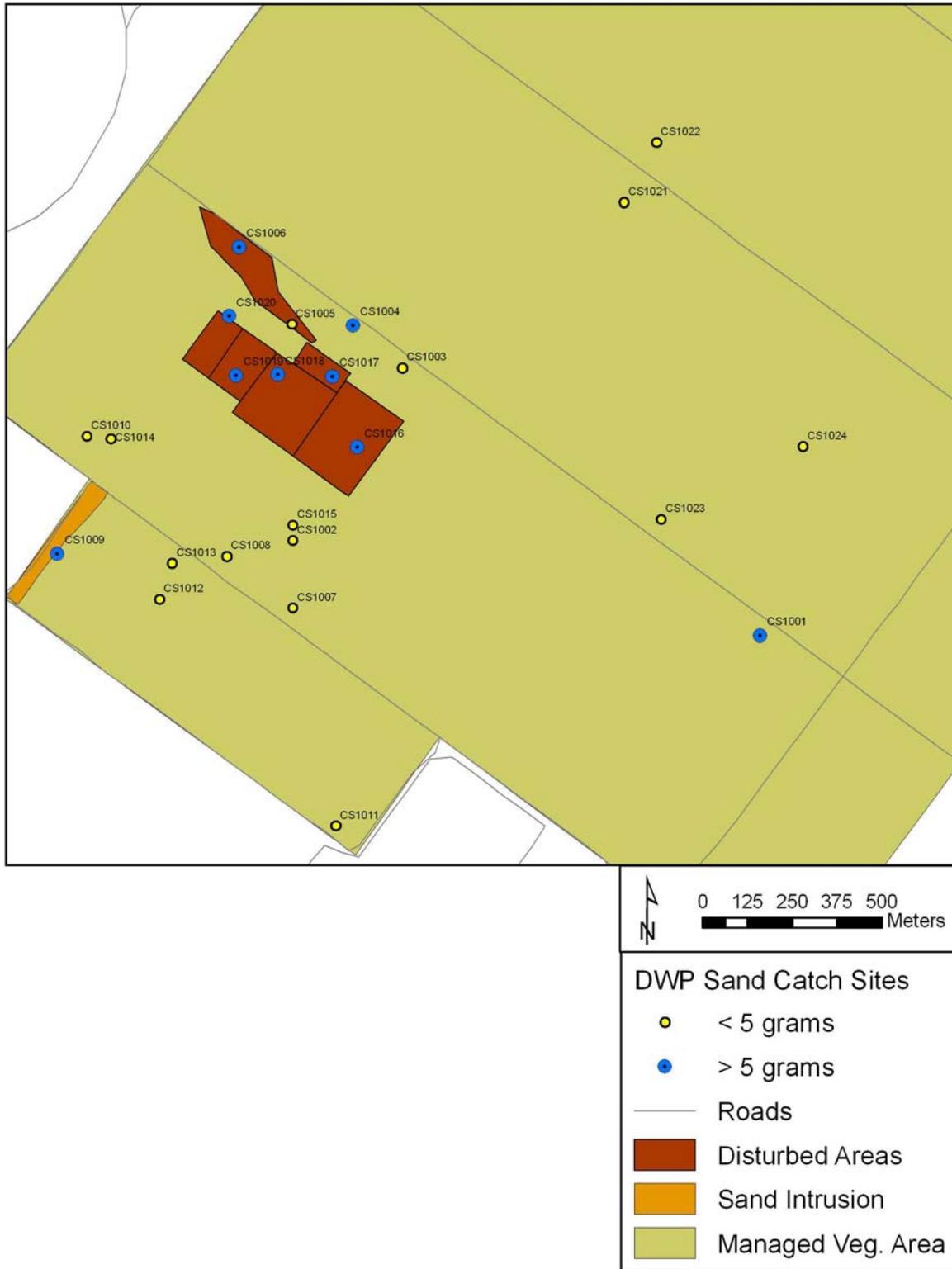
**Table 3: Maximum 24-hour PM<sub>10</sub> concentrations for 2005 and 2006.**

LADWP Site Number	District Site Number	Maximum 24-hour Concentration (µg/m <sup>3</sup> )	
		2005	2006
1004		0	0.05
1006		0.71	0.04
1009		1.18	1.73
1016	9513	0.05	12.57
1017		0.03	0.95
1018		0.11	0.85
1019	9511	0.06	2.01
1020		0.09	0.21
Rest of MV Area		16.41	7.66
Cumulative Maximum		16.41	19.01

Because the source contributions are much smaller than the standard less the background concentration (130 µg/m<sup>3</sup>), it is assumed that these source areas are achieving the required 99-percent control efficiency.

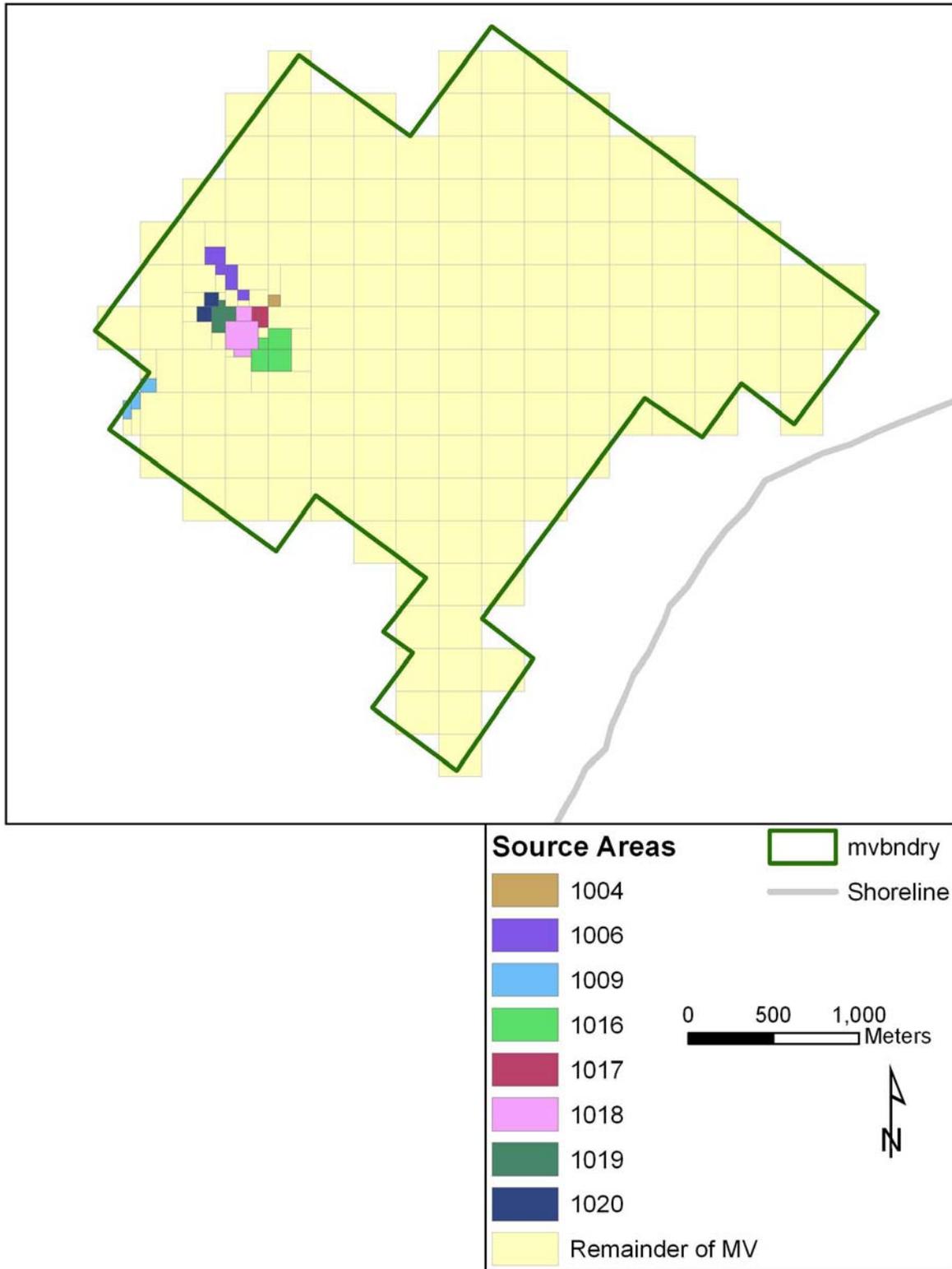
DEMONSTRATION OF 99-PERCENT CONTROL EFFICIENCY FOR THE MANAGED VEGETATION DUST CONTROL MEASURE

**Figure 4: Discrete source areas within the Managed Vegetation site.**



DEMONSTRATION OF 99-PERCENT CONTROL EFFICIENCY FOR THE MANAGED VEGETATION DUST CONTROL MEASURE

Figure 5: Modeled source areas for the LADWP sand catch sites (February 2005 to August 2006).





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## TECHNICAL MEMORANDUM

## CALCULATION OF MANAGED VEGETATION SAND FLUX CONTROL EFFICIENCY

PREPARED FOR: Duane Ono/GBUAPD  
Mark Schaaf, Air Sciences

PREPARED BY: Kent Norville, Air Sciences

PROJECT NO.: 228-7-1

DATE: August 1, 2007

This memorandum outlines the methods, data, and assumptions for calculating the sand flux control efficiency in the Managed Vegetation (MV) area in order to demonstrate compliance with the required 99-percent control efficiency as defined under the Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State Implementation Plan 2003 Revision (RSIP).

### Approach

The sand flux control efficiency is defined as

$$CE = \frac{[SF_{base}(w) - SF_{MV}(w)]}{SF_{base}(w)}$$

where  $SF_{MV}$  is the MV area averaged sand flux and  $SF_{base}$  is the uncontrolled pre-MV sand flux. Both sand fluxes are functions of wind speed. To estimate the uncontrolled sand fluxes, two years of pre-construction sand flux data from nine Sensit sites (7586, 7607, 7608, 7609, 7630, 7631, 7632, 7633 and 7654) in the MV area were used. First, for each Sensit, the cumulative daily sand flux was calculated. Since the pre-construction source areas were designated as square kilometers, the average daily sand flux was found by averaging the nine individual daily cumulative sand fluxes. Then for each day, the maximum wind speed, as measured at the Dirty Socks monitor, was determined. The sand flux was then binned into 1 m/s wind speed increments and the 98 percentile sand flux was determined. Figure 1 shows the binned sand flux values and the 98<sup>th</sup> percentile sand flux line. This line was set so that a bin's 98<sup>th</sup> percentile was never less than that found in a lower wind speed bin.

For the controlled MV area, the DWP MV Sensit data from January 2005 to June 2006 were used. DWP had 24 sites on the MV area operating during this period. Most of the sites had little sand activity; however, several sites (1004, 1006, 1009, 1016, 1017, 1018, 1019, and 1020) had higher sand activity and were thus assigned to delineated areas. These high activity

sites were treated individually. For the low sand mass sites, the catches were averaged and then time-resolved using an average flux based on a unit sand mass. This way, the modeled flux was the area-wide average value and not biased toward any one site. Then the daily cumulative sand fluxes were calculated and then weighted based on the size of the area that was assigned using:

$$SF_{MV} = \frac{\sum_{site} SF_s A_s}{\sum_{site} A_s}$$

where  $SF_s$  is the daily cumulative sand flux for site  $s$  and  $A_s$  is the delineated area for site  $s$ . Then, the sand flux was then binned into 1 m/s wind speed increments, using the wind data from the Dirty Socks monitor, and the 98 percentile sand flux was determined. Figure 2 shows the binned sand flux values and the 98<sup>th</sup> percentile sand flux curve.

## Results

Table 1 shows the CE for each wind speed bin. All of the CE's are greater than 99 percent control indicating compliance with the 99 percent control requirement.

**Table 1. Calculate CE by wind speed bin**

WS Bin (m/s)	$SF_{MV}$ (g/cm <sup>2</sup> /day)	$SF_{base}$ (g/cm <sup>2</sup> /day)	CE (%)
7	0.18	37.80	99.52
8	0.18	47.65	99.62
9	0.18	74.63	99.76
10	0.22	194.04	99.89
11	0.22	194.04	99.89
12	0.22	194.04	99.89
13	0.22	199.98	99.89
14	0.61	199.98	99.70
15	0.61	540.12	99.89
16	0.61	540.12	99.89
17	0.61	540.12	99.89
18	0.61	540.12	99.89
19	0.61	540.12	99.89
20	1.47	540.12	99.73
21	1.47	540.12	99.73
22	2.04	540.12	99.62
23	2.04	540.12	99.62

Figure 1. Binned uncontrolled sand flux ( $SF_{base}$ ) and the 98<sup>th</sup> percentile line

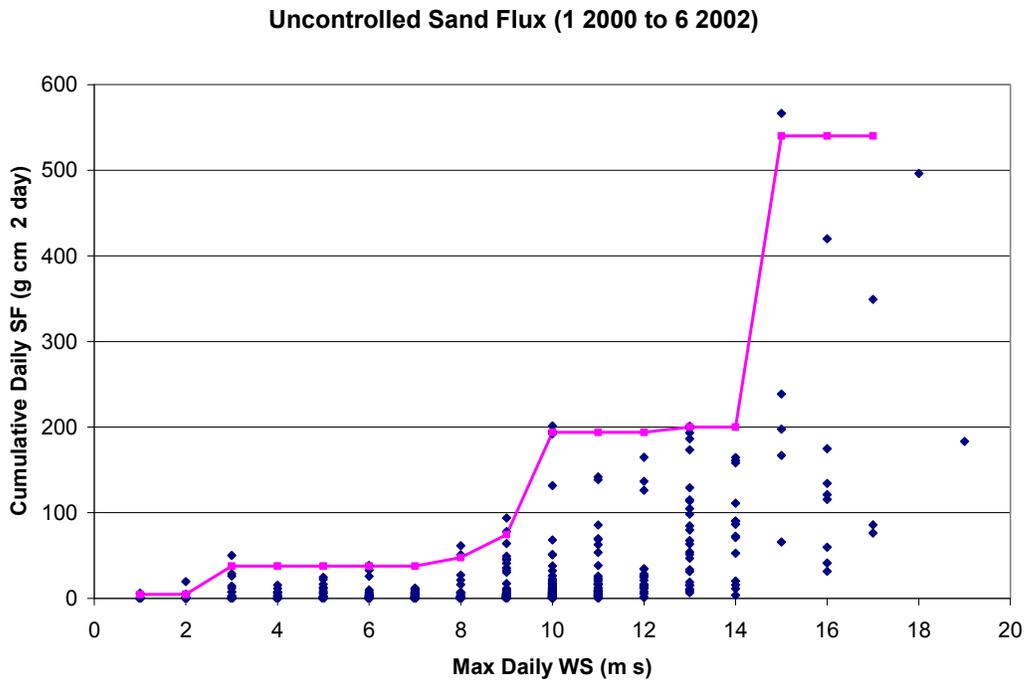
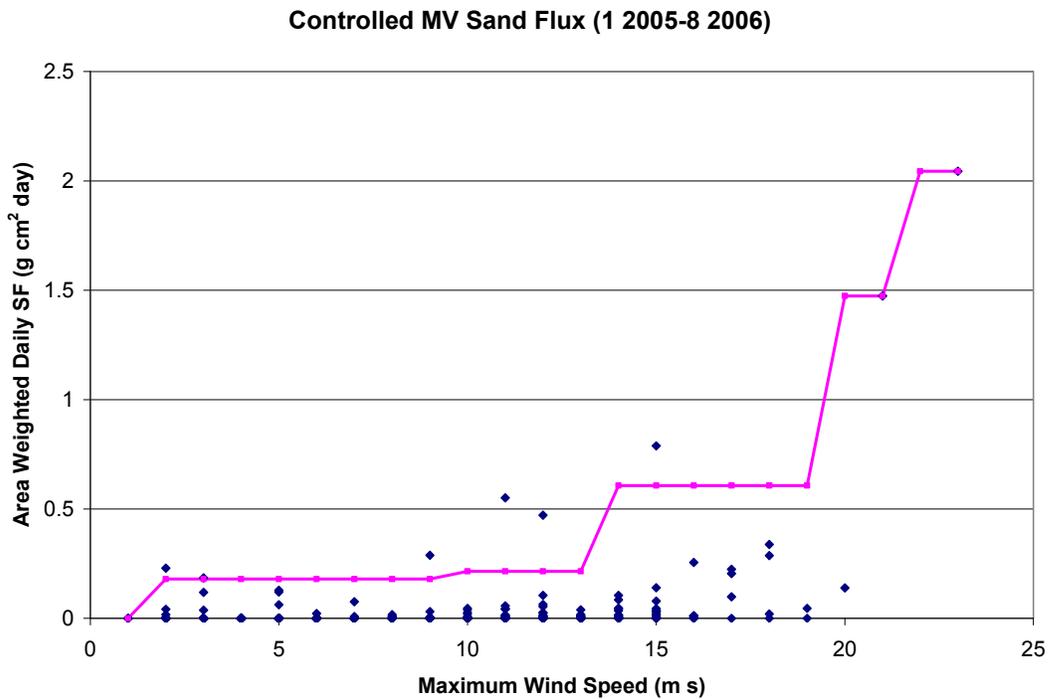


Figure 2. Binned controlled MV sand flux ( $SF_{MV}$ ) and the 98<sup>th</sup> percentile line



**APPENDIX 5.  
NEWFIELDS, AIR SCIENCES, AND EARTHWORKS. 2008.  
APPROACH TO THE MANAGED VEGETATION OPERATION AND  
MANAGEMENT PLAN.**

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*Report*

# **Approach to the Managed Vegetation Operation and Management Plan**

Prepared for  
**Los Angeles Department of Water and Power**

May 2008

**NewFields Agricultural and  
Environmental Resources**

304 S Street, Suite 101  
Sacramento, CA 95811

Co-authored by  
**EARTHWORKS Restoration, Inc.**  
and  
**Air Sciences Inc.**

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**ACRONYMS AND ABBREVIATIONS**

AOC	area of concern
APCO	Air Pollution Control Officer
DCM	dust control measure
DMU	drainage management unit
DPF	digital point frame
GBUAPCD	Great Basin Unified Air Pollution Control District
LADWP	Los Angeles Department of Water and Power
MV	managed vegetation
Plan	Managed Vegetation Operation and Management Plan
PMP	Performance Monitoring Plan
Site	managed vegetation Site
SOP	standard operating procedure

## INTRODUCTION

Item 6 of the November 2006 Settlement Agreement between Great Basin Unified Air Pollution Control District (GBUAPCD) and the Los Angeles Department of Water and Power (LADWP) contains a provision requiring the development of a *Managed Vegetation Operation and Management Plan* (Plan; NewFields et al., 2008), as follows:

6. *The Parties believe that the City's existing Managed Vegetation site may currently achieve a control efficiency of 99 percent. Therefore, the City shall continue to maintain and the District shall continue to monitor the site to ensure that it achieves 99 percent control efficiency. No later than July 1, 2007, the City shall submit to the District an operation and management plan for the City to maintain cover conditions that achieve 99 percent control efficiency in the Managed Vegetation areas. The plan shall be subject to written approval by the APCO, which approval shall not be unreasonably withheld. Prior to the time that the Managed Vegetation area is in compliance with an approved SIP, the District will not issue a Notice of Violation (NOV) for the existing Managed Vegetation area as long as:*
  - A. *From January 1, 2007, to the earlier of July 1, 2007 or the date when the City's operation and management plan is approved by the APCO, the City maintains its current operation and management practices for its Managed Vegetation areas; and*
  - B. *After the APCO's written approval of the operation and management plan, the City implements all provisions of its operation and management plan; and*
  - C. *The City's Managed Vegetation area site does not cause an exceedance of the federal standard at the historic shoreline.*

During the 2003 through 2006 period, LADWP conducted the Managed Vegetation Effectiveness Monitoring Study (Study). Data gathered during this study forms the basis for assessments of dust control effectiveness at the existing managed vegetation site (Site). The study is described in greater detail in an evaluation of the control efficiency of the Site is provided in Air Sciences (2006). This explanation of the approach to the Plan (Approach) explains how the Site will be operated and managed in the future to meet or exceed the minimum cover requirements, and to address any areas that threaten to produce shoreline NAAQS exceedances. It is understood that if cover condition that achieved 99 percent control efficiency in the past are met or exceeded, then achievement of these goals will be very likely. The Plan itself (NewFields et al., 2008) describes how ongoing compliance with federal PM<sub>10</sub> standards will be verified by GBUAPCD. The main elements of this approach are the following:

1. **Managing the Site.** The general Site management approach is described, but most of this section is devoted to areas that have required specific effort to establish and/or maintain. Over the past 5 years, the Site has been managed to maximize plant growth and cover, balancing the irrigation and drainage needs of diverse areas, often within a single, 40-acre block. The challenges encountered and successful management approaches developed, as well as the plant growth results achieved during this period are described.
2. **Verifying compliance with federal PM<sub>10</sub> standards.** Aerometric and meteorological data will be collected at selected locations and analyzed to better focus operations and maintenance (O&M) activities. Areas with sparse vegetation have been reduced in number and scale since the first planting that covered about 80 percent of the Site with live saltgrass, and seasonal growth across the Site as a whole increases average vegetative cover. Risk of significant emissions is, therefore, declining. Nevertheless, remaining or newly sparse areas will be monitored and, if they pose a significant emissions risk, will be specially managed to reduce this risk.
3. **Verifying vegetative cover.** Cover will be measured annually on the Site. Results will be compared with specific criteria related to historical conditions that were related to 99 percent control efficiency for the Site. Criteria will be developed or applied with a margin of safety. This comparison and any new O&M actions to address problems will be submitted annually by

LADWP in the Performance Monitoring Plan, as provided for in Item 12 of the Settlement Agreement:

12. *The City, in consultation with the District, shall annually develop and provide to the District a Performance Monitoring Plan (PMP) to aid in its operation of the Owens Lake dust mitigation program on the Owens Lake bed.*
  - A. *The PMP will describe the measurements and methods used to verify the performance of the constructed DCMs and Moat and Row test areas. The PMP will also describe the measurements and methods used to maximize information on dust emissions from areas of special interest.*
  - B. *The City shall implement the PMP, and will use the results as a guide for making operational decisions about the type, location, timing, and level of dust control measures needed to prevent exceedances of the federal standard at the shoreline.*
  - C. *The District may use information from the PMP to assist in determining the likely sources of dust emissions causing or contributing to exceedances (if any) of the federal standard at the shoreline.*

This version of the Plan has been developed in response to review of vegetative cover estimates. These reviews and their impact on the Plan are summarized in NewFields (2008).

## **APPROACH TO SITE MANAGEMENT**

The Site will be managed to meet or exceed target cover conditions, and address any areas identified as a threat to produce shoreline violations (see *Air Sciences 2007a and 2007b*).

### **1.1 Historical Management Strategy Experience**

The first 5 years of Site operation included intensive monitoring, extensive investment in facilities improvements, numerous research test plots, and a considerable replanting of problem areas (areas of concern, or AOCs) in 2004. The following brief summary of the progression of Site management strategies provides a backdrop against which the current management strategy has developed. More details of the intensive monitoring, observations, and management responses are available in the multiple annual monitoring reports and special investigation reports prepared by LADWP during the 2002 – 2007 period.

Figure 1 shows the first 5, now transitioning into 6 years of Site O&M. A few of the O&M activities that have been implemented each year are shown. As more is learned about

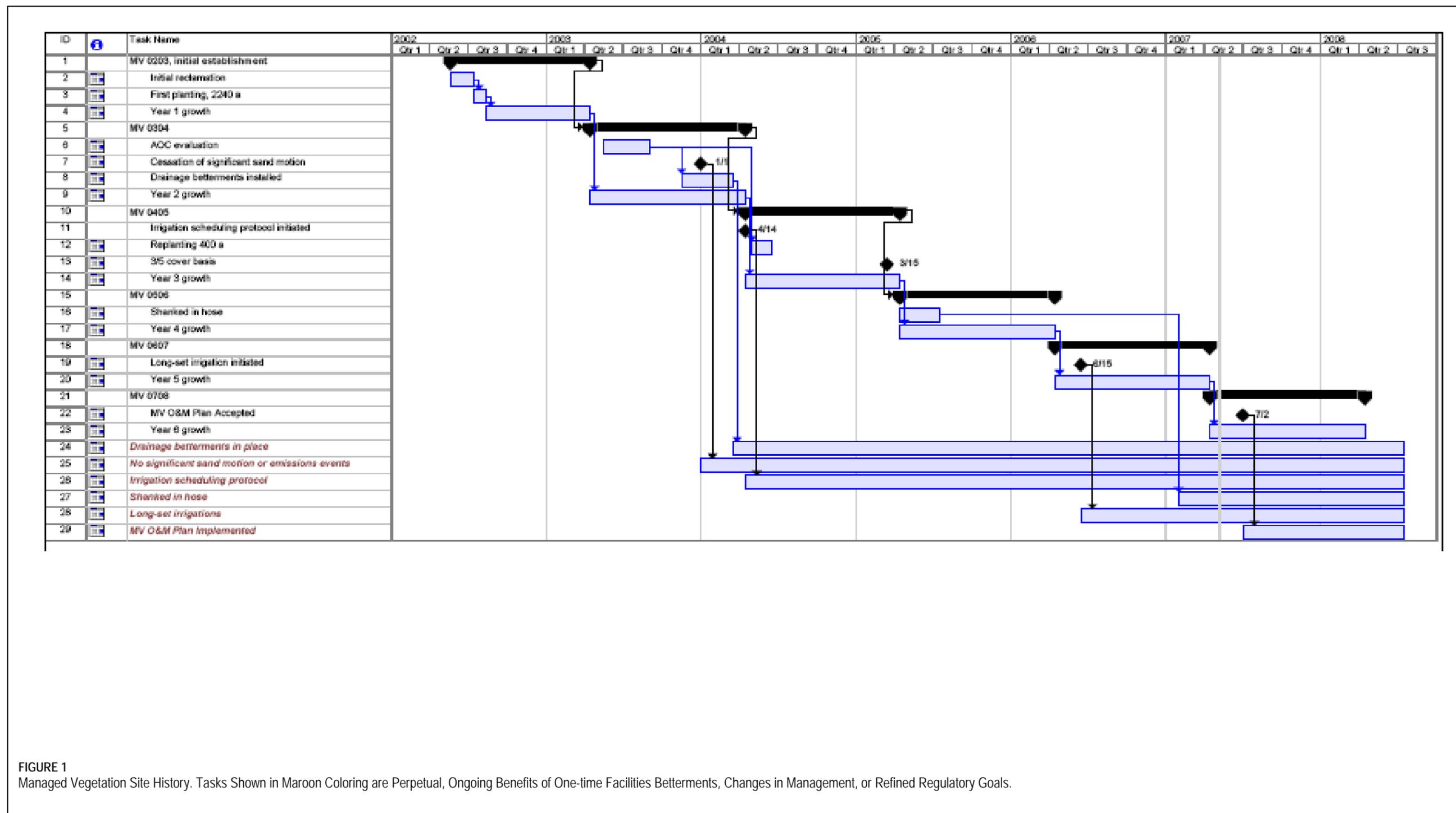


FIGURE 1 Managed Vegetation Site History. Tasks Shown in Maroon Coloring are Perpetual, Ongoing Benefits of One-time Facilities Betterments, Changes in Management, or Refined Regulatory Goals.

## Approach to Site Management

managed vegetation on Owens Lake in general, and about the Site in particular, O&M responses are developed to address specific challenges and to improve the Site's vegetative cover. Once implemented, benefits of improvements are generally there for the life of the Site. The accumulation of improvements (betterments and improved O&M) and the ongoing benefits generally improves the Site and reduces the risk that air quality violations will be caused by emissions from it. These ongoing benefits are shown in maroon font at the bottom of the schedule shown in Figure 1, beginning at the time that the improvement was first implemented, and continuing for as long as the Site is operated.

The following sections detail these and other improvements to Site facilities and O&M during past years of operation, again as an indication of the general approach to Site management that is anticipated for the future.

### 2002 – 2003 – Focus on Establishment and Growth

- After installing Site facilities and planting in the summer of 2002, management activities in 2002 and 2003 focused on irrigation for establishment and growth of as much area as possible.
- Management required irrigation within blocks to be balanced among drier and wetter areas, providing most of the young plants adequate, but not excessive, soil moisture to allow establishment.
- Growth and survivorship was compromised in multiple small areas (most of the AOCs, about 20 percent of the Site) in an effort to promote growth in the largest possible proportion of the Site.
- Initial mapping of AOCs was conducted primarily in areas that were too wet or too dry relative to the larger portions of blocks, and areas with localized problems related to drainage or offsite impacts (surface and subsurface flow into the area) were identified.
- Approximately 400 acres out of the 2,240-acre managed vegetation area were delineated as having poor establishment and targeted for replanting in the spring of 2004.
- Multiple management actions were taken to address facilities problems or other issues that were identified, including installation of 151 drainage system improvements to reduce site-specific drainage problems that led to many of the problem areas that required replanting.

### 2004 – Focus on Replant Establishment

- After the replanting effort in April 2004, the irrigation and drainage management strategy focused on careful attention to irrigation to support establishment of the plants in the replanted areas.
- Many of these replanted areas were the wetter portions of blocks within larger areas of established vegetation, again requiring a balance of wet areas with dry areas in the same blocks. However, now the established areas could tolerate more restricted irrigation because of their established root systems.
- Other replanted areas required high irrigation rates in generally dry blocks to establish replants.
- An irrigation scheduling protocol driven by field observations of the most sensitive areas, along with other irrigation system operating constraints, was developed and implemented. Generally, this led to more precise balancing of wetter and drier areas, taking advantage of the tolerance of more established vegetation to optimize irrigation management for more sensitive, newly replanted areas wherever possible.
- Close monitoring of the soil conditions in the DCA during 2004 further defined the need for focus of irrigation to coincide spring and fall saltgrass growing season.
- At the close of this season, all but about 11 of the initial 400 acres of AOCs had adequate plant populations from which to develop vegetative cover.

## 2005 – 2006 – Shift to Long-term Sustainability and Attention to Remaining Isolated Problem Areas

- With the bulk of the Site well established and expanding, and with most of the 2004 replanted areas established, operations in 2005 and 2006 shifted somewhat to more specific attention to smaller areas that continued to exhibit special needs.
- Continued careful monitoring of irrigation based on soil and historic wet areas in particular blocks served to refine generalized irrigation management strategies for particular blocks.
- The very wet winter preceding the 2005 growing season also provided an opportunity to observe how Site management must adjust to variable environmental factors such as high winter groundwater.
- An example of the diligent monitoring and adaptive management response during the 2005 growing season was the identification of discoloration and reduced vigor of vegetation in low areas of block T7-5A, a well-established block with greater than 50 percent cover. In response, an investigation was launched, and it was learned that the heavier-than-normal winter precipitation had raised the level of boron, chloride, and sulfate, as well as EC (bulk salinity) the root zone within low areas of block T7-5A. Irrigation applied at rates employed the previous season had not been adequate to re-reclaim the affected areas. However, when irrigation schedules were modified based on the results of the study, this block recovered by mid-season 2006.
- Other special project management actions taken in 2005 and 2006 in response to detailed monitoring observations included:
  - splitting irrigation control within blocks to better manage wet and dry portions
  - burying drip irrigation hoses in some blocks where the lines had been installed on the surface to respond to special establishment needs or installation challenges in those areas
  - implementing longer irrigation sets in 2006 to improve root zone leaching, especially in problem areas

### 1.2 Overall MV Operations Strategy

With this intensive effort and the knowledge gained from several years of operations, a reasonably stable protocol has been established for most of the Site. However, as expected for such a novel vegetated system in the unique, saline, and poorly drained lakebed environment, small areas within the Site still require special attention. In addition, new conditions may develop during ongoing operation (as occurs on any farm) that will require adaptive management. Accordingly, the Site O&M strategy requires:

1. Ongoing Site monitoring and O&M to support historical cover levels (applicable to the majority of the Site, see *Verification of Vegetative Cover* section)
2. Special monitoring and O&M actions to respond to problem areas and unusual conditions

The following sections detail the planned monitoring and management activities in these two categories (overall Site and problem areas).

### 1.3 Ongoing Management to Support Historical Cover Levels on the Overall Site

The majority of the Site will be managed to support adequate growth each year to maintain vegetative cover levels at target (historical) levels. Ongoing Site management encompasses a variety of activities to sustain the existing vegetation and grow new vegetation to replace the portion of previous years' growth that may have been decomposed or blown away. The management protocols for the well-established portions of the Site have been calibrated on a block-by-block basis to support

continued health of the bulk of the vegetated areas within each block without negatively affecting areas within the block where cover needs to be increased.

Ongoing management activities will be conducted as described in the following sections, unless a specific condition requiring a different response is identified through the monitoring program. If a special condition is identified, the affected area will be delineated, and a special condition management response plan will be developed and implemented according to the protocol defined in the *Problem Area Management Response* section.

### Ongoing Drainage System Operation

The drainage system for the Site will be operated year-round according to the standard protocols established during previous seasons. The Site's drainage system includes the drainage management units (DMUs) listed in Table 1.

The DMU pump stations are equipped with automatic level switches that cycle the DMU pumps on and off at set water levels. The appropriate level settings for each DMU have been identified over time to balance the need for low drainwater levels in the sump with pump cycling frequency. Operation of the drainage system will continue according to the following general guidance and in compliance with the established equipment-specific standard operating procedures (SOPs):

- DMUs will be operated year-round.
- DMU pump station levels will be kept at a level necessary to ensure DMU drainage function is not compromised by pump station water levels. Levels may be adjusted upward or downward according to other management needs, as long as such settings do not compromise DMU function.
- In the event of damaged or malfunctioning DMU pumps and supporting facilities, repairs will be made as quickly as practicable to restore proper function.
- DMUs will be periodically monitored for evidence of drain line or lateral clogging. Evidence of an impediment to flow will result in investigation and appropriate response to correct the problem.

TABLE 1  
Drainage Management Units Serving the Managed Vegetation Area  
*Approach to the Managed Vegetation Operation and Management Plan*

DMU	MV Blocks Served
41	T5-3B, 3C, 4B, 4C
42A	T5,-6B, 6C, 7B
51	T5-4D T6-4C
52	T5-5A, 5D, 6A, 6D T6-5B, 5C, 6B, 6C
53	T5-7A, 7D T6-7B, 7C
61	T6-4D T7-4C
62	T6-5A, 5Dn, 5Ds, 6A, 6D T7-5B, 5C, 6B, 6C
63	T6-7A, 7Dn, 7Ds T7-7B, 7C
71	T7-4An, 4As, 4D T8-3B, 4Bn, 4Bs
72	T7-5A, 5D, 6A

TABLE 1  
 Drainage Management Units Serving the Managed Vegetation Area  
*Approach to the Managed Vegetation Operation and Management Plan*

DMU	MV Blocks Served
41	T5-3B, 3C, 4B, 4C
42A	T5,-6B, 6C, 7B T8-5B, 5C, 6B, 6C
73A	T7-6D, 6A, 7D T8-6CT7-6D, 6A, 7D
81A	T8-3A, 4A, 4D
82	T8-5A, 5D, 6A, 6D

Other factors that cannot be controlled by DMUs, such as soil hydraulic properties, may limit drainage function. These problems are discussed elsewhere.

### Ongoing Irrigation Operation

The Site irrigation system will be operated during the growing season according to the standard protocols established over the previous operating seasons. Operation of the irrigation system will continue according to the following general guidance and in compliance with the established equipment-specific SOPs:

- The Site will be irrigated on a schedule balancing plant needs with field drainage capacity during the growing season, approximately April through October each year.
- Annual start-up and end-of-the-year shut-down times will be adjusted annually to account for temperature and precipitation conditions during the preceding year.
- At the beginning of each year, an anticipated irrigation schedule will be established for each block based on block-by-block experience of irrigation needs during previous years. This schedule will serve as a starting point for irrigation during the coming year, but will also be adjusted during the year based on field observation of plant growth and soil salinity, and on actual weather conditions (e.g., temperature, wind, and precipitation.).
- Routine operations and regular maintenance functions will be performed according to appropriate SOPs developed by LADWP based on manufacturer's guidelines and/or LADWP operations experience. These functions include:
  - Automatic primary filter backflush as determined by filter pressure differential
  - Manual secondary filter cleaning
  - Repair of irrigation system leaks as observed
- The need for soil amendments, such as fertilizers, will be determined on an approximately annual basis. *Routine MV Site Condition Monitoring* (see below) or focused investigations form the basis to establish amendment needs.
- Protocol may be altered when and where necessary to support operational research.
- LADWP will inform GBUAPCD within 48 hours of any significant breach of this O&M protocol.

### Routine MV Site Condition Monitoring

Irrigation operations staff will observe conditions in the field and take corrective action as part of normal duties. Observations to be noted include:

## Approach to Site Management

- Irrigation leaks or plugging, as evidenced by spraying water, standing water, or altered system flow rates.
- Areas of abnormal surface saturation or dry conditions that may indicate irrigation leaks or drip-tube clogging, or that may indicate a need for irrigation adjustment.
- Notable vegetation variation such as discoloration or unexpected levels of die-back.
- DMU and/or other drainage system malfunction as evidenced by conditions in sumps and fields.
- Turnout or control system malfunction, as evidenced by water quality or timing of irrigation.

Corrective actions may include making necessary repairs and/or notifying supervisor or Site manager. If immediate solutions or corrective actions are not obvious or routine, the supervisor or Site manager may initiate a special investigation, consult with off-site (vendor or specialist) personnel.

In addition to routine observations by field operations staff, regular dedicated monitoring will be conducted by one or more plant biology and/or agricultural specialist at approximately monthly intervals during the growing season. These monitoring observations will include assessment of:

- Plant health indicators, including discolorations, leaf curling, wilting, etc.
- General soil conditions such as moisture and salt crust
- Soil salinity monitoring at select locations to verify salinity levels in the acceptable range
- Other general site conditions such as:
  - Significant pest damage or populations
  - Exotic plant species
  - Recruitment of other native plant species

More detailed soil monitoring to track Site-wide soil conditions and to identify changes or trends in chemical and physical characteristics that are significant for plant growth. This more detailed monitoring will be conducted annually during the growing season and will include:

- Site-wide composite soil chemistry sampling to track levels of agronomic constituents
- Characterization of soils at select locations by description and sampling in test-pits to track soil physical conditions, root development and soil reclamation profiles in the upper 4 feet of soil. Test pit locations will be selected in consultation with the Site Manager to investigate areas that represent conditions of special operational interest.
- As directed by other monitoring efforts and LADWP operations staff, specific soil investigations or monitoring may be conducted to monitor operational trials or to investigate specific conditions or areas of concern.

Monitoring specialists will make recommendations regarding irrigation schedule, blending, fertilizer, amendment, drainage, or other appropriate adjustments, and will report to the designated LADWP operations staff before and after each visit. An annual report, summarizing field observations, block irrigation, soil monitoring, and associated recommendations will be prepared each of the next five years (2007 – 2011). Pertinent aspects of these reports will be cited in the PMP.

### Problem Area Management Response

The general process for identification of and response to problem areas, and several examples of types of problem areas and responses, are described in this section. If a specific type of problem is not described here, but actually disrupts the Site in a manner that may threaten cover levels that provide needed levels of performance, then the general process will be applied to resolve the problem. The Site history (previous section) demonstrates how this has been done during the past 5

years to resolve the diverse issues that have already arisen for saltgrass trying to grow on Owens Lake.

### Problem Area Identification and Response Process

If field monitoring of vegetation or soil identifies signs of possible problems, and a solution can be readily established, the solution will be applied. If the nature of the problem or an appropriate solution are not evident, then a **Problem Area Special Investigation** will be initiated to investigate the problem, identify likely causal factors, and develop a responsive action plan to correct the problem.

Signs of possible vegetation problems may include, but are not limited to unexpected:

- Downward trends in vegetative cover
- Expansion of a previously existing areas of sparse growth or plant stress
- Development of unique plant coloration
- Ponding in new areas or expansion of previously identified ponded areas
- General signs of reduced plant vigor

Upon identification of possible problems, the monitoring personnel noting the problem will notify the LADWP Operations Engineer. The Operation Engineer will assign a staff member (or team) to:

- Define and document the general nature and spatial extent of the suspected problem
- Assemble and review basic supporting information from operations (SCADA), performance monitoring, and field monitoring teams

If review of supporting information suggests that further study is needed, the Operations Engineer will:

- Identify additional specialized expertise needed to clarify the condition
- Assign a team to:
  - Define and conduct additional investigations, if needed
  - Develop corrective action plan options
  - Direct the Site Manager to implement corrective actions

In actual practice, the Site Manager and field staff understands the Site very well and may at times either investigate and solve problems, or seek outside consultation, informing the Operations Engineer of their activities. This type of initiative and ownership is one of the reasons that the Site is successful.

### Possible Problems and Example Responses

A number of problems that can be associated with this Site, and with vegetating Owens Lake in general, have already been encountered, or may be anticipated given experience on and knowledge of existing Site conditions and facilities. A brief description of some of the more likely problems and example responses are provided here for illustrative purposes. These examples illustrate a general process: problem identification, investigation of causes, development of appropriate management response(s), implementation of management responses, monitoring of Site response to changed management, and feedback from monitoring if further refinement of management is indicated. This general approach notwithstanding, problems will be dealt with on a case-by-case basis, considering the actual symptoms and conditions, so that future responses may differ somewhat from these examples.

### **Intrusion of High-EC Groundwater into Plant Root Zone.**

Periods of high precipitation, over irrigation, or poor drainage performance can lead to a rise of shallow groundwater into the plant root zone. Evidence suggests that this saline groundwater intrusion can be tolerated by saltgrass for short periods without long-term impacts, although plant growth and health may be temporally affected by even short-term exposure.

This is the suspected cause of a notable decline in plant health and cover in block T7-5A in 2005 compared to the previous year. In response, LADWP analyzed groundwater levels, irrigation history, and soil conditions (see Schmid/Inman TM, April 2006). The results of that investigation suggested that elevated shallow groundwater levels resulting from abnormally high rainfall in the winter of 2004-2005 had increased the salinity in the plant root zone of the block and immediately adjacent areas of some surrounding blocks. In response to recommendations from the investigation, irrigation amounts and durations to T7-5A and surrounding blocks were increased in 2006, and the block experienced a rebound in cover of approximately 10 percent in 2006. In this case, cover decline was identified and corrective action was successful in reversing the trend without cover levels dropping below 50 percent in the affected blocks (according to LADWP cover measurement estimates).

### **Surface Ponding.**

As noted above and in supporting documents, variations in topography and soil hydraulic conductivity within single blocks requires balancing the irrigation supply to the block to adequately wet the higher or better draining areas without over irrigating or inundating the lower or poorer draining areas within the block. This is often a precarious balance, and rather small changes in root zone hydrologic balance caused by irrigation or precipitation events can cause surface ponding to develop. This surface ponding can lead to redistribution of resident salts, which can quickly affect plant health when salts move into previously reclaimed soil where plant roots reside and extract water and nutrients to support metabolism and growth.

Surface ponding has occurred in limited areas across the Site since start-up in 2002. Ponding was particularly pronounced in 2002 and 2003, when the management emphasis was on achieving rapid increases in cover over most of the Site. The extent of surface ponding has dropped dramatically during subsequent years as irrigation strategy has shifted away from quick establishment of the driest areas to ongoing maintenance of cover on the whole Site, with special attention to problem areas. This shift in strategy recognizes the ability of well-established vegetation to survive and expand with less-than-optimum water supply.

Multiple strategies have been implemented to respond to surface ponding conditions including:

- Installation of supplemental surface and "French drains" in 151 locations between 2003 and 2004 (in advance of the April 2004 replanting effort) to improve drainage in frequently ponded areas.
- Reduction of irrigation frequency or set lengths in numerous blocks to manage to the problem areas after vegetation was well established in drier areas of the block

### **Build-up of Salts.**

Salt buildup could occur in areas where irrigation applications do not adequately leach salts from a reclaimed portion of the root zone. Causes of salt buildup could include inadequate local drainage, or low or excessive irrigation application rates, or sporadic irrigation. Any of these can cause water accumulation and evapo-concentration in the root zone. Ultimate sources of salts can be irrigation water and/or shallow groundwater. Subsurface drip irrigation is meant to provide adequate leaching in a zone along the drip line, while leaching native and applied salts outward to inter-row areas and downward to drains.

The reclaimed soil zone varies across the Site according to local soil/drainage conditions and the influence of block-wise irrigation strategies. Saltgrass roots and rhizomes are observed surviving in a wide range of soil salinity and physical conditions. Other native, salt-tolerant vegetation that might occur at the Site should behave in a similar manner, tolerating a wide range of Site conditions.

Regular and annual soil monitoring along drip irrigated rows provides information on areas that may exceed salinity thresholds and therefore may be experiencing salt accumulations. Likewise, annual soil test-pit salinity sampling helps to better understand the profile of salinity in the irrigated zone for different soil types.

When high salinity areas are detected, potential causes are assessed by reviewing irrigation rates, precipitation records, and block observations of ponding or drainage issues. Appropriate management actions are then selected and may include

- Altered irrigation rates
- Actions to improve local drainage (see “surface ponding” above), or
- Modification to irrigation durations (i.e. long sets as opposed to more frequent, short sets)
- Re-testing areas that do not show vegetative stress indicators or signs of plant die-back

These management actions have been successful in correcting or reducing high salinity areas in widely ranging soil conditions across the Site.

### Onsite Sand Deposition

Where sand blown offsite is determined to cause permanent vegetative cover reduction or net decline in vegetative cover over time, corrective actions may be taken. Where the plant stand is irreversibly damaged (and this is rare), some replanting may be needed. Otherwise, conditions for plant stand regrowth and restoration of cover are optimized to the extent practicable. Where perimeter control of sand motion is pending implementation of a planned, adjacent dust control measure, this will be taken into account.

## 1.4 Approach to Verifying Vegetative Cover

This section discusses methods of vegetative cover measurement and develops baseline cover criteria against which Site conditions can be judged in the future. The intent is to employ actual Site conditions associated with successful control of sand motion in the past as a reference for judging whether the Site can successfully control sand motion in the future. No implementable cover criteria could guarantee that every portion of the Site would perform adequately under all imaginable future conditions. For this reason, forgoing sections of the Plan focused mainly on identification and management of “problem areas.” This section, on the other hand, is intended to provide criteria for judging the adequacy of vegetative cover across *the entire Site*. However, in recognition of the still-developing understanding of how spatially variable vegetative cover works to control dust emissions, an extremely detailed spatial analysis of historical patterns of vegetative distribution have been employed and incorporated into cover criteria. This effectively prevents Site cover from degrading in a manner that could cause it to become much more emissive than it has been during past years.

Implementing either this portion, or the preceding sections of the Plan, could by themselves provide a Site that prevents significant PM<sub>10</sub> emissions from the Site in the future. When all parts of the Plan are implemented together, they provide a robust, redundant program with a very substantial and desirable margin of safety.

An additional factor of safety is the accumulation of knowledge and gradual improvement in Site cover and management. As noted previously, the benefits of most improvements begin when the improvement is implemented, and continue thereafter, so that the benefits of all previously accumulated improvements are active at the Site at any time. This has the effect of gradually increasing Site reliability in controlling emissions.

### Measuring and Reporting Management and Cover

Measurement of vegetative cover on the Site has been undertaken by GBUAPCD and LADWP using a variety of methods. Future cover measurement methods are discussed in *NewFields* (2007). It is the intent of this Plan that the method of cover measurement employed for judging compliance with

the Plan should be identical to the method employed to develop criteria in the Plan, or should contain adjustments that adequately compensate for differences in methodology. This avoids confusion and challenges associated with comparison among existing cover standards and contemporary cover estimates based on different methods.

### Vegetative Cover Thresholds

Cover on the Site developed over its five years of operation. Vegetation maps were developed from calibrated Quickbird images. Ground truthing for these calibrations, performed as part of the Study, was done by capturing low-altitude (6 feet high) digital images of the land surface (digital point frame, or DPF images), and then assessing vegetation cover by spectral analysis of each image. The consistent methodology was necessary to capture trends over time during the study.

After the Study was completed, GBUAPCD agreed to the use of DPF images analyzed by observing grid points on each image and taking the percentage of these points at which vegetation is observed as the percent cover (NewFields, 2008). To establish a reference cover measurement, areas that were not intended to be vegetated were identified and removed from consideration. These areas include primary roads and turnout facilities. Shifting of image registration among image capture events was taken into consideration so that, for example, roads will never be treated as vegetated areas, or vice-versa.

The vegetation map used to represent the Site reference cover was developed by calibrating the satellite image against ground truth results developed by the method agreed to with GBUAPCD, that is, counting of pins (grid points) on DPF images. The average vegetative cover levels in these calibrated images is somewhat higher than resulted from previous calibrations. The reasons for this difference, and the rationale supporting use of the agreed ground truth method, are explained in NewFields (2008). Cover distributions and criteria presented in this document are based on this agreed ground truth and calibration approach.

Figure 3 shows average vegetative cover results on site vegetation maps calibrated and validated with grid-point analyzed DPF images.

Cover level increased annually during the growing season, and declined annually by about 20 percentage points during the winter dormancy period. Fall cover levels increased from about 42 to 55% cover from fall 2004 to fall 2006, and then remained constant during the following year.

The observed levels of cover coincided with an extinction of significant sand motion by the beginning of 2004. Additional detail regarding Site performance in arresting sand motion and PM<sub>10</sub> emissions is provided in Air Sciences (2006).

The baseline reference for cover criteria in this Plan are based on observations of the Site in November 2004, after a season during which no significant sand motion was observed on the Site, but during which the average level and distribution of cover on the Site gradually improved because of the Site's age and aggressive management of both overall and site-specific vegetative cover (see *Approach to Site Management* section). Also, total cover measurements are most accurate during the November period, and at the beginning of the season during which cover is actually called upon to control emissions during the least stable season when most significant PM<sub>10</sub> emissions events occur. The choice of this point in time as reference cover, then, incorporates a margin of safety, since inferior cover conditions during the 2003-2004 season had resulted in adequate performance.

Approach to Site Management

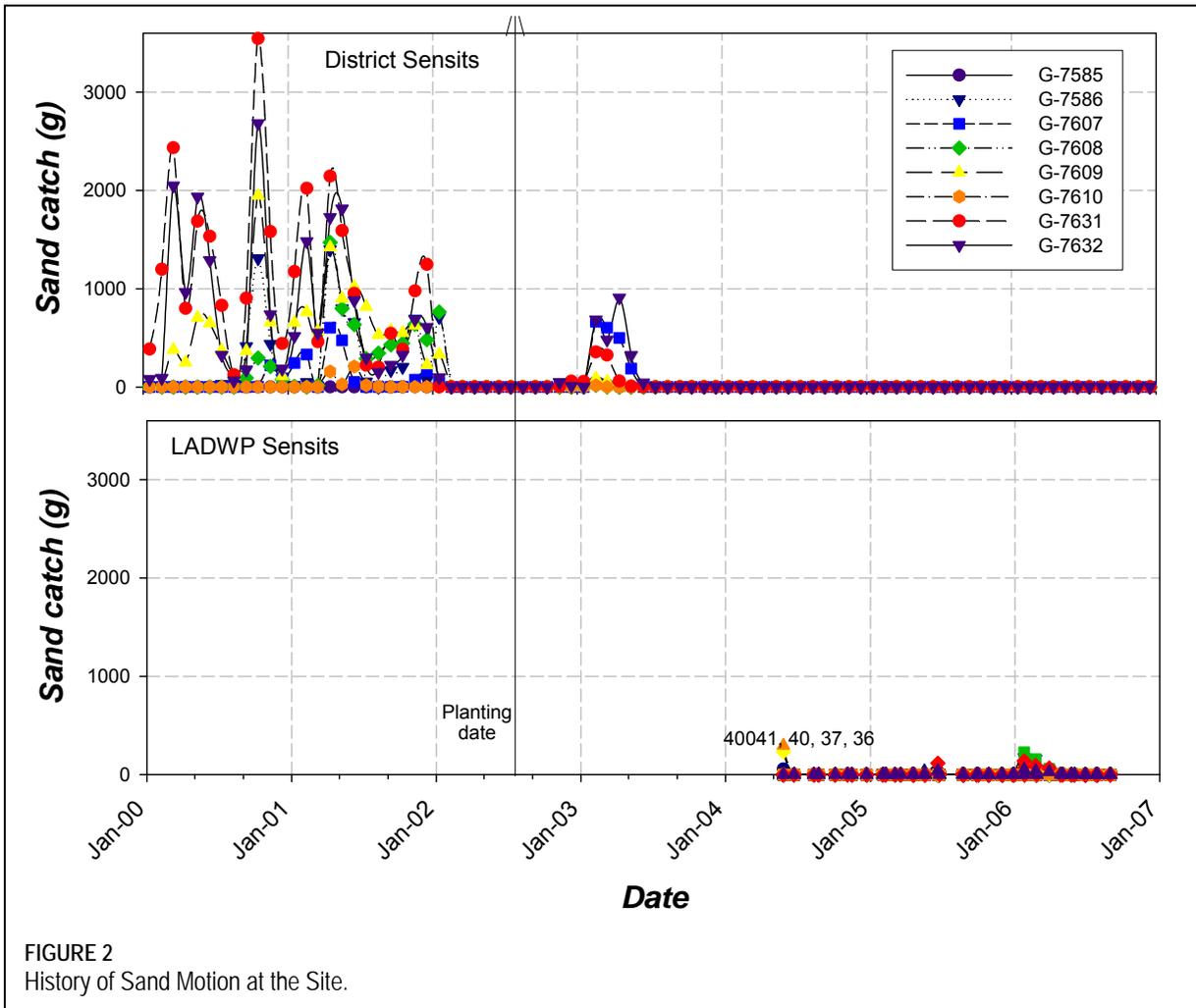
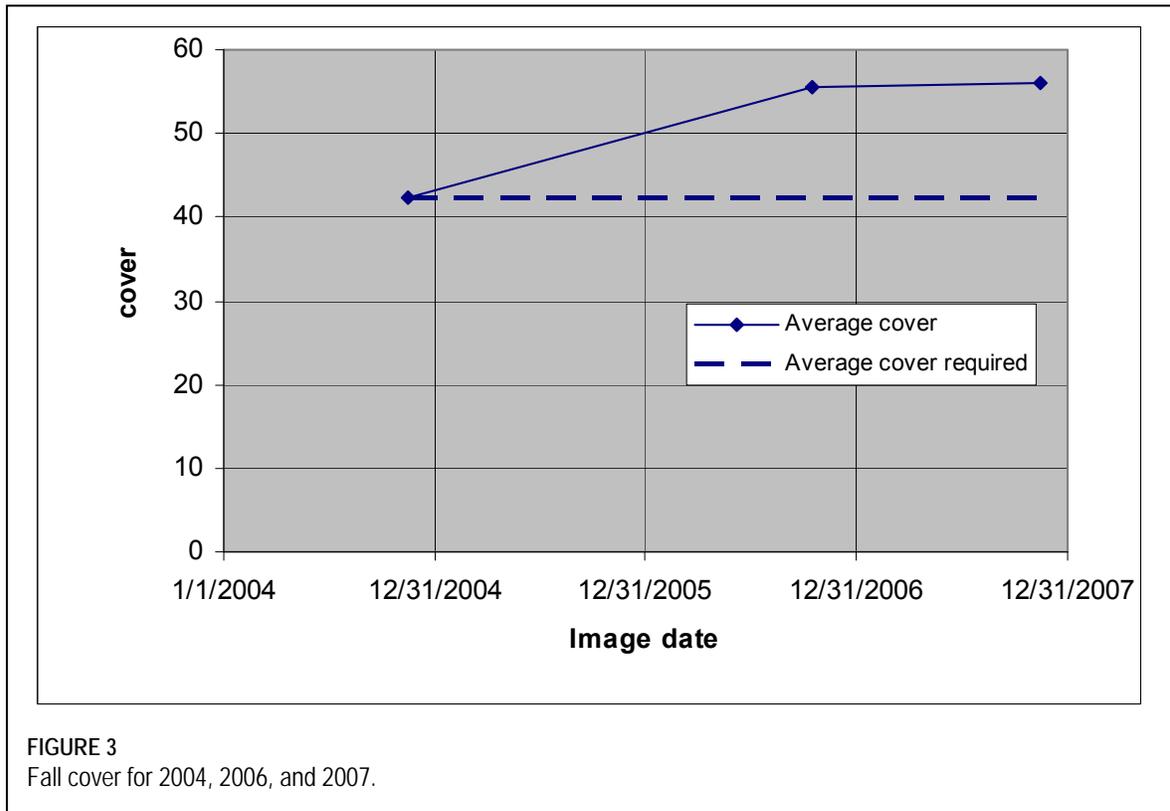


FIGURE 2  
History of Sand Motion at the Site.

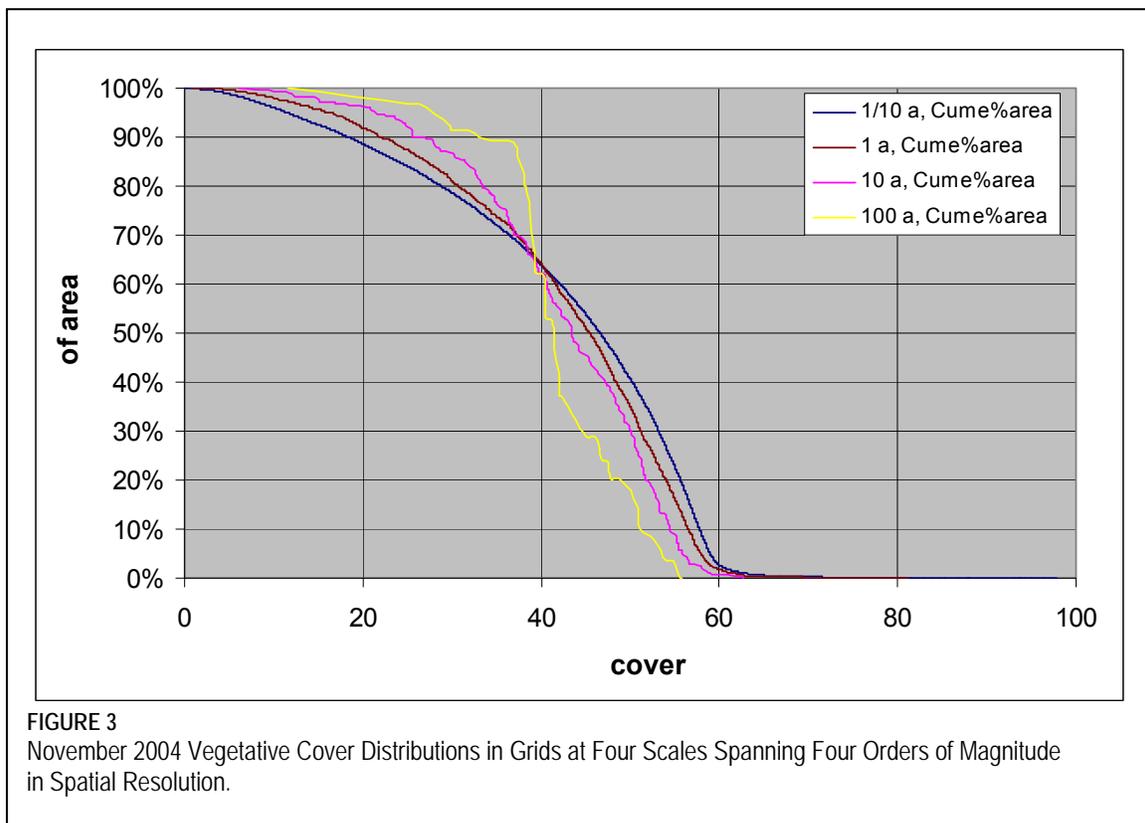


In Air Sciences (2006), it was shown that 99% control efficiency was achieved at between 11 and 20 percent vegetative cover on DPF images assessed by the spectral method. The average cover on the Site in November 2004 (according to a calibrated vegetation map based on spectrally interpreted DPF) was about 42%. However, several observations should be made to place the relationship between the control efficiency finding and average November 2004 cover:

- The control efficiency study (Air Sciences, 2006) employed spectral analysis of DPF images, while the proposed reference cover for the Managed Vegetation O&M Plan employs grid point observations of DPF. Where similar images have been calibrated by the two methods, average site-wide cover results were about 9 percentage points higher for calibration employing the grid-point observations.
- Air Sciences (2006) relates control efficiency to cover measured during each month. In the Managed Vegetation O&M Plan, fall cover will be evaluated as an indicator of site conditions during the following year, particularly during the ensuing winter and spring. Fall cover is about 10 percentage points higher than cover later in the potentially emissive winter-spring season
- The conservative (high) end of the control efficiency cover range is 20%, as indicated by spectral DPF. The ground truthing method now employed would likely attribute about 29% cover to such an area. Since measurements are to be taken in the fall, cover levels could fluctuate downward by up to 10 percentage points by springtime. Therefore, of 39% fall vegetative cover should result in maintenance of 29% or more cover throughout the winter season, which would approximate the highest level of cover that could be required for 99% control efficiency.
- This is another indication that a 42% site-wide average October-November cover requirement is appropriate, and perhaps conservative.

The Site is currently understood to control dust emissions as a unit. That is, a particular point within the Site, placed on open playa, might not achieve desired levels of control if pelted by saltating sand produced by surrounding uncontrolled playa. However, each point in the Site functions adequately within its actual context, surrounded as it is by other vegetated areas. The critical aspect of its surroundings (in terms a mathematically specific parameter describing distribution of cover) that allows each interdependent part to perform is currently unknown. However, this interdependence must be captured in these criteria. This is achieved by characterizing the actual spatial distribution of the successful Site, without preconception as to the specific aspects of the distribution that confer effectiveness.

The Site was subdivided by grids imposed at four scales, beginning at 0.1 acre, and increasing tenfold in area for the three subsequent grids (to 1, 10, and 100 acres). Cover distributions among these grid cells (average cover in each cell, and the distribution of those average values for each grid scale) were characterized. These distributions are shown in Figure 4.



A variance was then applied to each distribution to account for the fact that no future condition would likely match every point on a historical distribution perfectly. The lowest variances were applied to the lowest cover classes. The resulting criteria are shown relative to each of the four distributions in Table 2.

Vegetative cover at the Site is to be measured as described in NewFields (2007). As previously described, the Site has been subdivided by grids imposed at four scales, beginning at 0.1 acre, and increasing tenfold in area for the three subsequent grids (to 1, 10, and 100 acres). Cover distributions among these grid cells (average cover in each cell, and the distribution of those average values for each grid scale) will be characterized at any point in time. Cover thresholds in Table 2 will be adjusted for uncertainty of the vegetation map for that particular date (see discussion of map validation in NewFields [2007]), based on the cover map validation results. Adjustment of each threshold will be made as follows:

## Approach to Site Management

$$\text{Threshold}_{\text{adj}} = \text{Threshold} * (1 - \text{AFB}) / 5 \quad (1)$$

where  $AFB$  = half of the Absolute Fractional Bias (ranging from 0 to 1, with 1 indicating no error in the calibrated model prediction of vegetative cover at independent validation points),  $Threshold$  = any threshold from Table 2, and  $Threshold_{\text{adj}}$  is the adjusted criterion against which vegetation measurements for the date and parameter in question would be evaluated.

Conclusion

TABLE 2

Site cover levels and thresholds. Percent cover was assessed according to NewFields (2007), with imaged calibrated to ground truth measurements per NewFields (2007 and 2008). The vegetation map from the November 2004 Quickbird image of the site was employed.

*Approach to the Managed Vegetation Operation and Management Plan*

Grid Scale	n	Average ( cover)	5	10	20
			( of Site area)		
<b>Measured Reference</b>					
0.1	22,938	42	99	96	89
1	2,414	42	100	98	92
10	277	42	100	100	96
100	40	42	100	100	100
<b>Minimum Thresholds<sup>a</sup></b>					
0.1		42	94	86	71
1		42	95	88	73
10		42	95	90	77
100		42	95	90	80
<b>Thresholds Reference</b>			<b>( of measured reference)</b>		
		100	95	90	80

<sup>a</sup>Note that in the measured reference condition, no 1- to 100-acre grid cells had <5 percent cover. The associated criteria are not intended to imply or to allow whole 10-acre or 100-acre grid cells to have < 5 percent cover. Rather, they are intended to allow for smaller grid cell fragments (e.g., at the site's edges) with this level of cover.

In future years, the Site will be evaluated relative to adjusted threshold cover levels. The status of the Site along with indicated management responses will be reported in the PMP.

## CONCLUSION

The Plan contains the following assurances that Site effectiveness will be adequate in the future:

1. Site management is an active program to promote a general increase in cover and to further restrict areas of sparse coverage. Benefits of improved management and greater maturity to the Site are cumulative.
2. The Plan itself is an improvement to Site management, committing LADWP to actively manage problem areas.
3. Verification of compliance with federal PM<sub>10</sub> standards actively identifies areas that could cause violations.
4. Cover thresholds are based on the end of the second season during which no significant sand motion was measured, and future cover levels must meet or exceed these thresholds.
5. The Site was effective while surrounded by uncontrolled playa. New control along the margins of the Site reduces the sand mass moving into Site margins.
6. This Plan is based on five years of Site management experience, the firmest foundation yet for a set of DCM performance specifications.

## Acknowledgements

By all of these means, this Approach provides amply for maintenance of Site performance and the protection of human health.

## ACKNOWLEDGEMENTS

Previous drafts and a final version of this document were prepared by CH2M HILL, Air Sciences, and Earthworks Restoration. This version is based largely on that work, and includes changes based on comments and suggestions from GBUAPCD and their consultants. The contributions of all team members are appreciated by the authors and LADWP, and were essential to the completion of this work.

## REFERENCES

Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006.

Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for Managed Vegetation Dust Control Measure.

Air Sciences Inc. 2007b. Monitoring Of Hotspots Within The Managed Vegetation Area, Owens Lake Dust Mitigation Project.

NewFields. 2007. Methods Used for Verification of Vegetative Cover on the Managed Vegetation Dust Control Measure.

NewFields, Air Sciences, and Earthworks. 2008. Managed Vegetation Operation and Management Plan.

NewFields. 2008. *Notes on the January 2008 Version of the Owens Lake Managed Vegetation Operation and Management Plan* (January 10, 2008 memo from John Dickey to File).

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

**EXHIBIT 7**

**CONCEPTUAL**

**TRANSITION AREA**

**DUST CONTROL PLAN**

Great Basin Unified Air Pollution Control District  
Abatement Order 110317-01

EXHIBIT 7

Conceptual Dust Control Plan

The following Reasonable Precautions have been approved by the APCO pursuant to Rule 401A and shall be implemented by Respondent as reasonably necessary and feasible to mitigate PM10 emissions from the Transition Areas during construction:

1. Temporary sand fences shall be installed where feasible as soon as practicable without delaying project completion and shall be maintained as necessary until areas of Managed Vegetation have been established;
2. Water trucks shall be used as necessary and feasible during construction;
3. Tillage shall be implemented where soil conditions allow.
4. Construction activities shall cease during high wind events.

The Dust Control Plan shall be similar to the following plans previously approved by the APCO:

- a. T1A-1 Sand Fence and Tillage Construction Dust Control Plan – September 23, 2010 from Clarence E. Martin to Ted Schade and Susan Young
- b. Owens Lake Phase VII Construction Dust Control Plan – November 3, 2008 from William T. Van Wagoner to Theodore Schade

***Great Basin Unified Air Pollution Control District***

2013 Amendment to the Owens Valley PM<sub>10</sub> SIP

**Board Order 130916-01**

Exhibit 4: Phase 7a and Keeler Dunes Settlement Terms  
dated June 25, 2013 (“Terms Sheet”)

**GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT  
AND  
LOS ANGELES DEPARTMENT OF WATER AND POWER**

**PHASE 7a AND KEELER DUNES  
SETTLEMENT TERMS  
JUNE 25, 2013**

The following constitutes the Settlement Terms (the “Terms”) for the Phase 7a Stipulated Order for Abatement (SOA) and Keeler Dunes issues between the Great Basin Governing Board (GB) and the Los Angeles Department of Water and Power (LADWP):

**I. MODIFICATION OF SOA**

A. GB and LADWP agree that GB shall modify the Phase 7a SOA to do the following:

1. Deadline Extensions

- a) Existing December 31, 2013 deadline for all infrastructure for BACM and compliant operation (other than Managed Vegetation Compliance) to be installed and fully operational extended to December 31, 2015.
- b) Existing December 31, 2015 deadline for Managed Vegetation Controls (fully compliant managed vegetation cover) extended to December 31, 2017.

2. Assumptions for Extension of Deadlines

- a) Timely Availability of necessary leases from State Lands and of necessary permits from other agencies

- b) Acceptance by GB of 328 acres of Eligible Cultural Resource (ECR) areas. ECR areas are defined as California Register of Historical Resources (CRHR)-eligible areas plus necessary buffer areas and are to be removed from Phase 7a and placed into Phase 7b (see below) and potentially the subject of a new future Board order. A confidential map of the existing 328-acre ECR areas shall be attached to the amended SOA.
- c) Force majeure process of original SOA to be followed for newly discovered potential ECRs.

#### B. Creation of Phase 7b

1. Phase 7b would be created for the treatment of the 328 acres of ECR areas plus any newly discovered cultural resources within Phase 7a that are determined by LADWP's state certified archaeologist to be CRHR-eligible and necessary buffer areas (the "Additional Phase 7b Areas") and whose determination is confirmed by a second, state certified archaeologist mutually agreeable to GB, LADWP and State Lands (the "Second Archaeologist").
2. Initially Phase 7b would include 328 acres of previously identified ECR areas from Phase 7a (the "Initial Phase 7b Areas").
3. Any areas in Phase 7a (beyond the Initial Phase 7b Areas ) where ECRs are located during Phase 7a construction shall be handled as part of Phase 7b (the "Additional Phase 7b Areas"). Promptly upon discovery of any cultural resources during the Phase 7a construction process, LADWP shall promptly notify GB of, and confer with GB about, such discovery, and LADWP's state certified archeologist shall fulfill their legal obligations relative to assessing and making recommendations for cultural resources. LADWP's state certified archaeologist shall be responsible for evaluating whether any newly discovered cultural resource areas within Phase 7a are CRHR-eligible, and if so, the additional buffer areas necessary to address disturbance of the

CRHR eligible areas; such evaluations shall be confirmed by the Second Archaeologist. Newly identified CRHR eligible areas and necessary buffer areas shall become ECR areas and become part of the Additional Phase 7b Areas.

#### 4. Cultural Resource Task Force

- a) The amended SOA will establish a Cultural Resource Task Force (CRTF). The CRTF will be an advisory group consisting of LADWP, GB, State Lands, State Historical Preservation Office, and Local Tribal Representatives. The CRTF shall be able to draw upon outside resources and experts, as needed, to aid the CRTF's process. LADWP shall be responsible for paying the reasonable costs of the CRTF, including reimbursements for travel expenses of CRTF members.
- b) The CRTF will initially be charged to make recommendations to GB and LADWP as to the best course of action and timing for the treatment of the Initial Phase 7b Areas. Such treatment could include whether particular areas should be permanently avoided, subject to Phase III cultural recovery or subject to some less intensive form of cultural recovery to protect cultural resources in the Initial Phase 7b Areas. The CRTF will make non-binding recommendations to the GB Governing Board and LADWP regarding treatment of the Initial Phase 7b Areas on or before December 31, 2014. LADWP and GB shall commit to form the CRTF and host its initial meeting within ninety (90) days after the effective date of the amended SOA.
- c) The CRTF shall also make non-binding recommendations to GB and LADWP with respect to the treatment of ECRs that may become part of the Additional Phase 7b Areas. After making its recommendations for the Initial Phase 7b Areas, the CRTF shall remain in existence to make recommendations for any Additional Phase 7b Areas that may be designated ECRs by LADWP's state certified archaeologist and confirmed by the Second Archaeologist.

- d) If after considering the non-binding recommendations of the CRTF, GB exercises its discretion to order LADWP to install dust controls in either the Initial Phase 7b Areas or in the Additional Phase 7b Areas, GB will issue a new Board order or orders after receiving input from LADWP and will determine if any SIP amendment is necessary. The new Board order or orders shall include control completion deadlines that take into account project circumstances, including but not limited to, recovery and additional environmental work necessary to complete the project at issue. The new Board order or orders shall recognize that the construction period shall be subject to all time-extensions-for-cause provisions of Paragraphs 5 and 6 of the SOA.
- e) Like the SOA for Phase 7a, any future order or orders issued by GB pertaining to Phase 7b will give due consideration to the shared goals of GB and LADWP to control air pollution and decrease the use of water for dust control at Owens Lake. In making its recommendations, the CRTF will also give due consideration to GB's and LADWP's shared water saving and air pollution control goals.
- f) The CRTF will be advisory in nature only, and GB and LADWP will retain final determination as to the treatment of ECR areas. GB reserves the right to issue a future order or orders requiring LADWP to install dust controls on Phase 7b areas and LADWP reserves the right to contest any such order.
- g) Permanent avoidance of any portion of the Phase 7b Areas will be considered by GB, which, upon approval, shall amend the 2008 SIP and Board Order 080128-01 in order to get USEPA approval.

### C. No Fines

1. GB shall not fine, issue fees or impose any other type of penalty upon LADWP with respect to any areas of Phase 7a, provided that the Phase 7a dust controls are put into place within the time frames set forth in Section I.A.1.

2. GB shall not fine LADWP for any areas in the Initial Phase 7b Areas and the Additional Phase 7b Areas pursuant to the SOA and this agreement.

D. Modification of SOA

1. The amended SOA shall clarify that the discovery of any cultural resources that are determined by LADWP's state-certified archeologist to be potentially CRHR-eligible shall be included in the SOA's existing time-extensions-for-cause, as set forth in SOA Paragraphs 5 and 6.
2. The amended SOA shall reiterate that GB and LADWP shall make every effort to develop, approve and deploy high-confidence waterless dust control measures in all areas where dust controls are ordered.
3. The amended SOA shall state that the modification of the SOA by GB and LADWP shall not be construed as a waiver by either party of any rights, remedies, legal theories or positions that either party may choose to assert in any hearing, proceeding, tribunal or action now or in the future except with respect to the particular subject matter contained in the amended SOA and the Keeler and Other Dunes Release".<sup>1</sup>
4. The effective date of the amended SOA shall be the date upon which the necessary decision makers of the City of Los Angeles and the GB Governing Board agree to enter into this agreement to modify the SOA.

E. Clarification on BACM

1. GB hereby approves Reduced Thickness Gravel BACM (2 inches of gravel with geotextile fabric underlay).

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<sup>1</sup> LADWP disputes the legality of and does not agree to the Supplemental Control Requirements Determination (SCRD) process. GB asserts that LADWP agreed to the SCR D process in the original Phase 7a SOA and elsewhere, and the SCR D process is now the law. GB and LADWP have a continuing disagreement on this point.

2. GB hereby approves Brine Shallow Flooding BACM as a subcategory of Shallow Flooding BACM. GB and LADWP acknowledge and agree that the foregoing approval of Brine Shallow Flooding BACM shall not make LADWP liable for maintenance of the natural Brine Pool on Owens Lake. "Brine Pool" is defined as those areas below elevation 3,553.55 feet.
  
3. GB will commit to work with the LADWP on an accelerated testing schedules and BACM approval, if warranted, for Roughness Elements and Tillage in soil type areas where these controls can be applied. Within 30 days of the effective date of the amended SOA, GB and LADWP shall agree upon accelerated testing schedules for the candidate Roughness Elements and Tillage BACMs in soil types where these control can be applied. Said schedules will include consideration for BACM approval of these candidate measures by the GB Board within one year of completion of the schedules (within 13 months of the effective date of the amended SOA). If the accelerated testing does not result in approved BACM designation for the candidate measures, LADWP and the GB Board will jointly assess why the accelerated testing did not result in BACM approvals. GB and LADWP also will commit to work on accelerated testing schedules and BACM approvals for other forms of BACM.
  
4. GB will memorialize its approvals set forth in Sections I E. (1) and (2) and any future approvals pursuant to Section I E. (3) in formal GB board resolutions and orders. GB and LADWP will jointly appeal to State Lands to approve use of new BACMs promptly upon their approval by GB and, with respect to the approvals set forth in Sections I E. (1) and (2) within 90 days of the effective date of the amended SOA.

## II. KEELER DUNES

### A. Keeler Dunes Dust Control Project

1. LADWP shall provide \$10 Million to GB as a public benefit contribution to and will support GB's "Keeler Project" (as defined herein below) to control PM10 emissions from the Keeler Dunes. LADWP shall tender the \$10 Million in a single payment to GB within 90 days after the effective date of the amended SOA and the following two actions are completed: 1) delivery to LADWP of the "Keeler and Other Dunes Release" (defined herein below) and 2) the submittal to the California Air Resources Board (CARB) as described in Paragraph II.B.1.c., below. The "Keeler and Other Dunes Release" shall not be effective until GB receives the \$10 Million payment.
2. GB shall use the funds for environmental impact analysis, design, permitting, construction, operation, maintenance, management, monitoring and directly related activities for a dust emission control project at Keeler Dunes (the "Keeler Project"). No funds shall be used for the purpose of attorney fees, public affairs or governmental relations (collectively, "Public Affairs") or contractors or subcontractors for Public Affairs. The Keeler Project includes all those portions of the Keeler Dunes owned by LADWP and BLM. GB shall have exclusive authority over, and responsibility for, the Keeler Project. LADWP shall have no responsibility for the design, permitting, construction, operation, maintenance, management, monitoring and other activities directly and exclusively related to the Keeler Project for as long as dust controls are required.
3. Upon delivery of the "Keeler and Other Dunes Release" (defined herein below) and the SIP and Board Order 080128-01 amendment submittal to the CARB as described in Paragraph II.B.1.c., below, LADWP will immediately provide GB with access to its property in the Keeler Dunes area in order to complete environmental impact analyses and for all design, permitting, construction, operation, maintenance, management, monitoring and activities directly and exclusively related to the Keeler

Project. So long as such access is provided by LADWP, GB shall indemnify in perpetuity, defend and hold LADWP (and the City of LA) harmless for personal injuries caused by the negligence or willful misconduct of GB with respect to all activities undertaken by GB and its employees, agents and contractors on LADWP's property and GB shall promptly repair any damage to LADWP's property caused by GB's activities on LADWP's property except that GB shall not be required to repair any alteration of the property that is part of or related to the design or implementation of the dust control measures for the Keeler Project. Any dust monitoring undertaken by GB on LADWP's Keeler Dunes property shall exclusively be for the Keeler Project and shall not be used for any other purpose.

4. LADWP, at its sole cost and expense, shall have the right (without obligation) to audit GB's books and records on an annual basis to verify that the \$10 Million contributed by LADWP has been exclusively used to fund the Keeler Project in accordance with the amended SOA, the amended SIP, the Keeler and Other Dunes Release and any other document memorializing the Terms, and for no other purpose. GB shall fully co-operate with any annual audit of the Keeler Project initiated by LADWP.

B. Release of LADWP/LA City for Keeler and Other Dunes Areas

1. Upon the effective date of the amended SOA, GB shall deliver to LADWP a release (the "Keeler and Other Dunes Areas Release") as follows:
  - a) Release for Keeler Dunes:

GB forever releases LADWP from any and all liability under any and all federal, state and local laws that GB can enforce and settle, including but not limited to the Health and Safety Code, those portions of the SIP that can be enforced by GB, and fugitive dust emissions rules, for dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of Keeler Dunes owned by LADWP. GB forever agrees not to request, encourage or join in an enforcement

action by any other agency against LADWP related to dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of the Keeler Dunes owned by LADWP. A map defining the geographical boundaries of the Keeler Dunes is attached and incorporated into this agreement.

- b) Release for Swansea and Olancha Dunes (collectively these dunes are defined as the Other Dunes Areas):

GB forever releases LADWP from any and all liability under any and all federal, state and local laws that GB can enforce and settle, including but not limited to the Health and Safety Code, those portions of the SIP that can be enforced by GB, and fugitive dust emissions rules, for dust emissions, regardless of origin, from the Other Dunes Areas in the vicinity of Owens Lake, including but not limited to portions of such dunes that may be owned by LADWP. GB forever agrees not to request, encourage or join in an enforcement action by any other agency against LADWP related to dust emissions, regardless of origin, from the Other Dunes Areas in the vicinity of Owens Lake. This agreement does not release LADWP from liability for dust emissions resulting from any future groundwater pumping by LADWP at or below the 3600-foot contour in the Owens Lake area. Maps defining the geographical boundaries of the Other Dunes Areas in the vicinity of Owens Lake are attached and incorporated into this agreement.

- c) SIP and Board Order Amendment:

Great Basin shall amend the SIP and Board Order 080128-01 consistent with the terms of this agreement and the “Keeler and Other Dunes Areas Release” and shall request the USEPA and CARB to approve the amended SIP.

2. LADWP reserves the right to contest and defend any alleged violations not covered by the releases herein, including but not limited to the right to contest and defend any alleged violations of Rule 401, or alleged violations of H&S 42316 below the 3600-foot elevation and above the 3600-foot elevation in those areas outside the Keeler

Dunes and Other Dunes Areas. GB reserves the right to assert that any such defenses are barred or otherwise not legally supported.

3. After the date of this agreement, GB shall hold no hearings regarding LADWP's liability/responsibility for dust emissions from the Keeler Dunes or from the Other Dunes Areas.

### **III. GENERAL SETTLEMENT CONDITIONS**

- A. All Settlements and other matters contained in the amended SOA and Keeler Release shall be subject to final approval by LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles.
- B. All Settlements and other matters contained in the amended SOA and Keeler Release shall be subject to approval of GB Board and shall be memorialized in GB Board modification of SOA and appropriate GB resolutions, the 2008 SIP, if required, and Board orders.
- C. GB and LADWP shall memorialize the Terms in formal settlement documents, including the amended SOA, the Keeler Release and the Other Dunes Area Release, within 30 days after approval of the Terms by the GB Board and by the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles. Prior to such approvals and until such time that public disclosure is mandated by law, GB and LADWP shall not disclose the Terms or the existence and content of the SOA Mediation and shall keep the Terms confidential.
- D. Once the Terms are fully approved by the GB Board and by the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles, GB and LADWP shall issue a joint press release to announce the successful conclusion of the SOA Mediation, the Terms, the amended SOA and the Keeler Release.

- E. The parties to the SOA Mediation shall each execute a copy of this document to evidence that it contains the final and complete statement of the Terms resulting from the SOA Mediation that will be submitted for approval to the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles and to the GB Board.
  
- F. Prior to the public announcement of this Agreement, LADWP and GB will develop a mutually agreeable joint communication, which announces and explains this Agreement. The Parties agree not to disclose or divulge the content and substance of the Settlement Terms to any third parties, including, but not limited to members of the press or media, unless and until LADWP and the District have approved a final settlement. The confidentiality requirements do not extend to the undersigned participants' discussions with their respective party's legal counsel and governing boards, regarding the settlement meetings.

In witness thereof, the parties hereto have set their hands to this agreement on June 27, 2013.

Great Basin Unified  
Air Pollution Control District

Los Angeles  
Department of Water and Power

By: \_\_\_\_\_

By: \_\_\_\_\_

Name: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

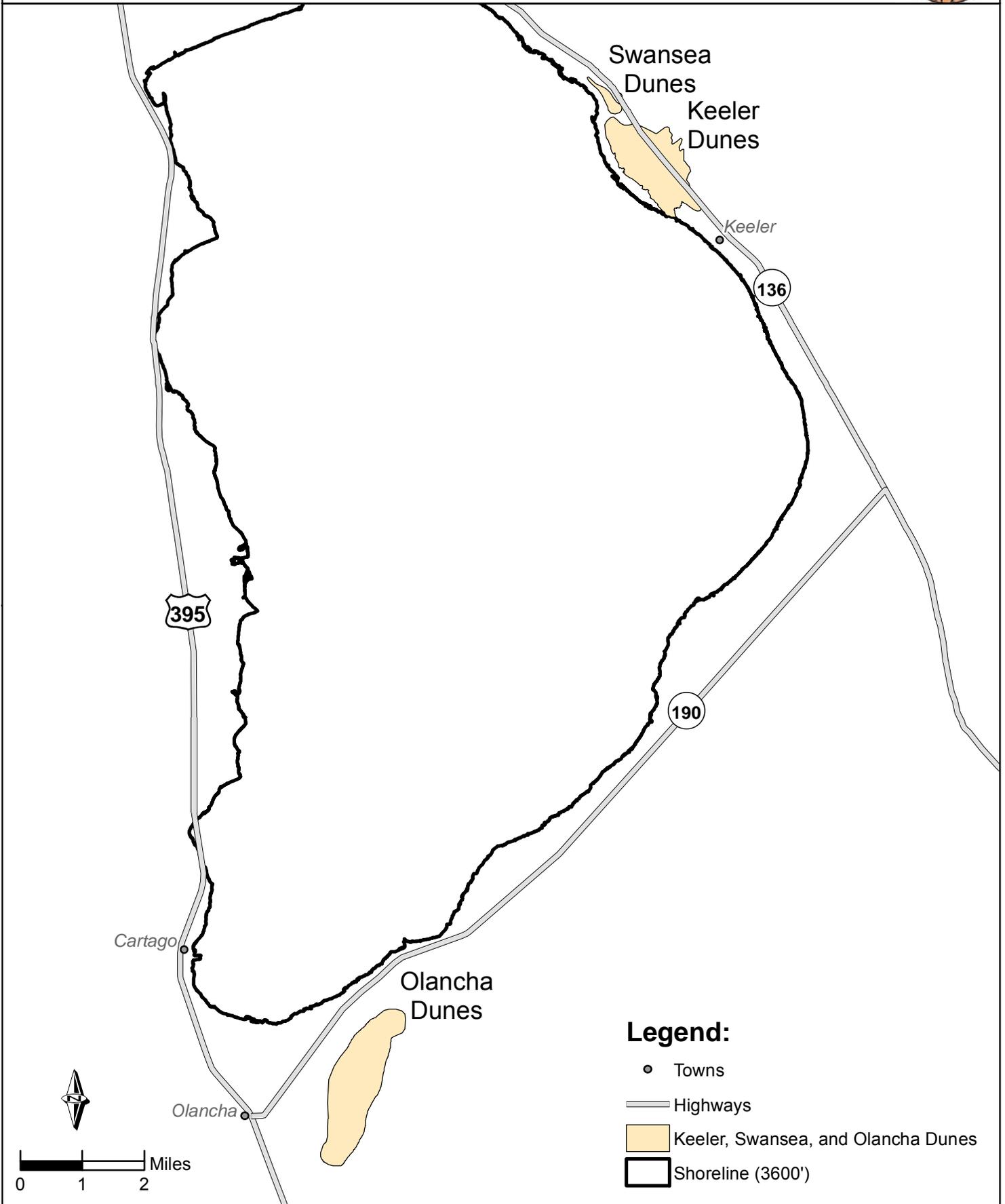
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# Keeler, Swansea, and Olancha Dunes



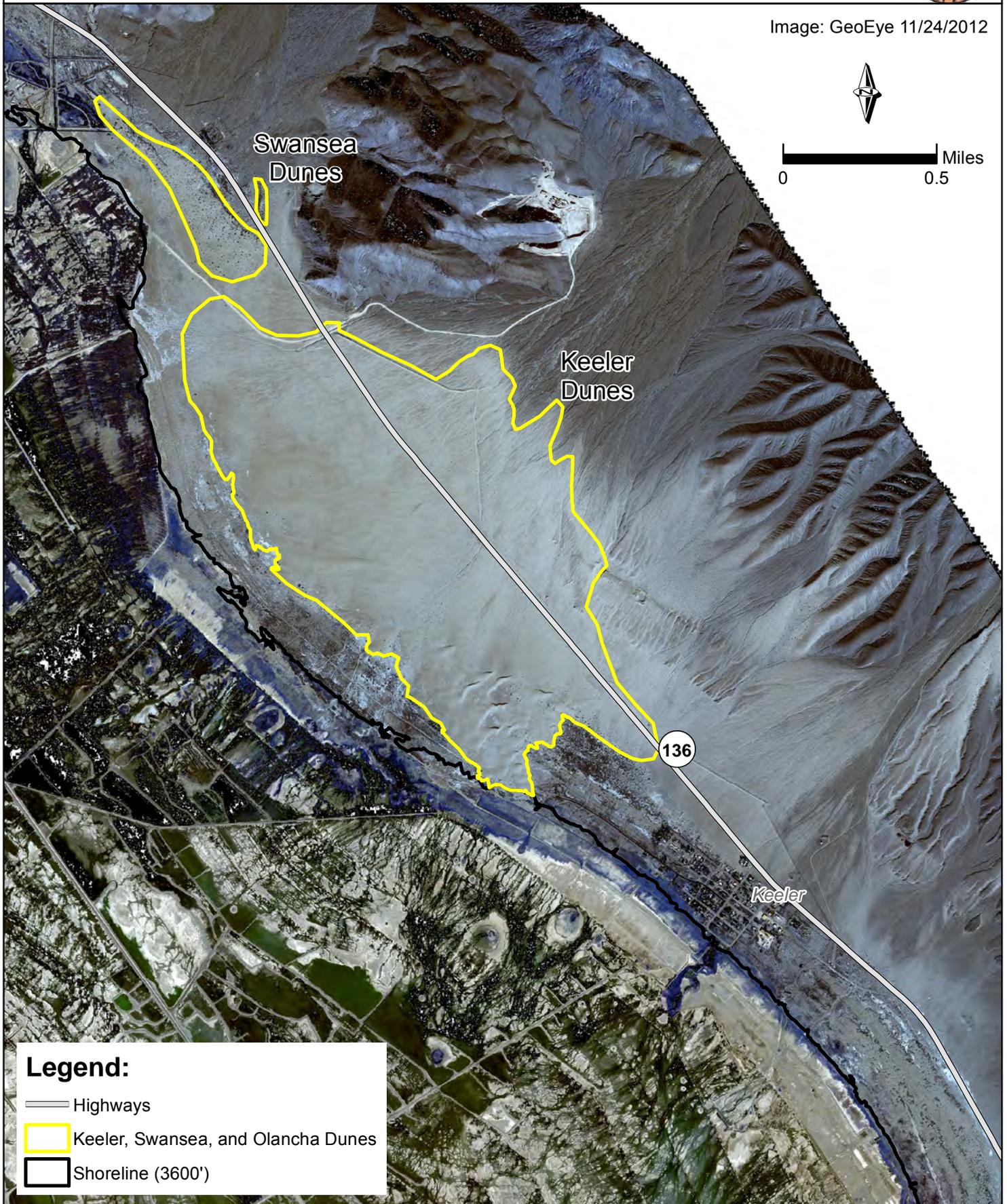


# Keeler and Swansea Dunes - Detail

Image: GeoEye 11/24/2012



0 0.5 Miles

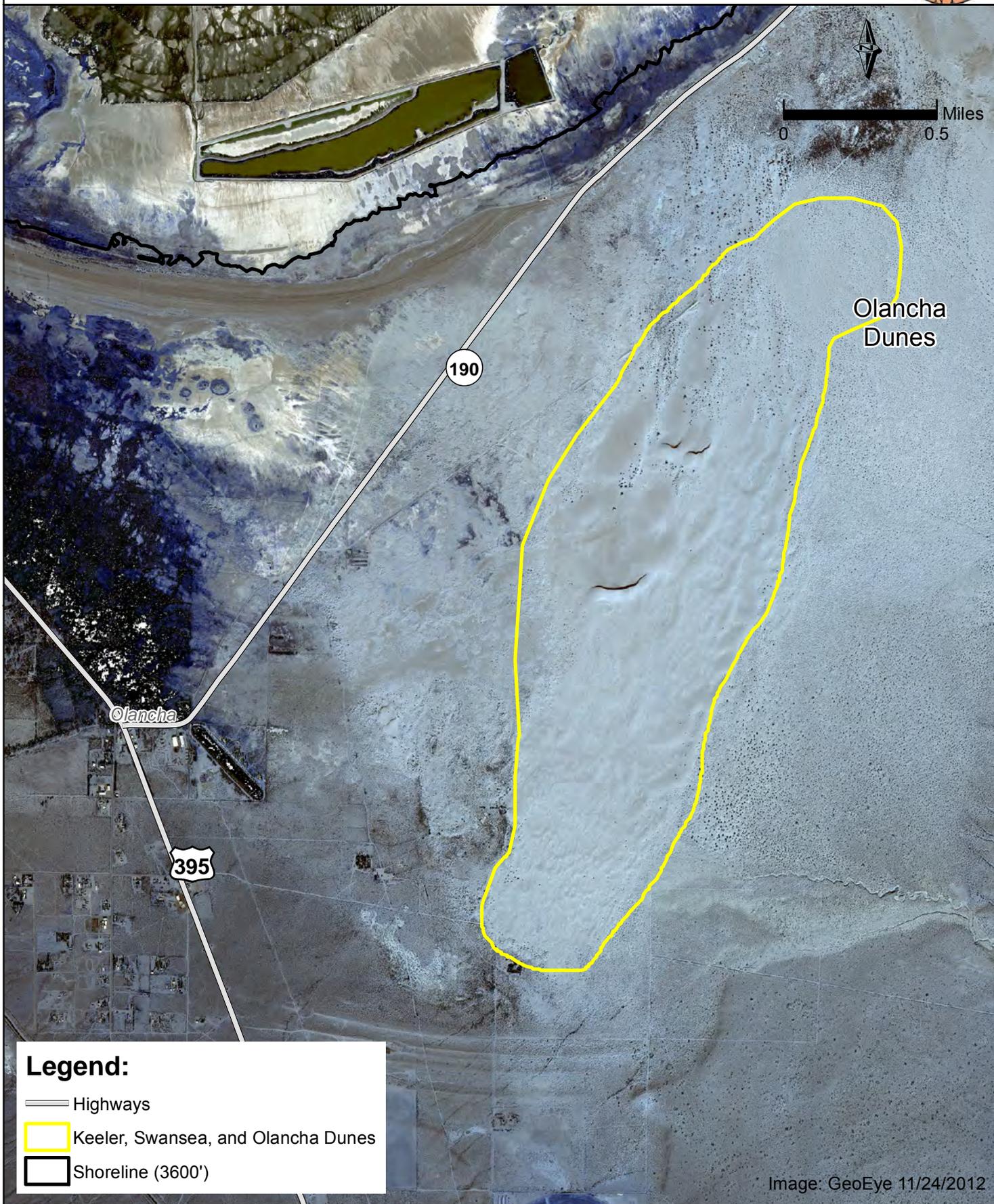


### Legend:

-  Highways
-  Keeler, Swansea, and Olancha Dunes
-  Shoreline (3600')



# Olancha Dunes - Detail



# ***Great Basin Unified Air Pollution Control District***

2013 Amendment to the Owens Valley PM<sub>10</sub> SIP

## **Board Order 130916-01**

Exhibit 5: Settlement Agreement and Release between the Great Basin Unified Air Pollution Control District and City of Los Angeles Acting by and through its Department of Water and Power Concerning Modification to Phase 7a Stipulated Order for Abatement No. 110317-01, dated August 13, 2013

**SETTLEMENT AGREEMENT AND RELEASE BETWEEN THE GREAT BASIN UNIFIED AIR  
POLLUTION CONTROL DISTRICT AND CITY OF LOS ANGELES ACTING BY AND THROUGH ITS  
DEPARTMENT OF WATER AND POWER CONCERNING MODIFICATION TO PHASE 7A  
STIPULATED ORDER FOR ABATEMENT NO. 110317 AND KEELER DUNES PROJECT**

*August 19, 2013*

THIS SETTLEMENT AGREEMENT AND RELEASE ("**Agreement**") is entered into on this 19<sup>th</sup> day of August, 2013, by and between the **Great Basin Unified Air Pollution Control District**, an agency organized pursuant to Division 16, Part 3, Chapter 3 of the California Health and Safety Code ("**District**"), on one hand, and the **City of Los Angeles acting by and through its Department of Water and Power ("LADWP")**, a municipal corporation organized under the Los Angeles City Charter and the Constitution and laws of the State of California, on the other hand. The District and LADWP may be referred to herein individually as "**Party**" or collectively as the "**Parties.**"

WHEREAS, on March 17, 2011, the District Governing Board issued Stipulated Order for Abatement, Order No. 110317-01 ("**Original Abatement Order**"). The Original Abatement Order requires LADWP to construct a dust control project, known as Phase 7a, on approximately 3.1 square miles of the Owens Lakebed, which includes six Dust Control Areas ("**DCAs**"), T37-1, T37-2, T1A-3, T1A-4, T-32-1 and T12-1 ("**Phase 7a areas**"). The Original Abatement Order allows LADWP to transition approximately 3.0 square miles of existing dust control areas ("**Transition Areas**"). These areas are identified in Exhibit 4 of the Original Abatement Order.

WHEREAS, the Original Abatement Order requires LADWP to install Best Available Control Measures ("**BACM**") in DCAs T37-1, T37-2, T1A-3, T1A-4 and T-32-1 and provides for LADWP to change BACM in the Transition Areas to conserve water, by no later than December 31, 2013, and to install BACM in the T12-1 tillage test area by May 1, 2016. (*See also* Governing Board Order No. 120206-07.) Under the Original Abatement Order, all Phase 7a Areas and Transition Areas controlled by Managed Vegetation BACM are to achieve fully-compliant BACM vegetation cover by December 31, 2015. Installation of BACM on the Phase 7a DCAs and Transition Areas entails ground disturbing activities such as grading, planting, dirt moving, boring, trenching and road, berm, pipeline and other construction.

WHEREAS, LADWP was required under District Governing Board Order No. 080128-01 ("**Board Order 080128-01**"), the enforcement Board order for the 2008 Owens Valley PM10 Planning Area Demonstration of Attainment State Implementation Plan ("**2008 SIP**"), to conduct environmental review for the Phase 7a project in compliance with the California Environmental Quality Act ("**CEQA**"). LADWP unexpectedly discovered significant cultural and archaeological resources in the Phase 7a area during the CEQA process that required LADWP to undertake additional investigations under CEQA and to comply with mitigation measures included in the District supplemental environmental impact report for the 2008 SIP ("**SEIR**"),

both of which resulted in unanticipated CEQA and project design and construction delays that LADWP determined are outside of its control.

WHEREAS, LADWP released the draft Phase 7a EIR for public review and comment in January 2013 for a 45 day public comment period. LADWP staff considered and responded to public comments, conducted further consultations with Native American groups and others about project impacts and comments on the draft EIR, and revised the draft EIR, as necessary, to incorporate any changes to the project. Alternatives were identified in the EIR that would avoid impacts to cultural resources by excluding California Register of Historic Resources (“**CRHR**”)-eligible areas from the Phase 7a project, including the Avoidance Alternative, which involved construction of the originally proposed Phase 7a project, except for 350 acres of Phase 7a subareas T1A-3, T32-1, T37-1 and T37-2 known to contain significant cultural resources.

WHEREAS, on June 4, 2013, LADWP’s Board of Water and Power Commissioners considered and certified the final Phase 7a EIR and approved the Avoidance Alternative for the Phase 7a project, subject to and contingent upon the District Governing Board’s approval of a petition to modify the Original Abatement Order to remove these 350 acres from the original Phase 7a area, and to make any other additional changes necessary to ensure consistency between the Original Abatement Order, the Phase 7a project and the Final EIR, including, but not limited to, obtaining extensions of time for completing the Phase 7a project necessitated by the unexpected discovery of significant cultural resources in the Phase 7a areas.

WHEREAS, paragraph 5 of the Original Abatement Order outlines circumstances that allow LADWP to seek an extension of time to comply with the Original Abatement Order, without penalty, when it is acting in good faith to comply with the terms of the Original Abatement Order but is impeded by circumstances beyond its control. In compliance with the Original Abatement Order, LADWP’s Board of Water and Power Commissioners adopted three resolutions on February 7, 2012 (Resolution No. 012-170), April 3, 2012 (Resolution No. 012-210), and January 11, 2013 (Resolution No. 013-157), finding that LADWP has acted in good faith to comply with the Original Abatement Order, but has been impeded by the unexpected discovery of significant cultural resources in the Phase 7a areas. In compliance with paragraph 6 of the Original Abatement Order, LADWP notified the District’s Air Pollution Control Officer (“**APCO**”) of each resolution and proposed schedules of increments of progress. The APCO objected to LADWP’s Resolution No. 013-157 on February 4, 2013. Pursuant to paragraph 5 of the Original Abatement Order, LADWP requested a meeting with District Governing Board members to attempt to resolve the dispute.

WHEREAS, designated members of the LADWP and District Boards have engaged in several meetings (“**Settlement Meetings**”) in April, May and June 2013 to resolve the dispute related to the Original Abatement Order. During the Settlement Meetings, the Parties also attempted to resolve a separate dispute related to the development and origin of the Keeler Dunes and a possible future District order requiring control of emissions at the Keeler Dunes. The District Governing Board has not made any findings or issued any order concluding that the Keeler Dunes are anthropogenic in nature and/or caused by LADWP’s activities in the

production, diversion, storage, or conveyance of water. The District Governing Board has not made any findings or issued any order concluding that LADWP is liable for, or that LADWP's activities in the production, diversion, storage, or conveyance of water has caused or contributed to any violations of state or federal air quality standards in the Keeler Dunes or other dunes areas, including the Swansea and Olancho Dunes, in the vicinity of Owens Lake.

WHEREAS, the Settlement Meetings resulted in an agreement on settlement terms dated June 17, 2013 ("**Term Sheet**") that was approved by LADWP's Water and Power Commissioners on June 26, 2013, and the District's Governing Board on June 27, 2013, and are memorialized in this Agreement. This Agreement does not result in any waiver by the District or LADWP of arguments raised in other proceedings or disputed issues that are not covered under this Agreement, including but not limited to the District's Supplemental Control Requirements Determination ("**SCRD**") process, SB 270 budgets, and fees.

For good and valuable consideration, the Parties agree as follows:

- I. **PHASE 7a DUST CONTROLS.** [*Corresponds to Term Sheet section I.A.*] The District Governing Board shall approve a modification to the Original Abatement Order ("**Modified Abatement Order**") that reflects the following terms:
  - a. **Deadline Extensions.** [*Corresponds to Term Sheet sections I.A.1.-I.A.2.*]
    - i. The deadline for LADWP to construct all infrastructure and install fully-compliant BACM in the Phase 7a areas and Transition Areas, except for those areas controlled by Managed Vegetation BACM, as set forth in paragraphs 1 and 4(a) of the Original Abatement Order, shall be extended from December 31, 2013, to December 31, 2015. All infrastructure and plant materials for Managed Vegetation BACM will be installed by December 31, 2015.
    - ii. The deadline to achieve fully-compliant BACM vegetation cover for areas controlled by Managed Vegetation BACM in the Phase 7a areas and Transition Areas, as set forth in paragraphs 1 and 4(a) of the Original Abatement Order, shall be extended from December 31, 2015, to December 31, 2017.
    - iii. The extensions of the deadlines set forth in section I(a)(i)-(ii) shall be contingent upon all of the following:
      - (1) LADWP timely receiving from California State Lands Commission ("**CSLC**") and all other agencies all of the required permits, approvals, or leases necessary to allow LADWP to construct BACM within the deadlines required by the Modified Abatement Order.
      - (2) The timely removal from the Original Abatement Order of all CRHR-eligible areas plus necessary buffer areas, referred to as the "Eligible Cultural Resource ("**ECR**") areas." The ECR areas initially consist of 328 acres of the Phase 7a areas

identified in Exhibit 1 (the “**Initial Phase 7b Areas**”), which is incorporated into this Agreement. Because Exhibit 1 identifies the locations of cultural resources, it is confidential and shall not be made publically available. The Initial ECR areas and any newly discovered CRHR-eligible and necessary buffer areas are considered part of Phase 7b, as set forth in section I(b)(i) below. A confidential map of the initial 328-acre ECR area shall be attached to the Modified Abatement Order.

- (3) The Original Abatement Order being revised to state explicitly that any newly discovered potential ECRs in the Phase 7a areas is considered a condition of force majeure under paragraph 5(d) of the Original Abatement Order.
  - iv. If any one of the above contingencies is not met, LADWP may seek further extensions of time under the provisions of paragraph 5 of the Original Abatement Order, as modified by the Modified Abatement Order, and paragraphs 6 and 22 of the Original Abatement Order, which shall not be unreasonably denied by the District.
- b. **Creation of Phase 7b.** [*Corresponds to Term Sheet sections I.B.1.-I.B.3., I.D.1*]
- i. Phase 7b shall consist of the Initial 328 acres of Phase 7b Areas and any other areas in Phase 7a that LADWP’s state-certified archaeologist has determined, and which are confirmed by a second, state-certified archaeologist mutually agreeable to the District, LADWP and CSLC (the “**Second Archaeologist**”) to be CRHR-eligible and necessary buffer areas (the “**Additional Phase 7b Areas**”). The difference between the 328 acres defined in this Agreement as the Initial Phase 7b areas, and the 350 acres identified in the Avoidance Alternative in the Phase 7a EIR, will also be subject to the Phase 7b process, if necessary, as described in this Agreement. The Additional Phase 7b Areas are not limited to the 350 acres described in the Avoidance Alternative in the Phase 7a EIR. All areas in Phase 7b shall be considered removed from the Original Abatement Order.
  - ii. LADWP shall promptly notify and confer with the District if any cultural resources are discovered during the construction of Phase 7a. The discovery of any cultural resources that are determined by LADWP’s state-certified archeologist to be potentially CRHR-eligible shall be subject to the procedure set forth in paragraph 5 of the Original Abatement Order, as modified by the Modified Abatement Order, and paragraph 6 of the Original Abatement Order. Upon the discovery of the cultural resources, LADWP will request that its state-certified archeologist fulfill his or her legal obligations relative to assessing and making recommendations for cultural resources. LADWP’s state-certified archaeologist shall be responsible for evaluating whether any of the newly discovered cultural resource areas within Phase 7a are CRHR-eligible, and if so, define the additional buffer areas necessary to address disturbance of the CRHR-eligible areas. LADWP’s state-certified archeologist’s recommendations shall be reviewed by the Second Archaeologist. If

confirmed by the Second Archaeologist, the newly identified CRHR-eligible areas and necessary buffer areas shall become ECR areas that are withdrawn from the Original Abatement Order and included in Phase 7b.

- c. Cultural Resource Task Force (“CRTF”) [*Corresponds to Term Sheet sections I.B.4*]
- i. LADWP and District commit to form the CRTF and host its initial meeting within ninety (90) days after the Effective Date of the Modified Order. The CRTF will be an advisory group consisting of representatives from LADWP, the District, CSLC, State Historical Preservation Office, and Local Tribal Representatives. The CRTF may draw upon outside resources and experts, as needed, to aid the CRTF’s process. LADWP shall be responsible for paying the CRTF’s reasonable costs, including reimbursing CRTF members for reasonable travel expenses. The CRTF shall exist to make recommendations for the Initial Phase 7b Areas and any Additional Phase 7b Areas.
  - ii. The CRTF will be advisory in nature only, and the District and LADWP will each retain its final decision-making authority as to the treatment of ECR areas. The District reserves the right to issue a future order or orders requiring LADWP to install dust controls on Phase 7b areas and LADWP reserves the right to contest any such order or orders.
  - iii. The CRTF will initially make non-binding recommendations to the District Governing Board and LADWP on or before December 31, 2014, as to the best course of action and timing for the treatment of the Initial Phase 7b Areas, which could include whether particular areas should be permanently avoided, subject to Phase III cultural recovery, or subject to some less intensive form of cultural recovery to protect cultural resources in the Initial Phase 7b Areas. In making its recommendations, the CRTF shall give due consideration to the District’s and LADWP’s shared water saving and air pollution control goals.
  - iv. The CRTF shall also make non-binding recommendations to the District Governing Board and LADWP with respect to the treatment of the Additional Phase 7b Areas. In making its recommendations, the CRTF shall give due consideration to the District’s and LADWP’s shared water saving and air pollution control goals.
  - v. If, after considering the CRTF’s non-binding recommendations and input from LADWP, the District Governing Board exercises its discretion and orders LADWP to install dust controls in either the Initial Phase 7b Areas or in the Additional Phase 7b Areas, the District Governing Board will do so by issuing a new Board order or orders. The new Board order or orders shall include deadlines for constructing dust controls that accommodate project circumstances, including but not limited to, the time to complete a Phase III cultural resources recovery and perform additional environmental work required under CEQA to approve the new project. The new Board order or orders shall incorporate the provisions in paragraph 5 of the Original Abatement Order as amended by section I(a) and the Modified Abatement Order. In

- issuing the new Board order or orders, the District Governing Board will determine if any amendment to the 2008 SIP is necessary. LADWP is not waiving its right to contest the new Board order or orders.
- vi. Any future order or orders issued by the District for Phase 7b will give due consideration to the shared goal of the District and LADWP to control air pollution and decrease the use of water as a dust control measure at Owens Lake.
- d. **No Fines Imposed.** [*Corresponds to Term Sheet sections I.C.1.-I.C.2.*]
- i. The District shall not fine, issue fees or impose any other type of penalty upon LADWP with respect to any Phase 7a areas if LADWP constructs the dust controls in the Phase 7a areas within the modified time frames set forth in sections I(a)(i)-(ii), or any modified time frames resulting from sections I(a)(iii)-(iv).
- ii. The District shall not fine LADWP for any areas in the Initial Phase 7b Areas and the Additional Phase 7b Areas pursuant to the Original Abatement Order, this Agreement, and the Modified Abatement Order.
- e. **Other Abatement Order Modifications.** [*Corresponds to Term Sheet sections I.D.2.-I.D.4.*]
- i. The Modified Abatement Order shall reiterate that the District and LADWP shall make every effort to develop, approve and deploy high-confidence, waterless dust control measures in all areas where dust controls are ordered on Owens Lake.
- ii. The Modified Abatement Order shall state that the District's and LADWP's agreement to modify the Original Abatement Order shall not be construed as a waiver by either Party of any rights, remedies, legal theories or positions that either Party may choose to assert in any hearing, proceeding, tribunal or action now or in the future, except with respect to the particular subject matter contained in this Agreement and the Modified Abatement Order.
- iii. The date the District Governing Board adopts the Modified Abatement Order shall be the effective date upon which the necessary decision makers of LADWP, the City of Los Angeles, and District Governing Board agree to enter into this Agreement to modify the Original Abatement Order, the "**Effective Date.**"
- f. **BACM Clarifications.** [*Corresponds to Term Sheet sections I.E.1.-I.E.4.*]
- i. District hereby approves Reduced Thickness Gravel as a BACM. "Reduced Thickness Gravel is defined as per the 2008 Owens Valley PM10 State Implementation Plan except that the gravel thickness is reduced from a minimum of four inches (4") to two inches (2") and all reduced thickness gravel areas shall be underlain with geotextile fabric. All geotextile fabric shall be Class I woven or nonwoven geotextile

fabric meeting the minimum specifications set forth in the National Standard Materials Specification “Material Specification 592—Geotextile” (National Engineering Handbook, Chapter 3, Part 642), or equivalent.

- ii. The District hereby approves Brine Shallow Flooding BACM as a subcategory of Shallow Flooding BACM. District and LADWP acknowledge and agree that the foregoing approval of Brine Shallow Flooding BACM shall not make LADWP liable for maintenance of the natural Brine Pool on Owens Lake. The existing “Brine Pool” is defined as those areas at Owens Lake below elevation 3,553.55 feet.
- iii. The District shall work with LADWP on accelerated testing schedules and BACM approval, if warranted, for Roughness Elements and Tillage in soil type areas where these controls can be applied. Within 30 days of the Effective Date of the Modified Abatement Order, the District and LADWP shall agree upon accelerated testing schedules for the candidate Roughness Elements and Tillage BACMs in soil types where these controls can be applied. The schedules shall include the District Governing Board’s consideration of BACM approval of these candidate measures within one year of completion of the schedule (within 13 months of the Effective Date of the Modified Abatement Order). If the accelerated testing does not result in approved BACM for the candidate measures, the District’s and LADWP’s respective Boards shall jointly assess why the accelerated testing did not result in the District Board’s BACM approval. The District and LADWP shall also work on accelerated testing schedules and BACM approvals for other forms of BACM.
- iv. The District shall memorialize its approvals set forth in sections I(f)(i)-(ii), and any future approvals pursuant to section I(f)(iii), in formal District Board resolutions and orders, including but not limited to, modifications to the 2008 SIP and Board Order 080128-01. The District and LADWP shall jointly apply to CSLC for approval to use new BACMs promptly upon their approval by the District and, with respect to the approvals set forth in Sections I(f)(i)-(ii), within 90 days of the Effective Date of the Modified Abatement Order.

## II. KEELER DUNES.

- a. Keeler Dunes Dust Control Project. [Corresponds to Term Sheet sections II.A.1.-II.A.4.]
  - i. LADWP shall provide ten million dollars (\$10,000,000) to the District as a public benefit contribution to support the District’s “**Keeler Project**” (as defined in section II(a)(ii)) to control PM10 emissions from the Keeler Dunes. LADWP shall tender the \$10,000,000 in one single payment to the District within 90 days after: (1) the date of approval of the Modified Abatement Order, which is also the Effective Date of this Agreement that includes the “**Keeler and Other Dunes Release**” defined in section II(b); and (2) the District Governing Board approves amendments to the 2008 SIP and Board Order 080128-01, and such amendments are submitted to the California Air Resources Board (“**CARB**”) pursuant to section II(b)(iii). The Keeler and Other

Dunes Release in this Agreement shall not be effective until the District receives the \$10,000,000 contribution.

- ii. The District shall use the \$10,000,000 for environmental impact analysis, design, permitting, construction, operation, maintenance, management, monitoring and directly-related activities for a dust emission control project at Keeler Dunes (the “**Keeler Project**”), including work previously conducted by the District in connection with the Keeler Project that was funded by Owens Lake Trust Fund monies. The District shall not seek from LADWP any reimbursement of Owens Lake Trust Fund monies used to pay for work conducted in connection with the Keeler Project through future SB 270 assessments or otherwise. No portion of the \$10,000,000 shall be used to pay for the District’s attorneys’ fees, public affairs or governmental relations (collectively, “**Public Affairs**”) or contractors or subcontractors for Public Affairs. The Keeler Project includes all those portions of the Keeler Dunes owned by LADWP and the United States Bureau of Land Management (“**BLM**”). The District shall have exclusive authority over, and responsibility for, the Keeler Project. LADWP shall have no responsibility for the design, permitting, construction, operation, maintenance, management, monitoring and any other activities directly and exclusively related to the Keeler Project for as long as dust controls are required.
- iii. Upon the effective date of the Keeler and Other Dunes Release pursuant to section II(b) of this Agreement, and the 2008 SIP and Board Order 080128-01 amendments submittal to CARB as described in section II(b)(iii) of this Agreement, LADWP will immediately provide the District access to its property in the Keeler Dunes area in order for the District to complete the environmental impact analyses and for all design, permitting, construction, operation, maintenance, management, monitoring and activities directly and exclusively related to the Keeler Project. So long as access is provided by LADWP, the District shall indemnify in perpetuity, defend and hold the City of Los Angeles and LADWP harmless for personal injuries caused by the negligence or willful misconduct of the District with respect to all activities undertaken by the District and its employees, agents and contractors on LADWP’s property, except that the District shall not be required to repair any alteration of the property that is part of or related to the design or implementation of the dust control measures for the Keeler Project. Any dust monitoring undertaken by the District on LADWP’s Keeler Dunes property shall exclusively be for the Keeler Project and shall not be used for any other purpose.
- iv. LADWP, at its sole cost and expense, shall have the right (without obligation) to audit the District’s books and records on an annual basis to verify that the \$10,000,000 contributed by LADWP has been exclusively used to fund the Keeler Project in accordance with this Agreement, which includes the Keeler Dunes and Other Dunes Release, the Modified Abatement Order, the amended 2008 SIP and Board Order 080128-01, and any other document memorializing Term Sheet, and for

no other purpose. The District shall fully co-operate with any annual audit of the Keeler Project initiated by LADWP.

- b. **District's Release of the City/LADWP for Keeler and Other Dunes Areas.** [*Corresponds to Term Sheet sections II.B.1.-II.B.4.*] The following Keeler and Other Dunes Release shall apply to the City of Los Angeles and LADWP and shall become effective upon the date the Modified Abatement Order is adopted and after the District has received the \$10,000,000 contribution from LADWP:
- i. Release for Keeler Dunes: The District forever releases LADWP from any and all liability under any and all federal, state and local laws that the District can enforce and settle, including but not limited to the Health and Safety Code, those portions of the 2008 SIP that can be enforced by the District, and fugitive dust emission rules, for dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of the Keeler Dunes owned by LADWP. The District forever agrees not to request, encourage, or join in an enforcement action by any other agency against LADWP related to dust emissions from the Keeler Dunes, regardless of origin, including but not limited to portions of the Keeler Dunes owned by LADWP. A map defining the geographical boundaries of the Keeler Dunes is attached as Exhibit 2 and incorporated into this Agreement.
  - ii. Release for Swansea and Olancho Dunes (collectively these dunes are defined as the "**Other Dunes Areas**"): The District forever releases LADWP from any and all liability under any and all federal, state, and local laws that the District can enforce and settle, including but not limited to the Health and Safety Code, those portions of the 2008 SIP that can be enforced by the District, and fugitive dust emission rules, for dust emissions from the Other Dunes Areas in the vicinity of Owens Lake, regardless of origin, including but not limited to portions of the Other Dunes Areas that may be owned by LADWP. The District forever agrees not to request, encourage, or join in an enforcement action by any other agency against LADWP related to dust emissions from the Other Dunes Areas in the vicinity of Owens Lake, regardless of origin. This Agreement does not release LADWP from liability for dust emissions resulting from any future groundwater pumping by LADWP at or below the 3600-foot contour in the Owens Lake area. Maps defining the geographical boundaries of the Other Dunes Areas is attached as Exhibit 2 and incorporated into this Agreement.
  - iii. 2008 SIP and Board Order 080128-01 Amendments: The District shall amend the 2008 SIP and Board Order 080128-01 consistent with the terms of this Agreement, including the Keeler and Other Dunes Release as defined in sections II(b)(i)-(ii), and shall request the United States Environmental Protection Agency ("**EPA**") and CARB to approve the amended SIP.
  - iv. LADWP reserves the right to contest and defend any alleged violations not encompassed in the Keeler and Other Dunes Release, including but not limited to, the right to contest and defend any alleged violations of Rule 401, or alleged liability

or violations of Health and Safety Code section 42316 below the 3600-foot elevation and above the 3600-foot elevation in those areas outside the Keeler Dunes and Other Dunes Areas. The District reserves the right to assert that any such defenses are barred or otherwise not legally supported.

- v. Upon the Effective Date of this Agreement, the District shall hold no hearings regarding LADWP's liability/responsibility for dust emissions from the Keeler Dunes or from the Other Dunes Areas.

III. **GENERAL SETTLEMENT CONDITIONS.** [*Corresponds to Term Sheet sections III.A.-III.E.*]

a. **Approval by District Board, LADWP Board, and City of Los Angeles.**

- i. All settlement terms and other matters contained in this Agreement (which includes the Keeler and Other Dunes Release) and the Modified Abatement Order shall be subject to final approval by the LADWP Board of Water and Power Commissioners and all other necessary decision makers at the City of Los Angeles.
- ii. All settlement terms and other matters contained in this Agreement (which includes the Keeler and Other Dunes Release) and the Modified Abatement Order shall be subject to approval of the District Governing Board and shall be memorialized in the District Governing Board's approval of the Modified Abatement Order and other appropriate District Board resolutions and orders, including modifications to the 2008 SIP, if required, and Board orders, including Order 080128-01.

b. **Binding Effect.** The provisions of this Agreement shall be binding upon and inure to the benefit of the Parties. There are no third-party beneficiaries to this Agreement.

c. **Representations.** The Parties represent that on and as of the date of this Agreement, they have full capacity, right, power and authority to execute, deliver and perform under this Agreement. The individuals signing this Agreement are duly authorized to sign the same on the Parties' behalves and to bind the Parties thereto. This Agreement is and shall be binding upon and enforceable against the Parties in accordance with its respective terms.

d. **Integration.** This Agreement is intended by the Parties to memorialize the terms in the Term Sheet, which is attached as Exhibit 3 to this Agreement, and to be the final expression of their agreement with respect to the subject matter of this Agreement and the complete and exclusive statement of the terms of this Agreement between the Parties, and supersedes any prior understandings between the Parties, whether oral or written.

e. **Interpretation.** In all cases, the language in all parts of this Agreement shall be construed simply, according to its fair meaning and not strictly for or against any Party, with the view of preserving and protecting the intent and purposes of the Agreement, it

being agreed that the Parties or their agents have all participated in the preparation of this Agreement.

- f. **Governing Law.** The Parties agree that this Agreement is made, executed and entered into, and is intended to be formed within the State of California and that this Agreement is to be interpreted and enforced under the laws of the State of California. Any federal law claims shall be interpreted and enforced under federal law.
- g. **Counterparts.** This Agreement may be executed in two or more identical counterparts, each of which shall be deemed to be an original and each of which shall be deemed to be one and the same instrument when each Party signs each such counterpart.
- h. **Recitals.** Each of the Recitals is incorporated into this Agreement.
- i. **Definitions; Attachments.** Capitalized terms used herein shall have the respective meanings specified in the text of this Agreement. Unless otherwise indicated, references in this Agreement to sections, paragraphs, clauses, exhibits, attachments and schedules are those contained in or attached to this Agreement and all exhibits and schedules referenced herein are incorporated herein by this reference as though fully set forth in this Agreement.
- j. **Parties.** All references to the Parties shall include all officials, officers, personnel, employees, agents, assigns, and subcontractors of the Parties.

*“Great Basin Unified Air Pollution Control District”*

Dated: \_\_\_\_\_

By: \_\_\_\_\_

*Governing Board Chair*

APPROVED AS TO LEGAL FORM:

By: \_\_\_\_\_

District Counsel

*“Los Angeles Department of Water and Power”*

*Dated:* \_\_\_\_\_

*By:* \_\_\_\_\_

*Board of Commissioners Chair*

APPROVED AS TO LEGAL FORM:

By: \_\_\_\_\_

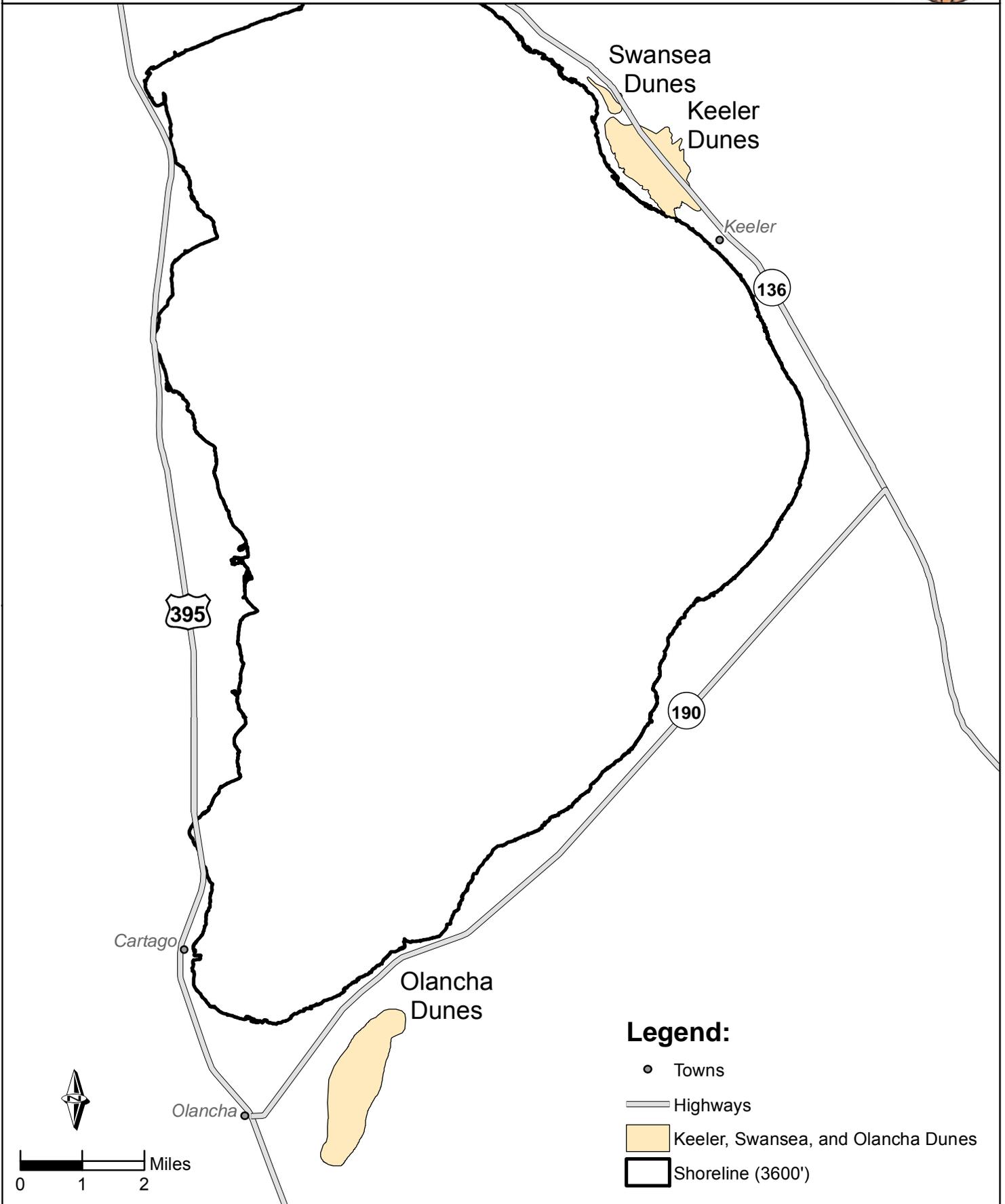
City Attorney

**List of Exhibits**

- Exhibit 1      **CONFIDENTIAL** – Maps of Initial Phase 7b areas (X Pages)
- Exhibit 2      Maps of the Keeler and Other Dunes Areas (3 pages)
- Exhibit 3      Term Sheet Term Sheet approved by the LADWP Board of Commissioners on June 26, 2013, and the District Governing Board on June 27, 2013



# Keeler, Swansea, and Olancha Dunes



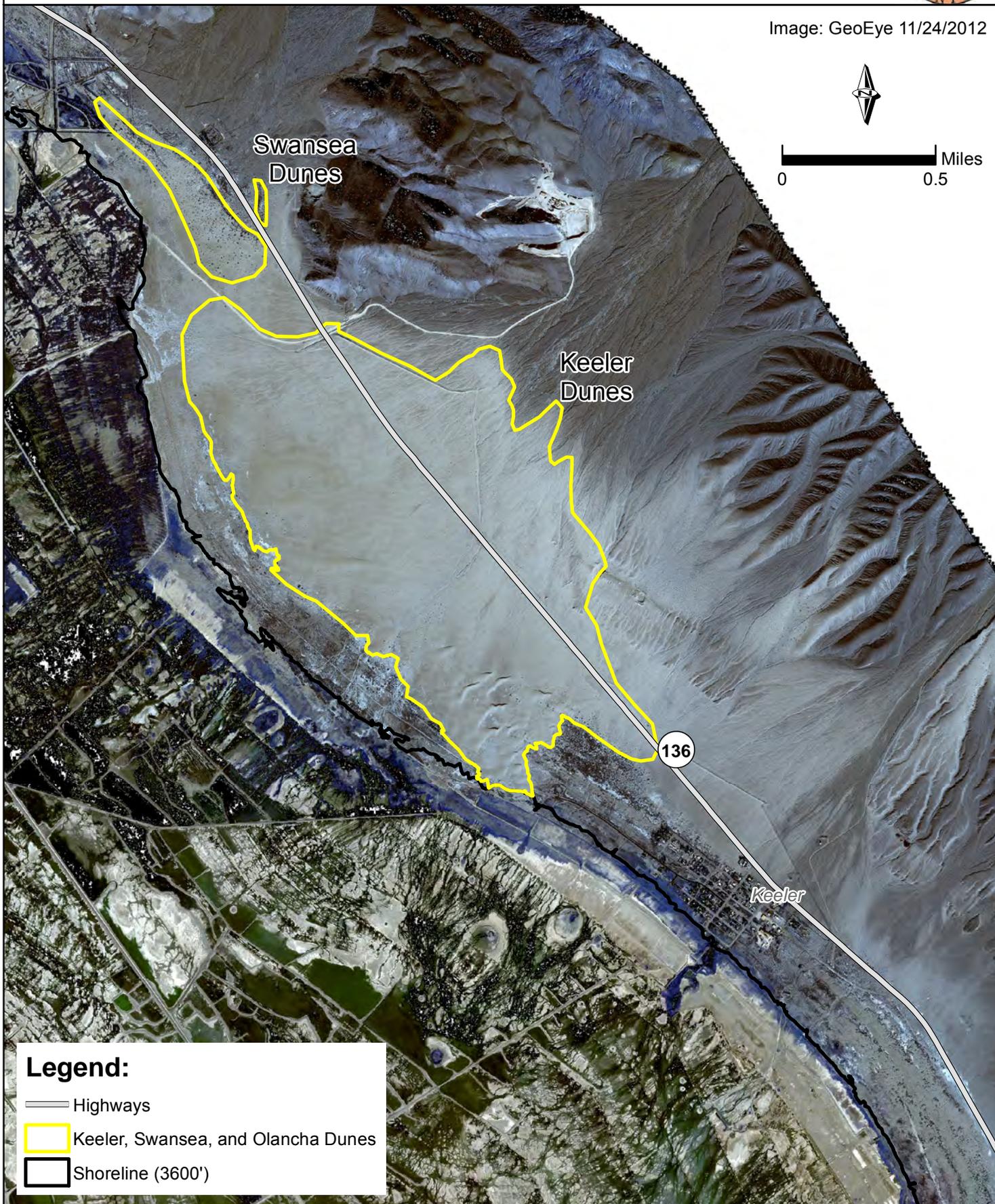


# Keeler and Swansea Dunes - Detail

Image: GeoEye 11/24/2012



0 0.5 Miles

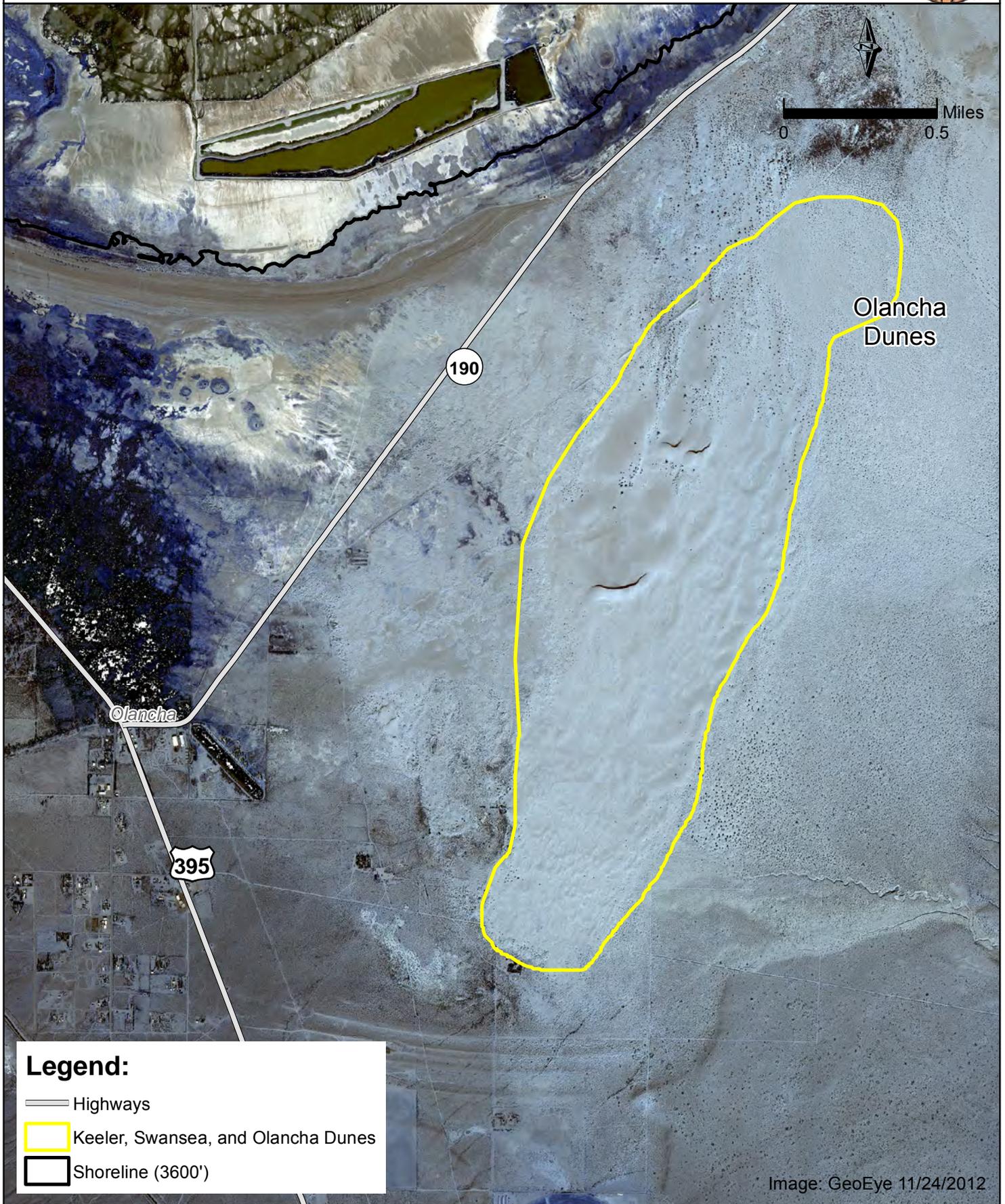


### Legend:

- Highways
- Keeler, Swansea, and Olancha Dunes
- Shoreline (3600')



# Olancha Dunes - Detail



**GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT  
AND  
LOS ANGELES DEPARTMENT OF WATER AND POWER**

**PHASE 7a AND KEELER DUNES  
SETTLEMENT TERMS  
JUNE 25, 2013**

The following constitutes the Settlement Terms (the “Terms”) for the Phase 7a Stipulated Order for Abatement (SOA) and Keeler Dunes issues between the Great Basin Governing Board (GB) and the Los Angeles Department of Water and Power (LADWP):

**I. MODIFICATION OF SOA**

A. GB and LADWP agree that GB shall modify the Phase 7a SOA to do the following:

1. Deadline Extensions

- a) Existing December 31, 2013 deadline for all infrastructure for BACM and compliant operation (other than Managed Vegetation Compliance) to be installed and fully operational extended to December 31, 2015.
- b) Existing December 31, 2015 deadline for Managed Vegetation Controls (fully compliant managed vegetation cover) extended to December 31, 2017.

2. Assumptions for Extension of Deadlines

- a) Timely Availability of necessary leases from State Lands and of necessary permits from other agencies

- b) Acceptance by GB of 328 acres of Eligible Cultural Resource (ECR) areas. ECR areas are defined as California Register of Historical Resources (CRHR)-eligible areas plus necessary buffer areas and are to be removed from Phase 7a and placed into Phase 7b (see below) and potentially the subject of a new future Board order. A confidential map of the existing 328-acre ECR areas shall be attached to the amended SOA.
- c) Force majeure process of original SOA to be followed for newly discovered potential ECRs.

#### B. Creation of Phase 7b

1. Phase 7b would be created for the treatment of the 328 acres of ECR areas plus any newly discovered cultural resources within Phase 7a that are determined by LADWP's state certified archaeologist to be CRHR-eligible and necessary buffer areas (the "Additional Phase 7b Areas") and whose determination is confirmed by a second, state certified archaeologist mutually agreeable to GB, LADWP and State Lands (the "Second Archaeologist").
2. Initially Phase 7b would include 328 acres of previously identified ECR areas from Phase 7a (the "Initial Phase 7b Areas").
3. Any areas in Phase 7a (beyond the Initial Phase 7b Areas ) where ECRs are located during Phase 7a construction shall be handled as part of Phase 7b (the "Additional Phase 7b Areas"). Promptly upon discovery of any cultural resources during the Phase 7a construction process, LADWP shall promptly notify GB of, and confer with GB about, such discovery, and LADWP's state certified archeologist shall fulfill their legal obligations relative to assessing and making recommendations for cultural resources. LADWP's state certified archaeologist shall be responsible for evaluating whether any newly discovered cultural resource areas within Phase 7a are CRHR-eligible, and if so, the additional buffer areas necessary to address disturbance of the

CRHR eligible areas; such evaluations shall be confirmed by the Second Archaeologist. Newly identified CRHR eligible areas and necessary buffer areas shall become ECR areas and become part of the Additional Phase 7b Areas.

#### 4. Cultural Resource Task Force

- a) The amended SOA will establish a Cultural Resource Task Force (CRTF). The CRTF will be an advisory group consisting of LADWP, GB, State Lands, State Historical Preservation Office, and Local Tribal Representatives. The CRTF shall be able to draw upon outside resources and experts, as needed, to aid the CRTF's process. LADWP shall be responsible for paying the reasonable costs of the CRTF, including reimbursements for travel expenses of CRTF members.
- b) The CRTF will initially be charged to make recommendations to GB and LADWP as to the best course of action and timing for the treatment of the Initial Phase 7b Areas. Such treatment could include whether particular areas should be permanently avoided, subject to Phase III cultural recovery or subject to some less intensive form of cultural recovery to protect cultural resources in the Initial Phase 7b Areas. The CRTF will make non-binding recommendations to the GB Governing Board and LADWP regarding treatment of the Initial Phase 7b Areas on or before December 31, 2014. LADWP and GB shall commit to form the CRTF and host its initial meeting within ninety (90) days after the effective date of the amended SOA.
- c) The CRTF shall also make non-binding recommendations to GB and LADWP with respect to the treatment of ECRs that may become part of the Additional Phase 7b Areas. After making its recommendations for the Initial Phase 7b Areas, the CRTF shall remain in existence to make recommendations for any Additional Phase 7b Areas that may be designated ECRs by LADWP's state certified archaeologist and confirmed by the Second Archaeologist.

- d) If after considering the non-binding recommendations of the CRTF, GB exercises its discretion to order LADWP to install dust controls in either the Initial Phase 7b Areas or in the Additional Phase 7b Areas, GB will issue a new Board order or orders after receiving input from LADWP and will determine if any SIP amendment is necessary. The new Board order or orders shall include control completion deadlines that take into account project circumstances, including but not limited to, recovery and additional environmental work necessary to complete the project at issue. The new Board order or orders shall recognize that the construction period shall be subject to all time-extensions-for-cause provisions of Paragraphs 5 and 6 of the SOA.
- e) Like the SOA for Phase 7a, any future order or orders issued by GB pertaining to Phase 7b will give due consideration to the shared goals of GB and LADWP to control air pollution and decrease the use of water for dust control at Owens Lake. In making its recommendations, the CRTF will also give due consideration to GB's and LADWP's shared water saving and air pollution control goals.
- f) The CRTF will be advisory in nature only, and GB and LADWP will retain final determination as to the treatment of ECR areas. GB reserves the right to issue a future order or orders requiring LADWP to install dust controls on Phase 7b areas and LADWP reserves the right to contest any such order.
- g) Permanent avoidance of any portion of the Phase 7b Areas will be considered by GB, which, upon approval, shall amend the 2008 SIP and Board Order 080128-01 in order to get USEPA approval.

### C. No Fines

1. GB shall not fine, issue fees or impose any other type of penalty upon LADWP with respect to any areas of Phase 7a, provided that the Phase 7a dust controls are put into place within the time frames set forth in Section I.A.1.

2. GB shall not fine LADWP for any areas in the Initial Phase 7b Areas and the Additional Phase 7b Areas pursuant to the SOA and this agreement.

D. Modification of SOA

1. The amended SOA shall clarify that the discovery of any cultural resources that are determined by LADWP's state-certified archeologist to be potentially CRHR-eligible shall be included in the SOA's existing time-extensions-for-cause, as set forth in SOA Paragraphs 5 and 6.
2. The amended SOA shall reiterate that GB and LADWP shall make every effort to develop, approve and deploy high-confidence waterless dust control measures in all areas where dust controls are ordered.
3. The amended SOA shall state that the modification of the SOA by GB and LADWP shall not be construed as a waiver by either party of any rights, remedies, legal theories or positions that either party may choose to assert in any hearing, proceeding, tribunal or action now or in the future except with respect to the particular subject matter contained in the amended SOA and the Keeler and Other Dunes Release".<sup>1</sup>
4. The effective date of the amended SOA shall be the date upon which the necessary decision makers of the City of Los Angeles and the GB Governing Board agree to enter into this agreement to modify the SOA.

E. Clarification on BACM

1. GB hereby approves Reduced Thickness Gravel BACM (2 inches of gravel with geotextile fabric underlay).

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<sup>1</sup> LADWP disputes the legality of and does not agree to the Supplemental Control Requirements Determination (SCRD) process. GB asserts that LADWP agreed to the SCRD process in the original Phase 7a SOA and elsewhere, and the SCRD process is now the law. GB and LADWP have a continuing disagreement on this point.

2. GB hereby approves Brine Shallow Flooding BACM as a subcategory of Shallow Flooding BACM. GB and LADWP acknowledge and agree that the foregoing approval of Brine Shallow Flooding BACM shall not make LADWP liable for maintenance of the natural Brine Pool on Owens Lake. "Brine Pool" is defined as those areas below elevation 3,553.55 feet.
3. GB will commit to work with the LADWP on an accelerated testing schedules and BACM approval, if warranted, for Roughness Elements and Tillage in soil type areas where these controls can be applied. Within 30 days of the effective date of the amended SOA, GB and LADWP shall agree upon accelerated testing schedules for the candidate Roughness Elements and Tillage BACMs in soil types where these control can be applied. Said schedules will include consideration for BACM approval of these candidate measures by the GB Board within one year of completion of the schedules (within 13 months of the effective date of the amended SOA). If the accelerated testing does not result in approved BACM designation for the candidate measures, LADWP and the GB Board will jointly assess why the accelerated testing did not result in BACM approvals. GB and LADWP also will commit to work on accelerated testing schedules and BACM approvals for other forms of BACM.
4. GB will memorialize its approvals set forth in Sections I E. (1) and (2) and any future approvals pursuant to Section I E. (3) in formal GB board resolutions and orders. GB and LADWP will jointly appeal to State Lands to approve use of new BACMs promptly upon their approval by GB and, with respect to the approvals set forth in Sections I E. (1) and (2) within 90 days of the effective date of the amended SOA.

## II. KEELER DUNES

### A. Keeler Dunes Dust Control Project

1. LADWP shall provide \$10 Million to GB as a public benefit contribution to and will support GB's "Keeler Project" (as defined herein below) to control PM10 emissions from the Keeler Dunes. LADWP shall tender the \$10 Million in a single payment to GB within 90 days after the effective date of the amended SOA and the following two actions are completed: 1) delivery to LADWP of the "Keeler and Other Dunes Release" (defined herein below) and 2) the submittal to the California Air Resources Board (CARB) as described in Paragraph II.B.1.c., below. The "Keeler and Other Dunes Release" shall not be effective until GB receives the \$10 Million payment.
2. GB shall use the funds for environmental impact analysis, design, permitting, construction, operation, maintenance, management, monitoring and directly related activities for a dust emission control project at Keeler Dunes (the "Keeler Project"). No funds shall be used for the purpose of attorney fees, public affairs or governmental relations (collectively, "Public Affairs") or contractors or subcontractors for Public Affairs. The Keeler Project includes all those portions of the Keeler Dunes owned by LADWP and BLM. GB shall have exclusive authority over, and responsibility for, the Keeler Project. LADWP shall have no responsibility for the design, permitting, construction, operation, maintenance, management, monitoring and other activities directly and exclusively related to the Keeler Project for as long as dust controls are required.
3. Upon delivery of the "Keeler and Other Dunes Release" (defined herein below) and the SIP and Board Order 080128-01 amendment submittal to the CARB as described in Paragraph II.B.1.c., below, LADWP will immediately provide GB with access to its property in the Keeler Dunes area in order to complete environmental impact analyses and for all design, permitting, construction, operation, maintenance, management, monitoring and activities directly and exclusively related to the Keeler

Project. So long as such access is provided by LADWP, GB shall indemnify in perpetuity, defend and hold LADWP (and the City of LA) harmless for personal injuries caused by the negligence or willful misconduct of GB with respect to all activities undertaken by GB and its employees, agents and contractors on LADWP's property and GB shall promptly repair any damage to LADWP's property caused by GB's activities on LADWP's property except that GB shall not be required to repair any alteration of the property that is part of or related to the design or implementation of the dust control measures for the Keeler Project. Any dust monitoring undertaken by GB on LADWP's Keeler Dunes property shall exclusively be for the Keeler Project and shall not be used for any other purpose.

4. LADWP, at its sole cost and expense, shall have the right (without obligation) to audit GB's books and records on an annual basis to verify that the \$10 Million contributed by LADWP has been exclusively used to fund the Keeler Project in accordance with the amended SOA, the amended SIP, the Keeler and Other Dunes Release and any other document memorializing the Terms, and for no other purpose. GB shall fully co-operate with any annual audit of the Keeler Project initiated by LADWP.

B. Release of LADWP/LA City for Keeler and Other Dunes Areas

1. Upon the effective date of the amended SOA, GB shall deliver to LADWP a release (the "Keeler and Other Dunes Areas Release") as follows:
  - a) Release for Keeler Dunes:

GB forever releases LADWP from any and all liability under any and all federal, state and local laws that GB can enforce and settle, including but not limited to the Health and Safety Code, those portions of the SIP that can be enforced by GB, and fugitive dust emissions rules, for dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of Keeler Dunes owned by LADWP. GB forever agrees not to request, encourage or join in an enforcement

action by any other agency against LADWP related to dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of the Keeler Dunes owned by LADWP. A map defining the geographical boundaries of the Keeler Dunes is attached and incorporated into this agreement.

- b) Release for Swansea and Olancho Dunes (collectively these dunes are defined as the Other Dunes Areas):

GB forever releases LADWP from any and all liability under any and all federal, state and local laws that GB can enforce and settle, including but not limited to the Health and Safety Code, those portions of the SIP that can be enforced by GB, and fugitive dust emissions rules, for dust emissions, regardless of origin, from the Other Dunes Areas in the vicinity of Owens Lake, including but not limited to portions of such dunes that may be owned by LADWP. GB forever agrees not to request, encourage or join in an enforcement action by any other agency against LADWP related to dust emissions, regardless of origin, from the Other Dunes Areas in the vicinity of Owens Lake. This agreement does not release LADWP from liability for dust emissions resulting from any future groundwater pumping by LADWP at or below the 3600-foot contour in the Owens Lake area. Maps defining the geographical boundaries of the Other Dunes Areas in the vicinity of Owens Lake are attached and incorporated into this agreement.

- c) SIP and Board Order Amendment:

Great Basin shall amend the SIP and Board Order 080128-01 consistent with the terms of this agreement and the “Keeler and Other Dunes Areas Release” and shall request the USEPA and CARB to approve the amended SIP.

2. LADWP reserves the right to contest and defend any alleged violations not covered by the releases herein, including but not limited to the right to contest and defend any alleged violations of Rule 401, or alleged violations of H&S 42316 below the 3600-foot elevation and above the 3600-foot elevation in those areas outside the Keeler

Dunes and Other Dunes Areas. GB reserves the right to assert that any such defenses are barred or otherwise not legally supported.

3. After the date of this agreement, GB shall hold no hearings regarding LADWP's liability/responsibility for dust emissions from the Keeler Dunes or from the Other Dunes Areas.

### **III. GENERAL SETTLEMENT CONDITIONS**

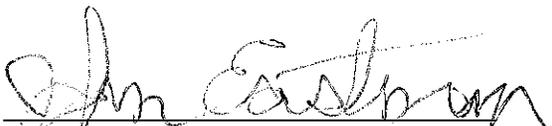
- A. All Settlements and other matters contained in the amended SOA and Keeler Release shall be subject to final approval by LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles.
- B. All Settlements and other matters contained in the amended SOA and Keeler Release shall be subject to approval of GB Board and shall be memorialized in GB Board modification of SOA and appropriate GB resolutions, the 2008 SIP, if required, and Board orders.
- C. GB and LADWP shall memorialize the Terms in formal settlement documents, including the amended SOA, the Keeler Release and the Other Dunes Area Release, within 30 days after approval of the Terms by the GB Board and by the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles. Prior to such approvals and until such time that public disclosure is mandated by law, GB and LADWP shall not disclose the Terms or the existence and content of the SOA Mediation and shall keep the Terms confidential.
- D. Once the Terms are fully approved by the GB Board and by the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles, GB and LADWP shall issue a joint press release to announce the successful conclusion of the SOA Mediation, the Terms, the amended SOA and the Keeler Release.

- E. The parties to the SOA Mediation shall each execute a copy of this document to evidence that it contains the final and complete statement of the Terms resulting from the SOA Mediation that will be submitted for approval to the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles and to the GB Board.
  
- F. Prior to the public announcement of this Agreement, LADWP and GB will develop a mutually agreeable joint communication, which announces and explains this Agreement. The Parties agree not to disclose or divulge the content and substance of the Settlement Terms to any third parties, including, but not limited to members of the press or media, unless and until LADWP and the District have approved a final settlement. The confidentiality requirements do not extend to the undersigned participants' discussions with their respective party's legal counsel and governing boards, regarding the settlement meetings.

In witness thereof, the parties hereto have set their hands to this agreement on June 27, 2013.

Great Basin Unified  
Air Pollution Control District

Los Angeles  
Department of Water and Power

By: 

By: 

Name: John Eastman

Name: RONALD O. NICHOLS

Title: Governing Board Chair

Title: General Manager

Date: June 27, 2013

Date: 7/25/13

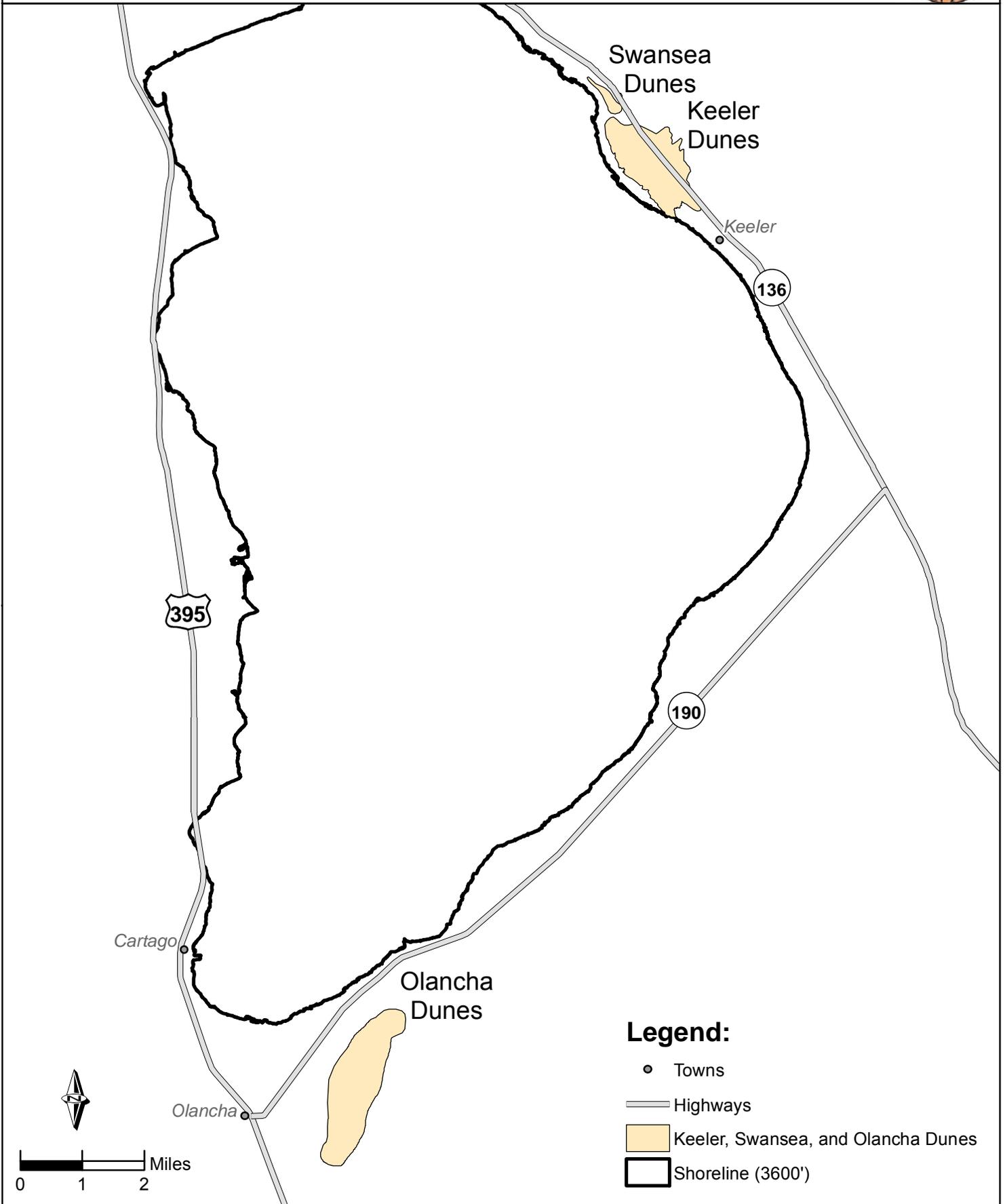
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APPROVED AS TO FORM AND LEGALITY  
CARMEN A. TRUTANICH, CITY ATTORNEY

JUL 22 2013  
  
MICHELLE LYMAN  
DEPUTY CITY ATTORNEY



# Keeler, Swansea, and Olancha Dunes



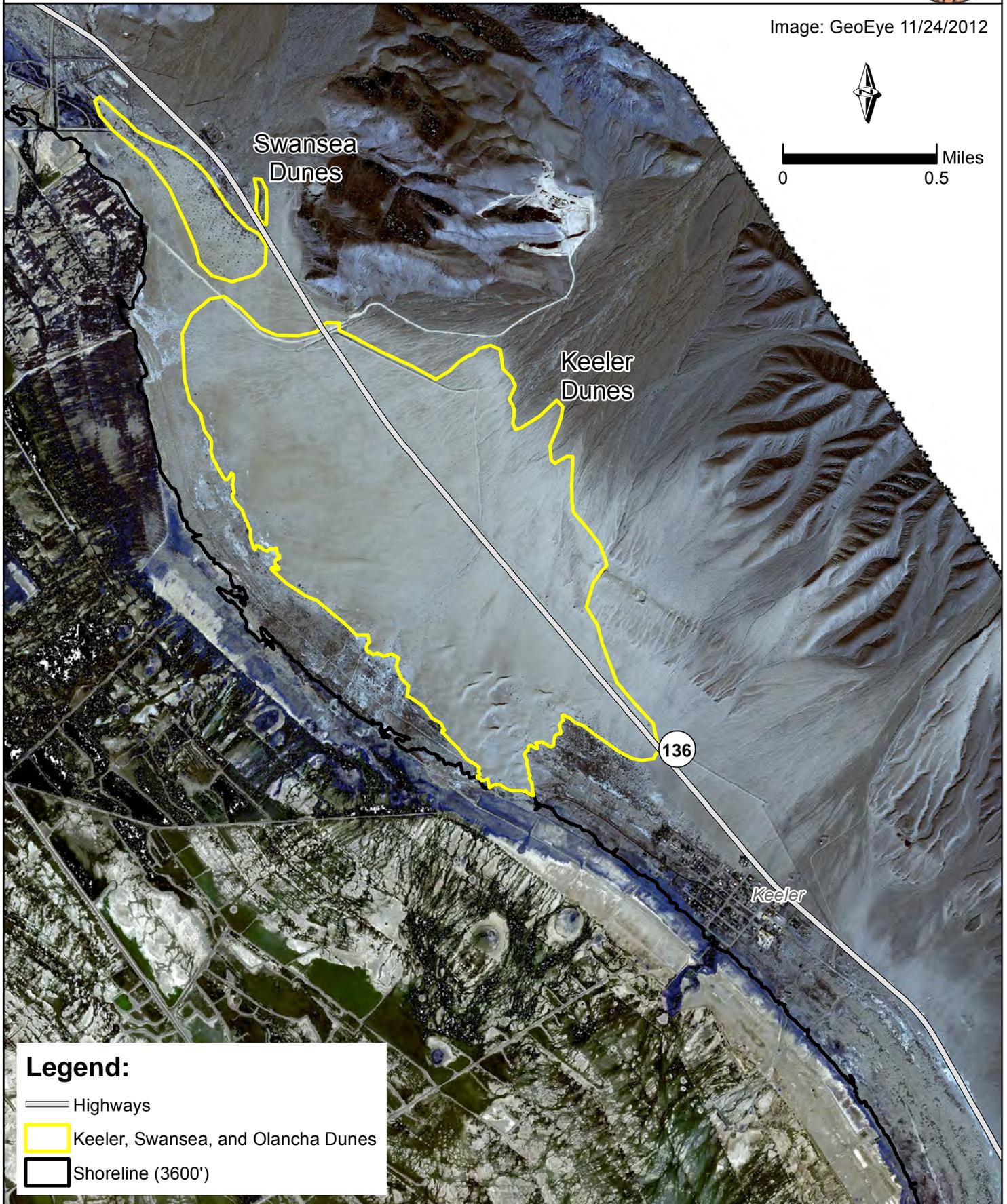


# Keeler and Swansea Dunes - Detail

Image: GeoEye 11/24/2012



0 0.5 Miles

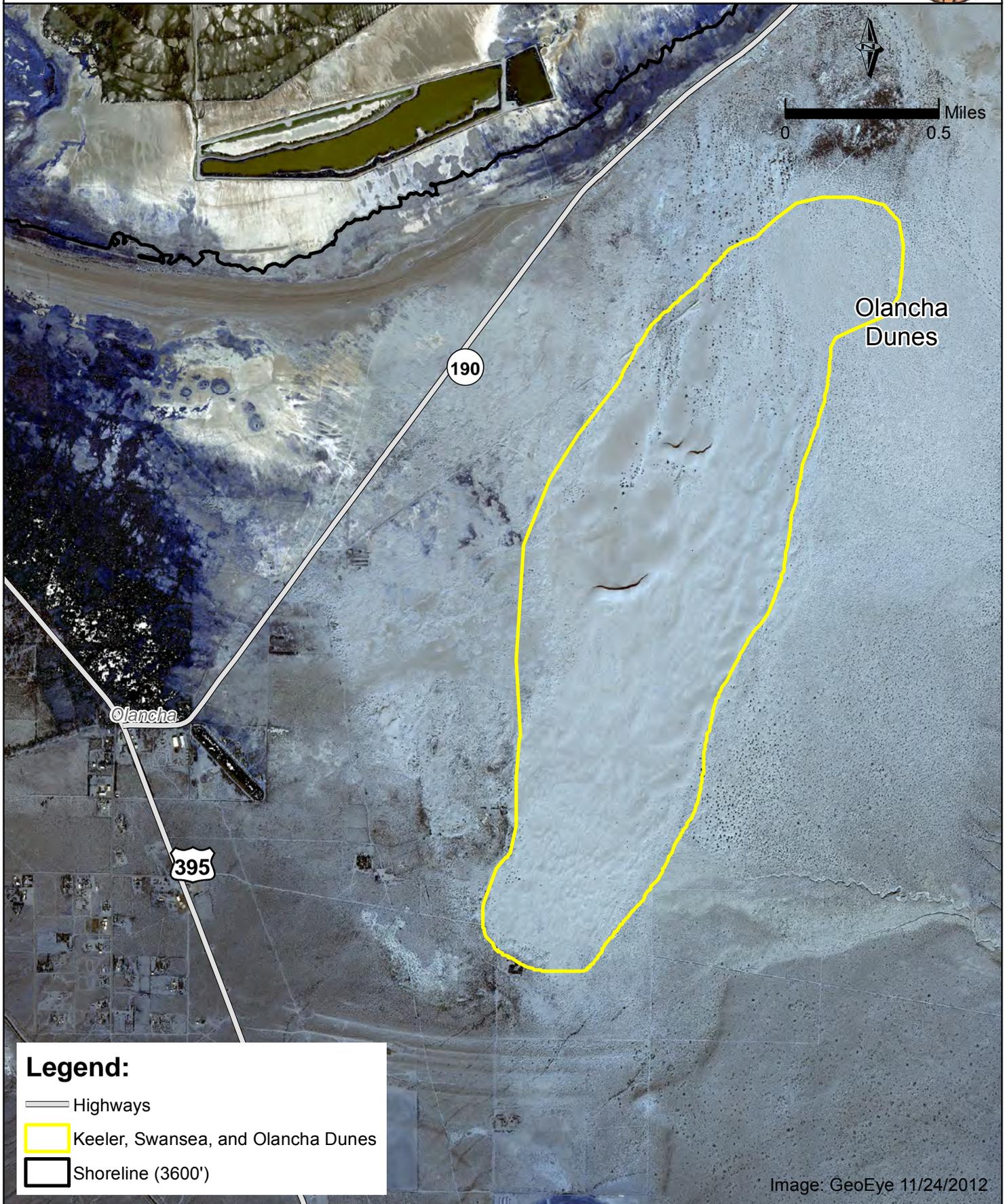


### Legend:

-  Highways
-  Keeler, Swansea, and Olancha Dunes
-  Shoreline (3600')



# Olancha Dunes - Detail



# ***Great Basin Unified Air Pollution Control District***

2013 Amendment to the Owens Valley PM<sub>10</sub> SIP

## **Board Order 130916-01**

Exhibit 6: District Governing Board Order Number  
130819-01 – Findings and Decision of District Governing  
board Upon Hearing for Stipulated Order for Abatement  
110317-01, dated August 19, 2013

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BEFORE THE GOVERNING BOARD OF THE  
GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

<p>In the Matter of Joint Petition and Stipulation to Modify District Governing Board Order No. 110317-01</p> <p><b>THEODORE D. SCHADE</b> AIR POLLUTION CONTROL OFFICER GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT,</p> <p>vs.</p> <p><b>CITY OF LOS ANGELES DEPARTMENT OF WATER AND POWER</b></p>	<p>Order Number 130819-01</p> <p>FINDINGS AND DECISION OF DISTRICT GOVERNING BOARD UPON HEARING FOR STIPULATED MODIFICATION TO STIPULATED ORDER FOR ABATEMENT 110317-01</p> <p>Hearing Date: August 19, 2013 Location: Bishop, California</p>
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**FINDINGS AND DECISION OF THE GOVERNING BOARD**

A joint petition from the Great Basin Unified Air Pollution Control District’s (“District”) Air Pollution Control Officer (“APCO”) and the City of Los Angeles by and through its Department of Water and Power (“LADWP”) was heard on August 19, 2013, pursuant to notice and in accordance with the provisions of California Health and Safety Code sections 40823 and 42450, District Rule 811, paragraph 22 of the Order 110317-01. Seven members of District Governing Board were present: Board Chair John Eastman, Board Vice-Chair Ron Hames, Linda Arcularius, Matt Kingsley, Larry Johnston, Byng Hunt, and Mary Rawson. The District Governing Board was represented by George Poppic of the California Air Resources Board. Co-Petitioner, Theodore D. Schade, APCO, was represented by Peter Hsiao of the law firm Morrison and Foerster. Co-Petitioner, LADWP was represented by Michelle Lyman, Deputy City Attorney for the City of Los Angeles. The public was given an opportunity to testify. The matter was submitted and evidence received including, but not limited to, the Original Stipulated Order for Abatement (Exhibit 1), LADWP’s Petition with all

1 attachments to the District Governing Board to modify Order 110317-01 submitted to the  
2 District on June 14, 2013 (Exhibit 2), the Term Sheet approved by the LADWP Board of  
3 Commissioners on June 26, 2013, and the District Governing Board on June 27, 2013 (Exhibit  
4 3), the District Board Report for the June 27, 2013 special meeting (Exhibit 4), and the  
5 Settlement Agreement and Release (Exhibit 5), a confidential map of the 277-acre Initial  
6 Eligible Cultural Resources Area (Exhibit 6), and a map of Phase 7a Modified Areas and Phase  
7 7a Transition Areas (Exhibit 7). The District Governing Board finds, concludes, and orders as  
8 follows:

9 **FINDINGS OF FACT**

10 1. Co-Petitioner APCO is authorized and empowered pursuant to Division 26, Part  
11 3, Chapter 7 of the California Health and Safety Code as the public official responsible for air  
12 pollution observation and enforcement in the Owens Valley Planning Area (“OVPA”).

13 2. Co-Petitioner LADWP is a municipal corporation organized under the Los  
14 Angeles City Charter and the Constitution and laws of the State of California. LADWP  
15 operates a municipal water collection, distribution, and aqueduct system in Inyo County that  
16 supplies water to the residents of the City of Los Angeles.

17 **Abatement Order Key Terms**

18 3. On May 17, 2011, the District Governing Board adopted Stipulated Order for  
19 Abatement No. 110317-01 (“Order 110317-01”). Order 110317-01 requires LADWP to  
20 construct a dust control project, known as Phase 7a, on approximately six square miles of the  
21 Owens Lakebed, which includes 3.1 square miles within six Dust Control Areas (“DCAs”),  
22 T37-1, T37-2, T1A-3, T1A-4, T-32-1 and T12-1 (“Phase 7a areas”), and approximately 3  
23 square miles of transition areas, as identified in Exhibit 4 of Order 110317-01 (“Transition  
24 Areas”). Except as to the modifications made herein, Order 110317-01 remains in full force  
25 and effect.

26 4. Paragraphs 1 and 4(a) of Order 110317-01 set forth the compliance schedule for  
27 Phase 7a of December 31, 2013, to install dust controls and December 31, 2015, to achieve  
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1 fully-compliant vegetation cover.

2 5. Order 110317-01 also requires dust controls be installed in the T12-1 tillage test  
3 area by December 31, 2015. The District Governing Board subsequently adopted Board Order  
4 No. 120206-07 extending the deadline to install BACM in DCA T12-1 from December 31,  
5 2015, to May 1, 2016.

6 6. Paragraph 5 of Order 110317-01 provides that LADWP shall not be in violation  
7 of Order 110317-01 if LADWP is acting in good faith to comply with the terms of the Order  
8 110317-01, but is impeded or prevented from doing so by, among other things, events or  
9 circumstances beyond its control. Paragraph 6 of Order 110317-01 permits the LADWP Board  
10 of Water and Power Commissioners (“LADWP Board”) to adopt a resolution to this effect, and  
11 requires that LADWP notify the District’s APCO of any such resolution within 15 days of its  
12 adoption. If the APCO does not concur with the LADWP Board’s resolution, the APCO shall  
13 notify LADWP and the District Governing Board in writing within 15 days of receipt of the  
14 LADWP Board’s resolution. Within 30 days of such written notice, two District Governing  
15 Board members and two LADWP Board members may meet to make a non-binding  
16 recommendation as to whether LADWP has met the requirements of Paragraph 5 of Order  
17 110317-01 and whether the requested Schedule of Increments should be granted, granted with  
18 modifications, or denied.

19 7. Paragraph 21 of Order 110317-01 provides that the District Governing Board  
20 shall retain jurisdiction over the matter in Order 110317-01 until December 31, 2015, unless  
21 Order 110317-01 is amended or modified. The District Board’s jurisdiction was extended to at  
22 least May 2016, which is the amended deadline to install BACM in the DCA T12-1, when it  
23 adopted District Governing Board Order 120206-07.

24 8. Paragraph 22 of Order 110317-01 provides that either the APCO or LADWP  
25 may petition the District Governing Board for a modification of Order 110317-01 with or  
26 without a stipulation. The District Governing Board may modify Order 110317-01 without a  
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1 stipulation upon a showing of good cause and upon making findings required by Health and  
2 Safety Code section 42451, subdivision (a), and District Rule 805, subdivision (a).

3 9. LADWP is currently in full compliance with Order 110317-01.

4 **Phase 7a Cultural Resources Evaluation**

5 10. LADWP was required under District Governing Board Order 080128-01  
6 (“Board Order 080128-01”), the enforcement Board Order for the 2008 Owens Valley PM<sub>10</sub>  
7 Planning Area Demonstration of Attainment State Implementation Plan (“2008 SIP”), to  
8 analyze the environmental impacts of the Phase 7a project under the California Environmental  
9 Quality Act (Pub. Res. Code, §§ 21000, et seq.) (“CEQA”).

10 11. LADWP retained Garcia and Associates (“GANDA”), a natural and cultural  
11 resources consulting firm with state-certified archaeologists, to conduct all of the  
12 archaeological investigations necessary to comply with CEQA requirements for Phase 7a.  
13 Between May and August 2011, GANDA conducted a Phase I pedestrian survey of the  
14 subareas within Phase 7a and discovered there were extensive unanticipated archaeological and  
15 cultural resources throughout the proposed project. The 2008 SEIR mitigation measures  
16 require among other things, that if the Phase I pedestrian survey identified significant  
17 unanticipated cultural and archaeological resources, LADWP must conduct an assessment of  
18 potentially impacted cultural sites—both known and undiscovered—for significance under  
19 CEQA through the implementation of Phase II investigations. (SEIR § 3.3.5; p. 3.3-24; *see*  
20 *also* Appendix R-E [Final Cultural Resources Technical Report], § 5.3, pp. 5-107-109.)  
21 LADWP was required to obtain an Archaeological Investigation Permit from California State  
22 Lands Commission (“CSLC”) before conducting the Phase II testing and evaluation. CSLC  
23 approved the permit on September 1, 2011.

24 12. After CSLC approved the permit, GANDA commenced Phase II testing and  
25 evaluation of the sites identified during the Phase I pedestrian survey to determine the sites’  
26 eligibility for inclusion in the California Register of Historical Resources (“CRHR”) and  
27 National Register of Historic Places (“NRHP”). In October 2011, GANDA completed its  
28

1 Phase II testing and evaluation of the DCAs impacted by archaeological and cultural resources.  
2 GANDA determined that the impacted DCAs contain 16 archaeological sites, of which six are  
3 CRHR-eligible. GANDA advised LADWP to avoid any ground disturbing activities in or near  
4 the CRHR-eligible sites and, if avoidance was not feasible, LADWP was required to complete  
5 a Phase III recovery before commencing ground disturbing activities in or near the CRHR-  
6 eligible sites.

7 13. In November and December 2011, LADWP evaluated whether it could proceed  
8 with the necessary geotechnical work on the impacted DCAs while avoiding the disturbance of  
9 the CRHR-eligible sites. LADWP determined that it was infeasible to avoid disturbance of the  
10 four CRHR-eligible sites identified in one of the DCAs during geotechnical work and,  
11 therefore, LADWP did not proceed with geotechnical work on that DCA. In addition, on  
12 December 13, 2011, GANDA issued a stop work order to LADWP pursuant to its authority  
13 under the CSLC permit, requiring LADWP to stop all geotechnical work or other construction-  
14 related ground disturbing activity on another DCA until after the completion of Phase III  
15 archaeological data recovery excavations. LADWP determined that the CRHR-eligible sites  
16 on this DCA could be avoided during geotechnical work. LADWP completed the geotechnical  
17 work on in December 2011. LADWP, however, determined that it could not avoid any of the  
18 Phase 7a CRHR-eligible sites if it constructed dust control measures in accordance with Order  
19 110317-01.

20 14. LADWP and the District's APCO met several times to discuss LADWP's  
21 progress on Phase 7a and possible alternatives to the project, including whether irreversible  
22 impacts to the cultural resources could be avoided, allowing the archaeologically-sensitive  
23 areas to remain untouched. In August 2012, GANDA completed its final Phase II Testing  
24 Report<sup>1</sup> and evaluation of historical and archaeological resources in all of the Phase 7a DCAs,  
25 except for the T12-1 tillage test area. In its January 30, 2012, memorandum, GANDA  
26 informed LADWP that two DCAs contains a total of 53 archaeological sites, five of which are

27 \_\_\_\_\_  
28 <sup>1</sup> The Phase II Testing Report contains sensitive cultural resources information that cannot be  
publicly disclosed under protection laws.

1 CRHR-eligible. GANDA recommended that the CRHR-eligible sites be completely avoided  
2 and that no geotechnical sampling or other construction-related ground disturbances be  
3 performed on these DCAs, since the CRHR-eligible sites encompass much of much of the  
4 DCAs and cannot otherwise be avoided. GANDA further recommended that if avoidance or  
5 preservation in place were determined to be infeasible, then no ground disturbances should  
6 occur on the two impacted DCAs until after the completion of Phase III archaeological data  
7 recovery excavations.

8 15. As a result of its investigations GANDA determined there are eleven sites in the  
9 Phase 7a project area eligible for listing in the CRHR. Three of the eleven sites are likely  
10 locations involving the Owens Valley Indian Wars.

11 **Phase 7a CEQA Process**

12 16. The entire Phase 7a and Transition Areas are a single project under CEQA and  
13 Order 110317-01. (Cal. Code Reg., tit. 14, § 15378, subd. (a).) In accordance with CEQA,  
14 LADWP conducted one environmental evaluation for the entire Phase 7a project, and  
15 LADWP determined that no single part of the project could be implemented until CEQA for  
16 the entire project was completed. Therefore, even though some of the Phase 7a and Transition  
17 Areas are not known to contain significant cultural resources, LADWP determined that design  
18 could not be completed, permits from other agencies could not be obtained, construction  
19 contracts could not be awarded, and construction of the dust controls could not commence until  
20 LADWP had completed the entire CEQA process for Phase 7a.

21 17. In May 2011, LADWP prepared an Initial Study based on State CEQA  
22 Guidelines Appendix G, which concluded that: (i) construction and operation of the proposed  
23 Phase 7a project would result in significant effects on the environment; and, (ii) that an EIR  
24 was required to analyze those environmental effects. A Notice of Preparation of the EIR,  
25 along with the Initial Study, was filed with the State Clearinghouse on May 23, 2011. A public  
26 scoping meeting for the Phase 7a project was held on June 7, 2011, at LADWP's office in  
27 Keeler, California.

28

1           18.     LADWP released the draft EIR in January 2013 for a 45 day public comment  
2 period. Over the course of the next several months, LADWP staff considered and responded to  
3 public comments from the District, CSLC, and other stakeholders; conducted further  
4 consultations with Native American groups and others about project impacts and comments on  
5 the draft EIR; and, revised the draft EIR, as necessary, to incorporate any changes to the  
6 project.

7           19.     CEQA requires that the EIR identify a reasonable range of alternatives to the  
8 proposed Phase 7a project that “would feasibly attain most of the basic objectives of the  
9 project but would avoid or substantially lessen any of the significant effects of the project,” and  
10 then provide detailed discussion of the comparative merits of each alternative for the decision-  
11 making body of the lead agency (LADWP Board) to consider before deciding which form of  
12 the project, if any, to ultimately approve. (CEQA Guidelines, §§ 15126.6, 15004, subd. (a).)  
13 Alternatives were identified in the EIR that would avoid impacts to cultural resources by  
14 excluding CRHR-eligible areas from the Phase 7a dust control project.

15           20.     On June 4, 2013, the LADWP Board considered and certified the Final EIR and  
16 approved the Avoidance Alternative for the Phase 7a project. The Avoidance Alternative  
17 involved construction of the original proposed Phase 7a project in all areas except for 350  
18 acres of Phase 7a subareas T1A-3, T32-1, T37-1 and T37-2 (“Avoidance Area”) known to  
19 contain significant cultural resources. Because the Avoidance Alternative would protect these  
20 significant cultural resources, increase vegetated area on the lake and improve the habitat value  
21 of the Transition Areas, it was identified as environmentally superior to the originally proposed  
22 Phase 7a project and to the other alternatives evaluated in the Phase 7a EIR. The EIR also  
23 concluded that a Phase III data investigation and recovery would not be feasible mitigation for  
24 these eleven sites because of the importance of these sites to both the archaeological and local  
25 Native American communities for their prehistoric and historic value as unique historical  
26 resources. The LADWP Board approved the Phase 7a project and certified the Final EIR  
27 subject to and contingent upon the District’s Governing Board’s approval of a modification to  
28

1 Order 110317-01 to remove the Avoidance Area from the original Phase 7a area, and to make  
2 any other additional changes necessary to ensure consistency between Order 110317-01, the  
3 Phase 7a project, and the Final EIR.

4 **Compliance with Order 110317-01 Procedure to Obtain Extension of Time**

5 21. On February 6, 2012, LADWP advised the District Governing Board at its  
6 meeting that numerous cultural resources had been discovered, and that LADWP may need to  
7 return to the Board to seek additional time to comply with Order 110317-01.

8 22. On February 7, 2012, in accordance with Paragraphs 5 and 6(a) of Order  
9 110317-01, the LADWP Board passed Resolution No. 012-170, finding that LADWP had  
10 acted in good faith to comply with the terms of Order 110317-01, but had been otherwise  
11 impeded in meeting the December 31, 2013, deadline for installing BACM on two Phase 7a  
12 DCA areas due to the unexpected discovery of extensive cultural resources. On February 21,  
13 2012, LADWP notified the APCO in writing of the LADWP Board's Resolution No. 012-170,  
14 and proposed a schedule of increments of progress and deadlines for future actions in  
15 compliance with Paragraph 6(a) of Order 110317-01. Under paragraph 6(c)(i) of Order  
16 110317-01, if the APCO does not concur with the LADWP Board's resolution, the APCO is  
17 required to notify LADWP and the District Governing Board in writing of his finding within  
18 15 days of receipt of the LADWP Board's resolution. The APCO did not provide such  
19 notification under paragraph 6(c)(i) of Order 110317-01.

20 23. On April 3, 2012, in accordance with Paragraphs 5 and 6(a) of Order 110317-  
21 01, the LADWP Board adopted Resolution No. 012-210, finding that LADWP had acted in  
22 good faith to comply with the terms of Order 110317-01, but had been otherwise impeded in  
23 meeting the December 31, 2013, deadline for installing BACM on two Phase 7a DCA areas  
24 due to the unexpected discovery of extensive cultural resources. On April 17, 2012, LADWP  
25 notified the APCO in writing of the LADWP Board's Resolution No. 012-210, and proposed a  
26 schedule of increments of progress and deadlines for future actions in compliance with  
27 Paragraph 6(a) of Order 110317-01. Under paragraph 6(c)(i) of Order 110317-01, if the APCO  
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1 does not concur with the LADWP Board's resolution, the APCO is required to notify LADWP  
2 and the District Governing Board in writing of his finding within 15 days of receipt of the  
3 LADWP Board's resolution. The APCO did not provide such notification under paragraph  
4 6(c)(i) of Order 110317-01.

5 24. On September 5, 2012, in accordance with Paragraphs 5 and 6(a) of Order  
6 110317-01, LADWP representatives attended the District Governing Board meeting and  
7 presented information about the unanticipated cultural resources discovered in Phase 7a, and  
8 the potential effect the discovery of these resources would have on LADWP's ability to  
9 complete the Phase 7a EIR and install dust controls on Phase 7a by the December 31, 2013,  
10 deadline set forth in Order 110317-01.

11 25. On September 5, 2012, LADWP notified the District Governing Board at its  
12 meeting that LADWP had located extensive unanticipated cultural resources that had impacted  
13 the construction schedule for the dust controls that LADWP would be returning to the  
14 Governing Board with a Petition to modify Order 110317-01. LADWP also sent a letter to the  
15 Governing Board Chair on February 14, 2013, informing the District of these issues.

16 26. On January 11, 2013, in accordance with Paragraphs 5 and 6(a) of Order  
17 110317-01, the LADWP Board adopted Resolution No. 013-157, finding that LADWP had  
18 acted in good faith to comply with the terms of Order 110317-01, but had been otherwise  
19 impeded in meeting the December 31, 2013 deadline for installing BACM on DCA T1A-4 and  
20 the Transition Areas due to the unexpected discovery of extensive cultural resources and the  
21 resulting delay in completing the Phase 7a EIR. Even though significant cultural resources  
22 have not been discovered in these areas, LADWP determined that the schedule for installing  
23 BACM in these areas is affected by the unexpected discoveries in the other Phase 7a area  
24 because CEQA requires one environmental analysis to encompass the entire project. DCA  
25 T1A-4 and the Transition Areas cannot be excluded from the project under CEQA. On  
26 January 23, 2013, LADWP notified the APCO in writing of the LADWP Board's Resolution  
27 No. 013-157 and proposed a schedule of increments of progress and deadlines for future  
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1 actions, in compliance with Paragraph 6(a) of Order 110317-01. Pursuant to paragraph 6(c)(i)  
2 of Order 110317-01, the APCO responded on February 4, 2013, stating that he did not concur  
3 with the findings of Resolution No. 013-517.

4 27. Following notification of the APCO's non-concurrence with Resolution No.  
5 013-517, in accordance with Paragraph 6(c)(ii) of Order 110317-01, two members of the  
6 LADWP Board (Richard Moss and Jonathan Parfrey) and three members of the District  
7 Governing Board (Linda Arcularius, Larry Johnston, and Matthew Kingsley) held several  
8 meetings to discuss the APCO's non-concurrence with Resolution No. 013-517.

9 28. On June 14, 2013, LADWP submitted a Petition to Modify Order 110317-01,  
10 with exhibits, to the District Governing Board. LADWP acknowledged in the Petition that the  
11 discussions between the District Governing Board and LADWP Board members remained  
12 ongoing, and that the modifications to Order 110317-01 requested in the Petition may need to  
13 be amended to reflect the terms of any agreement reached between the parties.

14 **Phase 7a Settlement Terms**

15 29. The District and LADWP Board member discussions resulted in an agreement  
16 on settlement terms dated June 17, 2013 ("Term Sheet") that was approved by LADWP on  
17 June 26, 2013, and the District on June 27, 2013. (*See* Exhibit 3 [Term Sheet]; Exhibit 4  
18 [APCO Board Report, dated June 27, 2013].)

19 30. Based on the provisions of the approved Term Sheet, the District and LADWP  
20 propose to enter into a settlement agreement dated August 19, 2013 ("Settlement Agreement")  
21 (*See* Exhibit 5 [Settlement Agreement]). The District approved the Settlement Agreement on  
22 August 19, 2013. LADWP is scheduled to approve the Settlement Agreement on August 27,  
23 2013.

24 31. The District and LADWP agreed in the Term Sheet and Settlement Agreement  
25 to, among other things, modify Order 110317-01, to extend the compliance deadlines, and also  
26 to address the discovery of cultural resources in the Phase 7a area.

1           32.     LADWP agreed to provide the District with a ten million dollar (\$10,000,000)  
2 public-benefit contribution for a dust control project carried out by the District in the Keeler  
3 Dunes. LADWP also agreed to support the District's project to control PM<sub>10</sub> emissions from  
4 the Keeler Dunes. The District agreed to release the LADWP from liability for the Keeler and  
5 other dune areas emissions. The details of these agreements are set forth in the Settlement  
6 Agreement.

7           The Settlement Agreement provides as follows:

8           *Extensions of Compliance Deadlines.*

9           33.     The District and LADWP agreed to the extension of LADWP's deadline to  
10 construct all infrastructure and install fully-compliant BACM in the Phase 7a areas and  
11 Transition Areas, except for those areas controlled by Managed Vegetation BACM, as set forth  
12 in paragraph 4(a) of Order 110317-01, from December 31, 2013, to December 31, 2015. All  
13 infrastructure and plant materials for Managed Vegetation BACM will be installed by  
14 December 31, 2015.

15           34.     The District and LADWP agreed to the extension of LADWP's deadline to  
16 achieve fully-compliant BACM vegetation cover for areas controlled by Managed Vegetation  
17 BACM in the Phase 7a areas and Transition Areas, as set forth in paragraph 4(a) of Order  
18 110317-01, from December 31, 2015, to December 31, 2017.

19           35.     The District and LADWP agreed that extensions of the deadlines in this Order  
20 would be contingent upon all of the following:

21           a)     LADWP timely receiving from CSLC and all other agencies all of the  
22 required permits, approvals, or leases necessary to allow LADWP to construct BACM within  
23 the deadlines required by Order 110317-01.

24           b)     Timely adoption of this Order modifying Order 110317-01 to remove all  
25 CRHR-eligible areas plus necessary buffer areas, referred to as the "Eligible Cultural Resource  
26 ("ECR") areas." The ECR areas initially consist of 277 acres of the Phase 7a areas identified  
27 in the confidential map attached to this Order as Exhibit 6 (the "Initial ECR Areas"). The  
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1 Initial ECR Areas and any newly discovered CRHR-eligible and necessary buffer areas (the  
2 “Additional ECR Areas”) become Phase 7b.

3 c) Adoption of this Order modifying Order 110317-01 to state explicitly  
4 that the discovery of any cultural resources in the Phase 7a areas is considered a condition of  
5 force majeure under paragraph 5(d) of Order 110317-01.

6 d) If any one of the above contingencies is not met, then LADWP may seek  
7 further extensions of time under paragraph 5 of Order 110317-01, as modified by Order  
8 130819-01, and paragraphs 6 and 22 of Order 110317-01, which shall not be unreasonably  
9 denied by the District.

10 Creation of Phase 7b.

11 36. The District and LADWP agreed to create Phase 7b, which shall consist of the  
12 Initial ECR Areas and any Additional ECR Areas. Additional ECR Areas are determined by  
13 LADWP’s state-certified archaeologist, and which are confirmed by a second, state-certified  
14 archaeologist mutually agreeable to the District, LADWP and CSLC (the “Second  
15 Archaeologist”). The District and LADWP agreed that this Order would modify Order  
16 110317-01 to remove all areas in Phase 7b.

17 37. The District and LADWP agreed that LADWP will promptly notify and confer  
18 with the District if any cultural resources are discovered during the construction of Phase 7a.  
19 Upon the discovery of the cultural resources, LADWP will request that its state-certified  
20 archeologist fulfill his or her legal obligations relative to assessing and making  
21 recommendations for cultural resources. LADWP’s state-certified archaeologist shall be  
22 responsible for evaluating whether any of the newly discovered cultural resource areas within  
23 Phase 7a are CRHR-eligible, and if so, define the additional buffer areas necessary to prevent  
24 disturbance of the CRHR-eligible areas. LADWP’s state-certified archeologist’s  
25 recommendations shall be confirmed by the Second Archaeologist. The District and LADWP  
26 agreed that once confirmed by the Second Archaeologist, the newly identified CRHR-eligible  
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1 areas and necessary buffer areas shall become ECR, will be withdrawn from Order 110317-01  
2 and included in Phase 7b.

3 Cultural Resources Task Force.

4 38. The City and District agreed to form a Cultural Resources Task Force (“CRTF”)  
5 and host its initial meeting within ninety (90) days after the Effective Date of this Order. The  
6 CRTF will be an advisory group consisting of representatives from the LADWP, District,  
7 CSLC, State Historical Preservation Office, and Local Tribal Representatives. The CRTF may  
8 draw upon outside resources and experts, as needed, to aid the CRTF’s process.

9 39. The District and LADWP agreed that the CRTF will initially be charged to  
10 make non-binding recommendations to the District and LADWP on or before December 31,  
11 2014, as to the best course of action and timing for the treatment of the Initial Phase 7b Areas.

12 40. The District and LADWP agreed that CRTF will be advisory in nature only, and  
13 that the District and LADWP will each retain their independent final decision-making authority  
14 as to the treatment of ECR areas.

15 No Fines Imposed.

16 41. The District agreed not to fine, issue fees or impose any other type of penalty  
17 upon LADWP with respect to any Phase 7a areas, provided that the Phase 7a dust controls are  
18 put into place within the time frames set forth in paragraphs 33 and 34 above.

19 42. The District agreed not fine LADWP for any areas in the Initial Phase 7b Areas  
20 and any Additional Phase 7b Areas pursuant to Order 110317-01 and Order 130819-01.

21 Other Abatement Order Modifications.

22 43. The District and LADWP agreed to make every effort to develop, approve and  
23 deploy high-confidence, waterless dust control measures in all areas where dust controls are  
24 ordered on Owens Lake.

25 44. The District and LADWP agreed that this Order shall not be construed as a  
26 waiver by either the District or LADWP of any rights, remedies, legal theories or positions that  
27 either the District or LADWP may choose to assert in any hearing, proceeding, tribunal or  
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1 action now or in the future, except with respect to the particular subject matter contained in this  
2 Order. For example, LADWP disputes the legality of and does not agree to the District's  
3 Supplemental Control Requirements Determination ("SCRD") process. The District asserts  
4 that LADWP agreed to the SCR D process in Order 110317-01 and elsewhere, and that the  
5 SCR D process is now the law. LADWP and the District have a continuing disagreement on  
6 this point.

7 *BACM Clarifications.*

8 45. The District approved Reduced Thickness Gravel BACM, which is defined as  
9 two (2) inches of gravel with geotextile fabric underlay. "Reduced Thickness Gravel is  
10 defined as per the 2008 Owens Valley PM<sub>10</sub> State Implementation Plan except that the gravel  
11 thickness is reduced from a minimum of four inches (4") to two inches (2") and all reduced  
12 thickness gravel areas shall be underlain with geotextile fabric. All geotextile fabric shall be  
13 Class I woven or nonwoven geotextile fabric meeting the minimum specifications set forth in  
14 the National Standard Materials Specification "Material Specification 592—Geotextile"  
15 (National Engineering Handbook, Chapter 3, Part 642), or equivalent.

16 46. The District approved "Brine Shallow Flooding BACM" as a subcategory of  
17 Shallow Flooding BACM. The District and LADWP acknowledged and agreed that LADWP  
18 is not liable for maintenance of the existing brine pool on Owens Lake. "Brine Pool" is  
19 defined as those areas at Owens Lake below elevation 3,553.55 feet.

20 47. The District agreed to work with LADWP on accelerated testing schedules and  
21 BACM approval, if warranted, for Roughness Elements and Tillage in soil type areas where  
22 these controls can be applied. Within 30 days of the Effective Date of this Order, the District  
23 and LADWP committed to agree upon accelerated testing schedules for the candidate  
24 Roughness Elements and Tillage BACMs in soil types where these control can be applied. The  
25 schedules shall include the District Governing Board's consideration of BACM approval of  
26 these candidate measures within one year of completion of the schedule (within 13 months of  
27 the Effective Date of this Order). If the accelerated testing does not result in approved BACM  
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1 for the candidate measures, the District's and LADWP's respective Boards shall jointly assess  
2 why the accelerated testing did not result in the District Board's BACM approval. The District  
3 and LADWP also agreed to work on accelerated testing schedules and BACM approvals for  
4 other forms of BACM.

### 5 CONCLUSIONS

6 48. In accordance with Health and Safety Code §42450 and Rule 805 of the Great  
7 Basin Unified Air Pollution Control District: Rules and Regulations, entitled "Findings," the  
8 Board finds that the findings listed in Order 110317-01 under that portion of the Order entitled  
9 "Conclusions" remain extant as of the effective date of this Order.

10 49. The District Governing Board finds that, because this Order is modified  
11 pursuant to a stipulation, this Order may be issued without making the finding required under  
12 California Health and Safety Code section 42451, subdivision (a). This Order constitutes the  
13 written explanation required by California Health and Safety Code section 42451, subdivision  
14 (b).

15 50. The District Governing Board finds that LADWP is in compliance with all of  
16 the terms of Order 110317-01.

17 51. The District Governing Board finds that there is currently no violation of Order  
18 110317-01. Accordingly, no fines or penalties of any type (including those in Order paragraph  
19 11 of Order 110317-01 and Order 130819-01) are imposed upon LADWP with respect to any  
20 areas of Phase 7a as identified in Order 110317-01, and for any areas in the Initial Phase 7b  
21 Areas and Additional Phase 7b Areas, at this time.

22 52. The District Governing Board agrees and, therefore, finds that the deadlines for  
23 installing and operating dust controls on Phase 7a Modified Areas and Transition Areas shall  
24 be extended.

25 53. The District Governing Board agrees and, therefore, finds that these new  
26 deadlines shall be subject to the timely issuance of permits, approvals, and leases; there being  
27 no discovery of new cultural resources or CRHR-eligible sites; and the District's timely  
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1 acceptance and removal of any new CRHR-eligible sites and associated buffer areas from  
2 Phase 7a Modified Areas and Order 110317-01. LADWP shall not be deemed in violation of  
3 Order 110317-01 or this Order if LADWP is impeded in its ability to comply due to these  
4 circumstances and those identified in paragraph 5 of Order 110317-01. Paragraph 5.e. of  
5 Order 110317-01 shall be clarified by this Order to mean that the discovery of any cultural  
6 resources that are determined by LADWP's state-certified archeologist to be potentially  
7 CRHR-eligible shall be considered a condition of force majeure.

8 54. The District Governing Board finds that a Phase 7b area shall be created for the  
9 treatment of Initial ECR Areas and Additional ECR Areas. The Phase 7b areas are not subject  
10 to any requirements or deadlines to install dust controls in Order 110317-01 or this Order.  
11 This Order does not require the construction and operation of dust controls on Phase 7b areas;  
12 new Board Orders would be required after completion of the CRTF process set forth in the  
13 Settlement Agreement (Exhibit 5). There is no agreement that dust controls will or will not be  
14 ordered.

15 55. The District Governing Board agrees and, therefore, finds that the District and  
16 LADWP shall make every effort to develop, approve, and deploy high-confidence waterless  
17 dust control measures in all areas where dust controls are ordered.

18 56. The District Governing Board finds that LADWP may implement Reduced  
19 Thickness Gravel BACM ("Reduced Thickness Gravel" is defined as per the 2008 Owens  
20 Valley PM<sub>10</sub> State Implementation Plan except that the gravel thickness is reduced from a  
21 minimum of four inches (4") to two inches (2") and all reduced thickness gravel areas shall be  
22 underlain with geotextile fabric. All geotextile fabric shall be Class I woven or nonwoven  
23 geotextile fabric meeting the minimum specifications set forth in the National Standard  
24 Materials Specification "Material Specification 592—Geotextile" (National Engineering  
25 Handbook, Chapter 3, Part 642), or equivalent), or Brine Shallow Flooding BACM in Phase 7a  
26 Modified Areas and Transition Areas.



1 replacing them with the following new paragraph 1 which reads as follows:

2           1.       Except as provided in Paragraph 2 of this Stipulated Order for Abatement  
3       (Order), below, LADWP shall install, operate and maintain Best Available Control  
4       Measure (BACM) dust controls on the “Phase 7a Modified Areas” and the “Phase 7a  
5       Transition Areas” by December 31, 2015. The Phase 7a Modified Areas are the “Original  
6       Phase 7a Areas” identified in Order 110317-01 excluding the “Phase 7b Areas.” Phase 7b  
7       includes 277 acres located within the Original Phase 7a Areas that contain California  
8       Register of Historical Resources (CRHR)-eligible sites and necessary buffer areas (Initial  
9       Phase 7b Areas) plus any newly discovered cultural resources within the Phase 7a Modified  
10      Areas that are determined by LADWP’s state certified archaeologist to be CRHR-eligible  
11      and necessary buffer areas and whose determination is confirmed by a second, state-  
12      certified archaeologist mutually agreeable to the District, LADWP, and California State  
13      Lands Commission (Additional Phase 7b Areas). All Phase 7b areas are not subject to  
14      Order 110317-01. The areas and BACM dust controls to be constructed, operated and  
15      maintained on the Phase 7a Modified Areas and Phase 7a Transition Areas are shown and  
16      described in Exhibit 7. For those areas to be controlled by Gravel BACM, LADWP may  
17      implement Reduced Thickness Gravel BACM (as defined above). LADWP may also  
18      implement Brine Shallow Flooding BACM. Vegetation cover shall meet the requirements  
19      of the March 2010 Managed Vegetation BACM Proposal (Exhibit 6 to Order 110317-01)  
20      by December 31, 2017. Other eligible BACM are described in paragraphs 12, 15, 16 and  
21      17 of District Governing Board Order 080128-01, as well as in Chapter 5 of the 2008 SIP.  
22      LADWP’s selection of approximately 3.4 square miles of the existing Shallow Flooding  
23      areas in Phase 7a Transition Areas (Subareas T1A-2, T28N, T28S, T30-1a, T30-1b, and  
24      T36-1b) to be transitioned to a hybrid of BACM including Managed Vegetation, Gravel  
25      Cover (including Reduced Thickness Gravel Cover) and Shallow Flooding (including  
26      Brine Shallow Flooding), is consistent and fully compliant with Paragraphs 7 and 8 of  
27      Order 110317-01. During construction of the Phase 7a project a maximum of 3.0 square  
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1 miles of Transition Areas may be without BACM during the dust season. The schedule of  
2 increments of progress and deadlines to install, operate and maintain dust controls on Phase  
3 7a Modified Areas and Phase 7a Transition Areas, including the vegetative cover  
4 requirements, are contingent upon all of the following circumstances:

5 a) LADWP timely receiving from California State Lands Commission  
6 and all other agencies all of the required permits, approvals, or leases (collectively,  
7 “required approvals”) necessary to permit LADWP to construct the dust controls  
8 within these deadlines. A list of the anticipated required permits, approvals and  
9 leases are identified in the Phase 7a EIR. This list is not inclusive of all agencies,  
10 and there may be other permits and approvals that are required.

11 b) There being no discovery of new cultural resources or CRHR-  
12 eligible sites.

13 c) The District’s timely acceptance and removal of all new CRHR-  
14 eligible sites and associated buffer areas from the Phase 7a Modified Areas and  
15 Order 110317-01.

16 LADWP shall not be subject to any legal action, nor shall the District impose any  
17 fines or penalties of any type (including those in Order paragraph 11 of Order 110317-01 or  
18 in Order 130819-01) upon LADWP with respect to any delay in installing dust controls in  
19 any areas of Phase 7a as identified in Order 110317-01 that is related to LADWP not  
20 timely receiving the required permits, approvals, or leases necessary to permit LADWP to  
21 construct the dust controls, or the discovery of new cultural resources or CRHR-eligible  
22 sites are discovered, or the District not timely accepting and removing all new CRHR-  
23 eligible sites and associated buffer areas from the Phase 7a Modified Areas and Order  
24 110317-01. LADWP may petition the District Governing Board pursuant to paragraph 22  
25 of Order 110317-01 to modify the timeframes in revised Order paragraph 1. It is the intent  
26 of this Order that the District Governing Board will extend the timeframes under these  
27 circumstances if they are beyond the control of LADWP.  
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**B.** The Phase 7a map and coordinates presently included as Exhibit 4 to Order 110317-01 shall be removed and replaced with Exhibit 7 in order to accurately reflect the Phase 7a Modified Areas, Transition Areas and the approved dust controls.

**C.** This Order modifies Order paragraph 3 of Order 110317-01 by removing the existing paragraph and replacing it with the following new paragraph 3 which reads as follows:

3. The 277 acres located in the Initial Phase 7b Areas that contain CRHR-eligible sites and necessary buffer areas are identified in Exhibit 6 and hereby removed from Order 110317-01 and added to Phase 7b. Exhibit 6 is strictly confidential because it identifies the location of cultural resources and neither the District nor LADWP shall release or otherwise make the Exhibit available to the public. Additional areas shall be added to Phase 7b and removed from Order 110317-01 in accordance with the following process:

a) During the construction of Phase 7a, LADWP shall promptly notify the District of, and confer with the District about, the discovery of any cultural resources.

b) LADWP shall request that its state-certified archeologist fulfill their legal obligations relative to assessing and making recommendations for these discovered cultural resources. LADWP's state-certified archaeologist shall be responsible for evaluating whether any newly discovered cultural resource areas within Phase 7a are CRHR-eligible, and if so, the additional buffer areas necessary to address disturbance of the CRHR-eligible areas.

c) If LADWP's state-certified archaeologist finds that the newly discovered cultural resource areas are CRHR-eligible, then LADWP will transmit the findings to the District and a second state-certified archaeologist mutually agreeable to the District, LADWP, and California State Lands Commission.

1                   d)       The second state-certified archaeologist will evaluate LADWP's  
2 state certified archaeologist findings to confirm those findings.

3                   e)       The second state-certified archaeologist shall send its findings  
4 concurrently to LADWP, the District and California State Lands Commission.

5                   f)       If the second state-certified archaeologist confirms LADWP's state  
6 certified archaeologist findings, the District APCO shall within one week issue an  
7 Order removing the new CRHR-eligible area and associated buffer area from Phase  
8 7a and placing it in Phase 7b.

9                   g)       If the second state-certified archaeologist does not confirm  
10 LADWP's state certified archaeologist findings, then the California State Lands  
11 Commission as the landowner shall determine whether the cultural resources shall  
12 be preserved in place or, whether California State Lands Commission intends to  
13 direct a Phase III data recovery or whether another approach is appropriate.

14                   h)       The District APCO shall within one week of receiving a  
15 determination from the California State Lands Commission that the cultural  
16 resources shall be preserved in place issue an Order removing the new CRHR-  
17 eligible area and associated buffer area from Phase 7a and placing it in Phase 7b.

18  
19 **D.**       This Order modifies Order paragraph 5.e. of Order 110317-01 by removing the existing  
20 paragraph and replacing it with the following new paragraph 5.e., which reads as follows:

21                   5.e)    A condition of Force Majeure, which is defined to mean an  
22 extraordinary event or circumstance beyond the control of the parties, such as a war,  
23 labor actions, riot, crime, disruption of utilities, acts of God (such as adverse  
24 weather, earthquake, volcanic eruption, or other natural disaster), and the discovery  
25 of potential ECRs. Adverse weather is any weather condition, including but not  
26 limited to flooding and dust storms, that forces the LADWP to suspend all  
27 construction operations or prevents the LADWP from proceeding with 50 percent  
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1 or more of the normal labor force and of the equipment engaged on critical path  
2 work. Delays shall only be granted for adverse weather days greater than 30 days  
3 for each 12 month period from April 1 through March 31.  
4

5 **E.** This Order modifies Order paragraph 15 of Order 110317-01 by removing the existing  
6 paragraph and replacing it with the following new paragraph 15, which reads as follows:

7 15. The parties commit to work cooperatively to support LADWP's efforts to  
8 develop and implement new PM<sub>10</sub> control measures or modify existing measures that are as  
9 water-use efficient as possible. The District and LADWP will make every effort to develop,  
10 approve and deploy high-confidence waterless dust control measures in all areas where  
11 dust controls are ordered. Neither this Order, Order 110317-01, Order 080128-01 or the  
12 2008 SIP shall preclude the transition of areas with existing dust control measures to  
13 alternative high-confidence waterless dust control measures.  
14

15 **F.** This Order modifies Order paragraph 18 of Order 110317-01 by changing the date of  
16 December 31, 2015 to December 31, 2017. Paragraph 18 shall read as follows:

17 18. Final compliance shall be achieved, and this Order shall terminate when  
18 Phase 7a and the Transition Areas are fully operational, but no later than December 31,  
19 2017. LADWP shall notify the Clerk of the Board and the APCO in writing when final  
20 compliance is achieved.  
21

22 **G.** This Order modifies Order paragraph 21 of Order 110317-01 by changing the date of  
23 December 31, 2015 to December 31, 2017. Paragraph 21 shall read as follows:

24 21. The District Governing Board shall retain jurisdiction over this matter until  
25 December 31, 2017, unless the Order is amended or modified.  
26

27 **H.** This Order adds the following paragraph 26 to Order 110317-01:  
28

1           26.     LADWP shall pay ten million dollars (\$10,000,000) to the District as a  
2 public-benefit contribution in support of the District's Keeler Dunes PM<sub>10</sub> control project.  
3 One hundred percent (100%) of said payment shall be used by the District to control PM<sub>10</sub>  
4 emissions from the area known as the Keeler Dunes (generally located above the eastern  
5 regulatory shoreline of Owens Lake and north of the community of Keeler). Details and  
6 conditions of the Keeler project and said payment are set forth in a separate Settlement  
7 Agreement between the District and LADWP. This agreement is attached to this Order as  
8 Exhibit 5.

9  
10 **I.**     The modification of Order 110317-01 by the District and LADWP shall not be  
11 construed as a waiver by either party of any rights, remedies, legal theories or positions that  
12 either party may choose to assert in any hearing, proceeding, tribunal or action now or in the  
13 future except with respect to the particular subject matter contained in this Order the Keeler  
14 and Other Dunes Release which is not subject to this Order or Order 110317-01.

15  
16 **J.**     The APCO and LADWP affirm that their respective signatories below have the  
17 authority to represent and bind their respective parties to the terms of this Stipulated Order for  
18 Abatement.

19  
20 **K.**     The effective date of this Order is August 19, 2013.

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1 **Reviewed and Stipulated by:**

2 District Air Pollution Control Officer, Co-Petitioner:

3

4 \_\_\_\_\_  
Theodore D. Schade, Air Pollution Control Officer Date

5

6

7 City of Los Angeles Department of Water and Power, Co-Petitioner

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9 \_\_\_\_\_  
Ronald O. Nichols, General Manager Date

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11

12 **ORDERED FOR THE BOARD BY:**

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14 \_\_\_\_\_  
John Eastman, Chair, District Governing Board Date

15

16 **ATTEST:**

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18 \_\_\_\_\_  
Tori DeHaven, District Governing Board Clerk

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19 Date: \_\_\_\_\_

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1     **List of Exhibits**

2     Exhibit 1:     District Governing Board Order 110317-01

3     Exhibit 2:     LADWP's Petition and attachments to the District Governing Board to modify  
4     Order 110317-01, filed June 14, 2013

5     Exhibit 3:     Term Sheet approved by the LADWP Board of Commissioners on June 26, 2013,  
6     and the District Governing Board on June 27, 2013

7     Exhibit 4:     District Governing Board Report for June 27, 2013, special meeting

8     Exhibit 5:     Settlement Agreement and Release between District and LADWP, dated August  
9     19, 2013

10    Exhibit 6:     **CONFIDENTIAL** map of the 277-acre Initial ECR Area

11    Exhibit 7:     Map of Phase 7a Modified Areas and Phase 7a Transition Areas

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**ATTACHMENT C**

Exhibit 1

District Governing Board Order of Abatement 110317-01



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1 Los Angeles. The public was given the opportunity to testify. The matter was submitted and  
2 evidence received. The District Governing Board finds, concludes and orders as follows:

3 **FINDINGS OF FACT**

4 1. The Great Basin Unified Air Pollution Control District (hereinafter “District”)  
5 is organized pursuant to Division 16, Part 3, Chapter 3 of the California Health and Safety  
6 Code, and is the sole and exclusive agency with the responsibility for comprehensive air  
7 pollution control and regulation in the Great Basin Valleys Air Basin (California’s Alpine,  
8 Mono and Inyo Counties), including that area of southern Inyo County known as the Owens  
9 Lake bed (Exhibit 1).

10 2. Respondent, the City of Los Angeles, acting by and through its Department of  
11 Water and Power, is a municipal corporation organized under the Los Angeles City Charter  
12 and the constitution and laws of the State of California, doing business within the jurisdiction  
13 of the Great Basin Unified Air Pollution Control District. Respondent operates a municipal  
14 water collection, distribution and aqueduct system in Inyo and Mono Counties for the  
15 purpose of supplying water to the residents of the City of Los Angeles.

16 3. Respondent is subject to District Governing Board Order 080128-01 adopted  
17 on January 28, 2008 (Exhibit 2). District Governing Board Order 080128-01 is the order  
18 contained in both the *2008 Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment*  
19 *State Implementation Plan (2008 SIP)* and the *2010 PM<sub>10</sub> Maintenance Plan and*  
20 *Redesignation Request for the Coso Junction Planning Area*. This order requires the  
21 Respondent to take a number of actions by certain specified dates in order to timely control  
22 the particulate matter air pollution (PM<sub>10</sub>) emissions caused by its water production,  
23 diversion, storage and conveyance activities.

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1           4.       Respondent is also subject to District Hearing Board Order GB09-06 (Exhibit  
2 3). District Hearing Board Order GB09-06 is the order associated with a variance, granted to  
3 the Respondent on September 25, 2009, that provided the Respondent additional time to  
4 implement PM<sub>10</sub> controls on some areas of the Owens Lake bed originally ordered by District  
5 Governing Board Order 080128-01.

6           5.       District Governing Board Order 080128-01 required Respondent to install a  
7 total of 13.2 square miles of additional PM<sub>10</sub> controls beyond the 29.8 square miles of PM<sub>10</sub>  
8 controls constructed prior to January 1, 2007. These 13.2 square miles are known as the  
9 “Phase 7” areas.

10          6.       Of the required 13.2 total square miles in Phase 7, Respondent implemented  
11 9.6 square miles in compliance with District Governing Board Order 080128-01 and District  
12 Hearing Board Order GB09-06 and there are 0.5 square miles known as the “Channel Area”  
13 on which no representations regarding compliance status are made in this Order. These 10.1  
14 square miles are not the subject of this Order.

15          7.       However, within the 3.1 square-mile balance of the 13.2 square-mile Phase 7  
16 areas, there are six sub-areas known collectively as “Phase 7a” where Respondent did not  
17 implement dust control measures in compliance with District Governing Board Order  
18 080128-01 and District Hearing Board Order GB09-06. For the Phase 7a areas, District  
19 Governing Board Order 080128-01 required Respondent to implement any combination of  
20 approved PM<sub>10</sub> controls known as Best Available Control Measures (“BACM”), which  
21 consists of Shallow Flooding, Managed Vegetation and Gravel Blanket, or an experimental,  
22 non-BACM PM<sub>10</sub> control measure known as “Moat and Row.”

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1           8.       Respondent had the legal option to select at its sole discretion any of the  
2 methods of dust control described in Findings of Fact Paragraph 7 herein and was required to  
3 secure all appropriate approvals and construct the controls by the deadline set forth in the  
4 order and modified by the variance. The deadline set by District Governing Board Order  
5 080128-01 for constructing controls on the Phase 7a project areas was originally April 1,  
6 2010, if Respondent selected BACM controls, or October 1, 2009, if Respondent selected  
7 Moat & Row controls.

8           9.       Using District-, State- and Federally-approved air pollution modeling  
9 techniques specifically developed for Owens Lake emissions (District Board Order  
10 080128-01, Attachment B, “Supplemental Control Requirements Determination Procedure”),  
11 for the period 2006 through 2010 the District determined that the Phase 7a areas emitted an  
12 annual average of approximately 6,265 tons of excess PM<sub>10</sub>. These excess emissions have  
13 caused and contributed to violations of the state and federal 24-hour PM<sub>10</sub> standards.

14          10.       All of the Phase 7a areas are on State of California public lands managed by  
15 the California State Lands Commission (“CSLC”). Respondent is required to secure a lease  
16 from the CSLC before it may proceed to conduct any dust control activities occurring on  
17 state lands. The CSLC is not subject to District Governing Board Order 080128-01 and  
18 District Hearing Board Order GB09-06 or any other current order requiring it to control PM<sub>10</sub>  
19 emissions from the areas of the dried bed of Owens Lake owned by the State of California  
20 and managed by the CSLC.

21          11.       Respondent exercised its discretion to implement Moat and Row controls on  
22 the Phase 7a project areas. In order to secure the necessary permits, leases and approvals  
23 from other public agencies, Respondent was required to and did conduct full-scale dust

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1 control performance testing of Moat and Row at two locations on the Owens Lake bed.

2 Results of the testing were disputed by the Petitioner and Respondent.

3 12. As a condition of considering Respondent's application for a Moat and Row  
4 lease for the Phase 7a areas, CSLC staff required that Respondent prepare a supplemental  
5 Environmental Impact Report ("SEIR") pursuant to the California Environmental Quality  
6 Act ("CEQA"). Respondent agreed to prepare the SEIR required by CSLC staff. The SEIR  
7 prepared and finalized by Respondent was not legally challenged by the CSLC or any other  
8 party.

9 13. Delays caused by preparation of the SEIR and securing the necessary permits,  
10 leases and approvals resulted in Respondent's inability to implement Moat and Row dust  
11 control measures on Phase 7a by October 1, 2009. Respondent therefore sought and was  
12 granted Variance Order GB09-06 from the District Hearing Board. The Variance Order  
13 extended the deadline for completion of the Phase 7a Moat and Row controls by one year  
14 from October 1, 2009 until October 1, 2010. The variance order also contained additional  
15 requirements designed to reduce excess PM<sub>10</sub> emissions to the maximum extent feasible.  
16 These requirements provided for PM<sub>10</sub> control through the use of temporary tilling on 3.5  
17 square miles of area then under construction (a portion of the Phase 7 areas) and through  
18 implementation of a future dust control project to be completed six months earlier than would  
19 have normally been required under the provisions of Governing Board Order 080128-01. The  
20 expedited future project is 2.03 square miles of BACM known as the "Phase 8" project,  
21 which was ordered by the District Governing Board on December 6, 2010 (Order Number  
22 101206-01).

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1           14.     For more than two years, Respondent negotiated with the CSLC in an attempt  
2 to procure a lease to implement Moat and Row controls in the Phase 7a project areas.

3           15.     On April 6, 2010, the CSLC denied Respondent's application for the Moat  
4 and Row lease. As a result of the CSLC's denial of the Moat and Row lease, Respondent  
5 was unable to construct Moat and Row dust control measures on any part of the 3.1 square-  
6 mile Phase 7a project areas and was required to remove the Moat and Row dust control  
7 measures in place at the two Phase 7a demonstration areas. Thereafter, Respondent had  
8 insufficient time to comply with CEQA, obtain the necessary permits, leases and approvals  
9 and construct BACM on the 3.1 square mile Phase 7a project areas by October 1, 2010.

10          16.     At all times relevant herein, Respondent acted in good faith to comply with  
11 District Governing Board Order 080128-01 and District Hearing Board Order GB09-06.

12          17.     As there were no approved PM<sub>10</sub> controls in place on the Phase 7a areas by  
13 the October 1, 2010 deadline, Petitioner determined that Respondent was in violation of  
14 District Governing Board Order 080128-01 and District Hearing Board Order GB09-06 on  
15 that date. Petitioner determines that Respondent will remain in violation of District  
16 Governing Board Order 080128-01 and District Hearing Board Order GB09-06 until  
17 approved PM<sub>10</sub> controls are fully installed and operational on all Phase 7a areas.

18          18.     "Fully installed and operational" means that all required Phase 7a and  
19 "Transition Areas" (additional areas that are transitioned from an existing BACM to another  
20 BACM in order to conserve water) infrastructure, earthwork and appurtenances necessary for  
21 compliant BACM operation is installed and, in the case of managed vegetation BACM, all  
22 plant materials are in place, but the plants may not necessarily be fully developed or grown

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1 sufficiently to meet the 2008 SIP requirements for cover conditions. The Phase 7a and  
2 Transition Areas locations are shown and described in Exhibit 4.

3 19. Due to the fact no approved controls were in place on the Phase 7a areas, on  
4 October 1, 2010 the APCO issued Notice of Violation (“NOV”) number 471 to Respondent  
5 for violating District Governing Board Order 080128-01 and District Hearing Board Order  
6 GB09-06.

7 20. Paragraph 11 of District Governing Board Order 080128-01 requires the  
8 APCO to use the “2008 Owens Valley Planning Area Supplemental Control Requirements  
9 Determination Procedure” (“SCR procedure,” contained in Attachment B of Order) to  
10 determine the need for additional PM<sub>10</sub> controls on the Owens Lake bed beyond those  
11 required by the original Order.

12 21. The SCR procedure provides that if Respondent is in compliance with the  
13 requirements set forth in “Board Order 080128-01 regarding the amount, timing and  
14 operation of existing and future dust controls, the APCO will not issue additional written  
15 SCR determinations until after May 1, 2010 and will not use data collected prior to April 1,  
16 2010 for new determinations.” The last SCR determination was issued in January 2008 in  
17 association with the 2008 SIP and used data up to June 30, 2006. The data collected starting  
18 July 1, 2006 has not previously been used to make an SCR determination.

19 22. Respondent maintains the right to challenge SCR determinations made by the  
20 APCO and orders for additional PM<sub>10</sub> controls issued by the APCO based on such SCR  
21 determinations. Respondent retains all of its rights pursuant to Health and Safety Code §  
22 42316, Attachment B to Board Order 080128-01, and all other available legal remedies to

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1 challenge SCR determinations and orders based on such determinations. Nothing in this  
2 Order for Abatement amends or otherwise changes the SCR procedures.

3 23. Notice of hearing on this matter was duly given and published in accordance  
4 with Health and Safety Code §42450 and District Rule 811.

5 24. All parties have stipulated to this matter being heard by the District Governing  
6 Board and have waived all rights to contest the ongoing authority of the District Governing  
7 Board to hear this matter.

8 25. Members of the public were offered the opportunity to provide comment on  
9 the Order of Abatement. No public comments were offered.

10 26. To the extent any of these Findings of Fact are considered or deemed to be  
11 Conclusions or part of the Order, they are incorporated into those sections as if fully set forth  
12 therein.

### 13 CONCLUSIONS

14 1. The District Governing Board finds that Respondent is in violation of  
15 requirements in District Governing Board Order 080128-01 and District Hearing Board  
16 Order GB09-06 due to Respondent's failure to implement approved PM<sub>10</sub> control measures  
17 on the 3.1 square-mile Phase 7a areas by October 1, 2010. The District estimates these  
18 violations are expected to result in approximately 6,265 tons of excess PM<sub>10</sub> per year to be  
19 emitted from the Phase 7a areas of the dried bed of Owens Lake. These emissions would  
20 have been controlled if the Phase 7a PM<sub>10</sub> controls had been implemented according to  
21 requirements. Excess PM<sub>10</sub> emissions from the Phase 7a areas are expected to continue to  
22 cause or contribute to exceedances of both state and federal 24-hour PM<sub>10</sub> standards.

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1           2.       The District Governing Board finds that Petitioner and Respondent have  
2 worked together to develop a number of corrective actions and Petitioner has committed to  
3 take such actions so as to provide effective PM<sub>10</sub> control on the Phase 7a as expeditiously as  
4 feasible. Until dust control measures are implemented pursuant to this Order, there is the  
5 potential for excess emissions and state and federal air quality standards violations to  
6 continue to occur.

7           3.       The District Governing Board finds that Respondent can achieve compliance  
8 with District requirements as expeditiously as feasible by implementing BACM, including an  
9 APCO-approved BACM test on Area T12-1 only, on the 3.1 square-mile Phase 7a areas.

10          4.       The District Governing Board finds that, in addition to the expeditious  
11 implementation of BACM, Respondent must offset the potential excess PM<sub>10</sub> air pollution  
12 emissions that may be emitted during the non-compliance period by taking additional actions  
13 to control and/or offset any excess air pollution emissions to the extent feasible.

14          5.       The District Governing Board finds that due to the need to construct extensive  
15 infrastructure to deliver water to the emissive Phase 7a areas, if Respondent were to  
16 terminate, or reduce its water production, diversion, storage or conveyance activities in Inyo  
17 County, the available water could not immediately or readily be put to use in reducing excess  
18 PM<sub>10</sub> air pollution emissions.

19          6.       The District Governing Board finds it is not reasonable under California  
20 Health and Safety Code section 42316 to require Respondent to cease or curtail its water  
21 production, diversion, storage and conveyance activities in Inyo County during the non-  
22 compliance period, since the water is needed to comply with dust control requirements for  
23 the existing 39.9 square miles of PM<sub>10</sub> control measures currently operating at Owens Lake

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1 as required by District Governing Board Order 080128-01 and District Hearing Board Order  
2 GB09-06.

3 7. Therefore, the District Governing Board finds that the cessation or curtailment  
4 of Respondent's water production, diversion, storage and conveyance activities in Inyo  
5 County during the non-compliance period is contrary to Health and Safety Code § 42316 and  
6 would not provide a corresponding benefit in reducing the excess PM<sub>10</sub> emissions.

7 8. The District Governing Board finds that, in addition to the essential and  
8 mandatory requirements that Owens Lake dust controls be effective and ensure that air  
9 quality standards are met in a timely manner, it is important that Owens Lake dust controls  
10 be as cost-efficient and water-use-efficient as possible.

11 9. The District Governing Board finds that issuance of this Order will not  
12 constitute a taking of property without due process of law.

13 10. The District Governing Board finds that corrective actions to be taken by the  
14 Respondent and compliance with the conditions set forth in this Order will bring the  
15 Respondent's water production, diversion, storage and conveyance activities into compliance  
16 with District orders, rules and requirements as expeditiously as feasible.

17 11. To the extent any of these Conclusions are considered or deemed to be  
18 Findings of Fact or part of the Order, they are incorporated into those sections as if fully set  
19 forth therein.

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**ORDER**

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THEREFORE, subject to the aforesaid statements, findings and good cause appearing, the Governing Board of the Great Basin Unified Air Pollution Control District orders as follows:

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1. Except as provided in Paragraph 2 of this Stipulated Order for Abatement (Order), below, Respondent shall install, operate and maintain Best Available Control Measures (BACM) on approximately 3.1 square miles of the Owens Lake bed known as the "Phase 7a" areas and on approximately 3.0 square miles known as the "Transition Areas" as shown and described in Exhibit 4. BACM shall consist of the existing approved Shallow Flooding, Managed Vegetation, Gravel Blanket or any new/modified District-approved BACM. BACM are described in Paragraphs 12, 15, 16 and 17 of District Governing Board Order 080128-01, as well as in Chapter 5 of the 2008 SIP.

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2. Respondent shall construct existing BACM, or conduct testing of new or modified BACM, as set forth in Attachment D of District Governing Board Order 080128-01 on up to one-third (0.33) square mile of the Phase 7a project area. The test area is limited to the Phase 7a subarea known as "T12-1" and is shown in Exhibit 4. BACM testing shall begin before October 1, 2011 and shall be conducted as provided in the 2008 SIP. As provided in District Governing Board Order 080128-01, Attachment D, additional research on potential new, modified and adjusted BACM shall be allowed within the 43.0 square mile 2008 Total Dust Control Area (which is described in District Board Order 080128-01, Exhibit 1).

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1           3.       The BACM and BACM-testing described in Order Paragraphs 1 and 2 shall  
2 generally be constructed as set forth in the Project Description attached as Exhibit 5. The  
3 Parties agree that in order for the project to comply with Health and Safety Code Section  
4 42316, the Phase 7a project will rely upon and incorporate the use of all three approved  
5 BACMs.

6           4.       Respondent shall install fully operational BACM for the Phase 7a areas and  
7 Transition Areas according to the following schedule:

8                   a.       Except the T12-1 BACM test area, BACM controls shall be fully  
9 installed and operational (as defined in Findings of Fact Paragraph 18, above) by  
10 December 31, 2013. All Phase 7a and Transition areas controlled by the Managed  
11 Vegetation BACM are to achieve fully-compliant BACM vegetation cover as specified in  
12 the March 2010 Managed Vegetation BACM Proposal (Exhibit 6) by December 31,  
13 2015. The APCO shall submit said Proposal to the District Governing Board for  
14 approval and incorporation into the 2008 SIP prior to July 31, 2011.

15                   b.       For the T12-1 BACM test area (as provided in Order Paragraph 2,  
16 above) either any existing BACM or a District-approved new BACM shall be fully  
17 installed and operational by December 31, 2015 or an earlier date, if specified in the  
18 District's approval of the new BACM.

19           5.       Respondent shall not be deemed in violation of this Order if Respondent is  
20 acting in good faith to comply with the terms of Order Paragraphs 1 through 4, but is  
21 impeded in its ability to comply with one or more of those terms of this Order as applicable  
22 to the Phase 7a and Transition Areas due to:

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1                   a.       Unreasonable delays caused by the California State Lands  
2 Commission (CSLC), the District, or any other agency, except the City of Los Angeles  
3 and its agencies, in processing Respondent's application for a required permit, approval  
4 or lease necessary to allow Respondent to implement any of the three BACM, or the  
5 proposed 7a project.

6                   b.       Denial by the CSLC, the District, or any other agency, except the  
7 City of Los Angeles and its agencies, of a required permit, approval or lease necessary to  
8 allow Respondent to implement any of the three BACM, or the proposed 7a project.

9                   c.       A condition for a required permit, approval or lease made by the  
10 CSLC, the District or any other agency, except the City of Los Angeles and its agencies,  
11 that is unreasonable, unduly onerous, or that is not comparable to conditions contained in  
12 similar permits, approvals or leases necessary to allow Respondent to implement any of  
13 the three BACM, or the proposed 7a project.

14                  d.       Delays caused by any third party challenge to Respondent's  
15 compliance with CEQA related to the Phase 7a areas or the Transition Areas.

16                  e.       A condition of Force Majeure, which is defined to mean an  
17 extraordinary event or circumstance beyond the control of the parties, such as a war,  
18 labor actions, riot, crime, disruption of utilities or acts of God (such as adverse weather,  
19 earthquake, volcanic eruption or other natural disaster). Adverse weather is any weather  
20 condition, including but not limited to flooding and dust storms, that forces the  
21 Respondent to suspend all construction operations or prevents the Respondent from  
22 proceeding with 50 percent or more of the normal labor force and of the equipment

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1 engaged on critical path work. Delays shall only be granted for adverse weather days  
2 greater than 30 days for each 12 month period from April 1 through March 31.

3 f. Force Majeure is not intended to excuse delays or conditions where  
4 non-performance is caused by the usual and natural consequences of external forces, or  
5 where the intervening circumstances are specifically contemplated.

6 The Parties shall follow the procedure set forth in Order Paragraph 6 to determine if  
7 Respondent acted in good faith, but has been impeded in its ability to comply with the Order  
8 for any of the causes or conditions set forth above.

9 6. If Respondent's Board of Commissioners determines that Respondent has  
10 been impeded in its ability to comply with the requirements of this Order due to one or more  
11 conditions set forth in Order Paragraph 5, the following procedure shall be followed:

12 a. The Board of Commissioners shall pass a resolution making such a  
13 finding. If such a resolution is passed by the Board of Commissioners, Respondent shall  
14 notify the APCO in writing within 15 days of such resolution, and propose a detailed  
15 schedule of increments of progress setting deadlines for future actions to come into full  
16 compliance with this Order and to request an extension of the deadlines contained in this  
17 Order ("Schedule of Increments").

18 b. If the APCO concurs with the Board of Commissioners resolution,  
19 the Respondent and APCO shall jointly petition the District Governing Board to modify  
20 this Order as provided in Order Paragraph 22.

21 c. If the APCO does not concur with the Board of Commissioners  
22 resolution, the following shall occur:

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1                   i. The APCO shall notify the Respondent and the District  
2           Governing Board in writing of his finding within 15 days of receipt of the Board of  
3           Commissioner's resolution.

4                   ii. Within 30 days of such written notice by the APCO to  
5           Respondent, two District Governing Board members and two of Respondent's Board  
6           members may meet to make a non-binding recommendation as to whether  
7           Respondent has met the requirements of Order Paragraph 5 and whether the requested  
8           Schedule of Increments should be granted, granted with modifications, or denied.  
9           The final recommendation, if any, shall be made in writing within 15 days of the  
10          meeting. If a recommendation is not made, or the meeting does not take place within  
11          30 days of written notice by the APCO, Respondent may request a final determination  
12          from the District Governing Board at a public hearing, as provided in Order  
13          Paragraph 22.

14                  iii. If there is written recommendation pursuant to Order Paragraph  
15          (6)(c)(ii), the APCO shall submit such written recommendation to the District  
16          Governing Board. The Respondent shall have the burden of proof by a  
17          preponderance of the evidence that the conditions set forth in Order Paragraph 5 have  
18          been met.

19                  iv. If, at a public hearing, as provided in Order Paragraph 22, the  
20          District Governing Board finds that Respondent has proved by a preponderance of the  
21          evidence that the conditions set forth in Order Paragraph 5 have been met, the District  
22          Governing Board shall grant or grant with modifications the Schedule of Increments  
23          to allow Respondent additional time to comply without additional financial penalties

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1 being imposed for the delay. In addition, Respondent shall not be found in violation  
2 of this Order.

3 d. The Respondent retains all of its appellate and other legal rights to  
4 contest the findings of the District Governing Board to a court of competent jurisdiction.

5 7. In order to decrease water use on Owens Lake consistent with the stated goals  
6 of the Respondent and the District, up to 3.0 square miles of existing Shallow Flood controls  
7 as described in the attached Project Description (Exhibit 5) may be transitioned to any  
8 combination of the three approved BACM measures (Managed Vegetation, Shallow  
9 Flooding and/or Gravel Blanket) in order to provide a water supply for the 3.1 square miles  
10 of Phase 7a areas. The Transition Areas and the Phase 7a areas (with the exception of Area  
11 T12-1, which will be a BACM test) when completed shall only include BACM and will not  
12 include Moat and Row or any other non-BACM.

13 8. The parties stipulate that during construction of the Transition Areas, the  
14 Transition Areas may not be compliant at all times with the BACM requirements set forth in  
15 Governing Board Order 080128-01. Respondent therefore shall take “Reasonable  
16 Precautions” to control particulate matter emissions to the extent practicable during  
17 construction of the Transition Areas as set forth in District Rule 401A (adopted 09/05/74;  
18 amended 12/04/06). Respondent has developed a Conceptual Dust Control Plan for the  
19 Transition Areas consistent with, and considered to be the Reasonable Precautions required  
20 by, District Rule 401A and (attached hereto as Exhibit 7). Upon completion of the design of  
21 the Transition Areas and prior to any construction or any time when dust control measures in  
22 Transition Areas may be modified in a manner that would cause the areas not to comply with  
23 BACM requirements, Respondent shall submit to the APCO for his approval a final Dust

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1 Control Plan. The APCO shall expeditiously review Respondent's plan and shall not  
2 unreasonably withhold his approval of such plan. Despite the terms of Sections 7.9 of the  
3 2008 SIP and Attachment D to the Board Order, if the Transition Areas are not BACM  
4 compliant and if there is a monitored exceedance or if the Dust ID Protocol predicts an  
5 exceedance of the National Ambient Air Quality Standard for PM<sub>10</sub> caused solely by  
6 emissions from the Transition Areas (as determined by the "Dust ID" procedure set forth in  
7 the 2008 SIP), the District shall not take enforcement action pursuant to the Health and  
8 Safety Code, a variance will not be required and the Respondent shall not be deemed in  
9 violation of this Order, District Governing Board Order 080128-01, the 2008 SIP, or other  
10 District rules or orders related to such exceedances, provided that Respondent implements  
11 the approved Dust Control Plan or under circumstances of force majeure prohibiting  
12 compliance with the Dust Control Plan during this transition period

13 9. Respondent shall submit quarterly written reports on Phase 7a and Transition  
14 Area progress to the APCO and Board Clerk. Quarterly reports shall describe the status of  
15 the work completed during that quarter, the planned work for the next four quarters,  
16 compliance with the schedule, and specifically identify issues that could delay progress on  
17 the Phase 7a project. Respondent shall promptly notify the District in writing of any  
18 circumstances that could cause project delays. Quarterly reports shall be due within 30 days  
19 of the end of each calendar quarter. The first quarterly report subject to this Order shall be  
20 due on or before July 30, 2011 and the last quarterly report subject to this Order shall be due  
21 for the quarter during which Respondent has achieved full compliance for all Phase 7a areas  
22 and all Transition Areas.

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1           10.     Based on the 2008 SIP modeling protocol estimate of 6,265 tons of excess  
2 annual PM<sub>10</sub> air pollution emissions expected to be caused by Respondent's failure to  
3 implement effective PM<sub>10</sub> controls on the Phase 7a areas by the mandatory deadlines,  
4 Respondent shall pay six-million-five-hundred-thousand dollars (\$6,500,000.00) to the  
5 District to offset and mitigate such excess emissions that may occur between October 1, 2010  
6 and December 31, 2013.

7           11.     Except as provided in Order Paragraphs 5, 6, 8 and 9, above, and failure to  
8 comply with BACM implementation and operation deadlines for all Phase 7a areas and  
9 Transition areas as set forth in Order Paragraph 4, above, or by deadlines as subsequently  
10 modified by the District as provided in Paragraph 22, Respondent shall be subject to  
11 additional daily offset payments prorated by the amount of noncompliant area according to  
12 the following formula:

13                     Offset Amount (\$/day) = \$5,500 + \$4500 (A<sub>7a</sub> + A<sub>TA</sub>)/6.1

14                     where,

15                     A<sub>7a</sub> = Non-compliant Phase 7a Area (square miles), and

16                     A<sub>TA</sub> = Non-compliant Transition Area (square miles).

17           12.     Respondent shall make the payment as set forth in of this Order Paragraph 10,  
18 above, within 90 days of the date of this Stipulated Order for Abatement, or within 90 days  
19 of the issuance of an order to pay, if additional payments are demanded, as provided in  
20 Paragraph 11 above, for failure to meet the completion dates set forth in Order Paragraph 4,  
21 above.

22           13.     Eighty-five percent (85%) of the excess air pollution offset/mitigation  
23 payment made by Respondent to the District under Paragraphs 10 and 11 of this Order shall

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1 be deposited into an Owens Lake Excess Air Pollution Offset Fund established by the  
2 District. These monies shall be used for Clean Air Projects within the District (Inyo, Mono  
3 and Alpine Counties) with preference given to projects in the Owens Valley PM<sub>10</sub> Planning  
4 Area. "Clean Air Projects" are defined as improvements, replacements, or programs that  
5 directly or indirectly result in a reduction in air pollution emissions. Monies shall not be  
6 used to fund projects that Respondent is required to undertake or implement. The District  
7 Governing Board shall have the sole authority and discretion regarding project selection and  
8 approval, but will consider any project recommendations made by Respondent. Projects  
9 shall be publicized as joint projects of the Great Basin Unified Air Pollution Control District  
10 and the Los Angeles Department of Water and Power. Fifteen percent (15%) of the Clean  
11 Air Projects funds will be deposited into the District's regular budget account. All costs  
12 incurred by the District to administer the Clean Air Projects program will be paid by the  
13 District from the District regular budget account. The District shall have the sole discretion  
14 and responsibility for the Clean Air Projects program administration, planning and  
15 implementation, and Respondent shall not be responsible for program costs other than for the  
16 offset mitigation payments in compliance with Paragraphs 10 and 11 of this Order.

17 14. The APCO shall resume the Supplemental Control Requirement  
18 determinations required in Paragraph 10 of District Governing Board Order 080128-01 and  
19 shall use data collected since July 1, 2006 to make such determinations.

20 15. The parties commit to work cooperatively to support Respondent's efforts to  
21 develop and implement new PM<sub>10</sub> control measures or modify existing measures that are as  
22 water-use efficient as possible.

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1           16.     Respondent shall comply with all other District rules, codes, orders and  
2 regulations not covered by this Order for Abatement, including all provisions of District  
3 Governing Board Order 080128-01 and District Hearing Board order GB09-06 that have not  
4 been modified by this Order for Abatement. Respondent's violation of any District rules,  
5 codes, orders or regulations not covered by this Order for Abatement, including all other  
6 provisions of District Governing Board Order 080128-01 and District Hearing Board Order  
7 GB09-06, shall be subject to District enforcement and will be considered separate violations  
8 not subject to the limitations and reductions set forth in the Order for Abatement.

9           17.     This Order for Abatement does not act as a variance and Respondent is  
10 subject to all rules and regulations of the District except as provided in this Order for  
11 Abatement.

12           18.     Final compliance shall be achieved, and this Order for Abatement shall  
13 terminate when Phase 7a and the Transition Areas are fully operational, but no later than  
14 December 31, 2015. Respondent shall notify the Clerk of the Board and the APCO in  
15 writing when final compliance is achieved.

16           19.     Respondent enters into this Stipulated Order for Abatement without admitting  
17 liability and for the limited purpose of settling NOV No. 471 issued to Respondent by the  
18 APCO on October 1, 2010, and for violation of Governing Board Order 080128-01, and for  
19 violation of District Hearing Board Order GB09-06. Respondent specifically waives and  
20 agrees not to appeal or otherwise contest this Stipulated Order for Abatement under Health  
21 and Safety Code Section 42316 or any other cause of action. Respondent however, reserves  
22 its legal and appellate rights to contest any allegation that it has violated this Stipulated Order  
23 for Abatement. Respondent does not waive or give up its right to contest any other future

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1 order, NOV, civil or criminal prosecution, or any other action the District may bring against  
2 Respondent subsequent to entry of this Stipulated Order for Abatement.

3 20. This Stipulated Order for Abatement is a full and final settlement of NOV  
4 No. 471 issued by the APCO to Respondent on October 1, 2010, and for the violation of  
5 Governing Board Order 080128-01. The stipulated order is the final integrated agreement  
6 between the parties regarding the matters addressed herein. By entering this Stipulated Order  
7 of Abatement, Respondent is hereby released from any additional liability for these  
8 violations except as set forth in this Order.

9 21. The District Governing Board shall retain jurisdiction over this matter until  
10 December 31, 2015, unless the Order is amended or modified.

11 22. The parties may petition the District Governing Board for a modification of  
12 this Order for Abatement with or without a stipulation. The Governing Board may modify  
13 the Order for Abatement without the stipulation of the parties upon a showing of good cause  
14 therefore and upon making the findings required by Health and Safety Code Section  
15 42451(a) and District rule 805(a). Any modification of the Order shall be made only at a  
16 public hearing held upon ten (10) days published notice and appropriate notice to the parties.

17 23. The United States Environmental Protection (USEPA) Region 9 has been  
18 informed of this agreement made and entered into between the District and Respondent.

19 24. Petitioner and Respondent stipulate that the District Governing Board has full  
20 and complete jurisdiction in the matter of this Stipulated Order for Abatement.

21 25. Petitioner and Respondent affirm that their respective signatories below have  
22 the authority to represent and bind their respective parties to the terms of this Stipulated  
23 Order for Abatement.

24

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1 **Reviewed and Stipulated by:**

2 Air Pollution Control Officer, Petitioner:

3 *T. D. Schade*  
4 Theodore D. Schade, Air Pollution Control Officer

1 April 2011  
Date

5 Los Angeles Department of Water and Power, Respondent:

6 *Ronald O. Nichols*  
7 Ronald O. Nichols, General Manager

3/30/11  
Date

8 **ORDERED FOR THE BOARD BY:**

9 *Linda Arcularius*  
10 Linda Arcularius, Chair, District Governing Board

April 1, 2011  
Date

11 **ATTEST:**

12 *Shirley Ono*  
13 Shirley Ono, Acting Board Clerk

14 Date: April 1, 2011  
15

APPROVED AS TO FORM AND LEGALITY  
CARMEN A. TRUTANICH, CITY ATTORNEY

MAR 29 2011  
*Michelle Lyman*  
MICHELLE LYMAN  
DEPUTY CITY ATTORNEY

Final: 3/17/2011

1 **List of Exhibits**

- 2 Exhibit 1 Owens Lake – Map
- 3 Exhibit 2 District Governing Board Order 080128-01, contained in the *2008 Owens*  
4 *Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State*  
5 *Implementation Plan*, January 28, 2008
- 6 Exhibit 3 District Hearing Board Order GB09-06, *Findings and Order Granting*  
7 *Regular Variance from Requirements Set Forth in Governing Board Order*  
8 *080128-01*, September 25, 2009
- 9 Exhibit 4 Phase 7a and Transition Areas– Map and Coordinate Description
- 10 Exhibit 5 Phase 7a and Transition Areas Project Description
- 11 Exhibit 6 March 2010 Managed Vegetation BACM Proposal
- 12 Exhibit 7 Conceptual Transition Area Dust Control Plan

**ATTACHMENT C**

Exhibit 2

LADWP Petition to the District Governing Board to modify Order 110317-01,  
filed June 14, 2013

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 City Attorney  
 2 RICHARD BROWN  
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 Assistant General Counsel  
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14 Attorneys for CITY OF LOS ANGELES  
 15 ACTING BY AND THROUGH ITS  
 DEPARTMENT OF WATER AND POWER

17 BEFORE THE GOVERNING BOARD OF THE  
 18 GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

19  
 20 IN RE STIPULATED ORDER FOR  
 ABATEMENT (ORDER 110317-01)

**PETITION BY THE CITY OF LOS  
 ANGELES ACTING BY AND THROUGH  
 ITS DEPARTMENT OF WATER AND  
 POWER TO MODIFY ORDER 110317-01**

21  
 22  
 23  
 24  
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1       **1. INTRODUCTION.**

2           The City of Los Angeles, acting by and through its Department of Water and Power  
3 (LADWP), respectfully submits this Petition to modify Stipulated Order of Abatement 110317-01,  
4 dated March 17, 2011, by and between LADWP and the Great Basin Unified Air Pollution Control  
5 District (Great Basin), a copy of which is attached as Exhibit 1 (the Order). LADWP is currently in  
6 full compliance with the Order. However, due to the unexpected discovery of significant cultural  
7 and archaeological resources in the Phase 7a area, LADWP will not be able to complete the  
8 construction of the Phase 7a dust controls in the five Phase 7a subareas (T37-1, T37-2, T1A-3,  
9 T1A-4, and T32-1) and the transition areas selected from existing Shallow Flooding areas (T1A-2a,  
10 T28N, T28S, T30-1a, T30-1b, T35-1, T35-2, and T36-1b) within the time frame specified in the  
11 Order. The extent and significance of these cultural resources is unprecedented around Owens  
12 Lake. LADWP relied upon the disclosures related to cultural resources set forth in the 2008 State  
13 Implementation Plan (2008 SIP) Supplemental Environmental Impact Report (SEIR) in agreeing to  
14 the time schedule in the Order. However, when LADWP investigated the presence of cultural  
15 resources, which it is required to do under Great Basin Governing Board Order 080128-01 (Order  
16 080128-01), ¶ 23, the 2008 State Implementation Plan (SIP), §§ 5.1, 8.1, the SEIR, §§ 3.3.5, and  
17 the California Environmental Quality Act (Pub. Resources Code, §§ 21000, et seq.) (CEQA),  
18 LADWP discovered the cultural resources were far more extensive than disclosed in the SEIR.  
19 Because the consultation, investigation, and analysis of these extensive and unanticipated cultural  
20 resources must be completed before engineering design and contracting can begin, the construction  
21 of dust controls in the Phase 7a did not commence when it needed to in order to meet the future  
22 deadlines in the Order. Thus, the deadlines in the Order no longer provide a reasonable and  
23 sufficient time to construct the Phase 7a dust control project.

24           Section 5 of the Order explicitly allows for situations like this where LADWP is acting in  
25 good faith to comply with the Order's terms, but is impeded by circumstances beyond its control.  
26 LADWP fully satisfied the requirements of Paragraphs 5 and 6 of the Order by adopting three  
27 resolutions on February 7, 2012, April 3, 2012, and January 11, 2013, finding that LADWP acted in  
28

1 good faith to comply with the terms of the Order, but has otherwise been impeded in meeting the  
2 deadlines for installing BACM due to the unexpected discovery of extensive cultural resources.  
3 LADWP also briefed the Governing Board at its September 5, 2012, meeting about the impacts of  
4 the unexpected discovery of extensive cultural resources in the Phase 7a area. The September 5,  
5 2012 meeting is part of the record for these proceedings. The Order provides that after adoption of  
6 the resolutions, LADWP may petition the Governing Board to modify the Order.

7 In addition to adjusting the deadlines to construct dust controls, LADWP is also requesting  
8 that the Governing Board adjust the boundaries of the Phase 7a dust control area to remove 350  
9 acres (Avoided Area). This request is based upon the results of an extensive CEQA analysis  
10 conducted by LADWP that included consultation with local tribal representatives. The Avoided  
11 Area includes sites that are eligible for inclusion in the California Register of Historical Resources  
12 (CRHR) and a small buffer area. As further explained in this petition, there is good cause to  
13 support the Governing Board's approval of LADWP's request.

## 14 **2. SUMMARY OF LADWP'S MODIFICATION REQUEST.**

15 LADWP submits this Petition requesting that the Governing Board modify the Order as  
16 follows:

17 First, LADWP requests an extension of time to install dust controls on Phase 7a subareas  
18 (T37-1, T37-2, T1A-3, T1A-4, and T32-1), and the transition areas (T1A-2a, T28N, T28S, T30-1a,  
19 T30-1b, T35-1, T35-2, and T36-1b). In order to implement BACM as expeditiously as possible,  
20 LADWP proposes to implement the BACM project in two Phases.

### 21 **Phase 1 Schedule**

22 The proposed Phase 1 schedule covers the following areas:

- 23 • Phase 7a: T1A-4 and T37-2 (except for 14 acres)
- 24 • Transition areas: T1A-2a, T28N, T28S, T30-1a, T30-1b, T35-1, T35-2, and T36-1b

25 LADWP requests an extension of time to install controls in these areas until April 2, 2015,  
26 and for the areas with managed vegetation (T37-2 (minus 14 acres), T1A-2, T28N, T28S, T30-1a,  
27 T30-1b, and T36-1b) to have the vegetation sufficiently established by March 30, 2017.

28

1           **Phase 2 Schedule**

2           The proposed Phase 2 schedule covers the following areas:

- 3           • Phase 7a: T37-1, T1A-3, and T32-1

4           LADWP requests an extension of time to install controls in these areas until December 30,  
5 2016, and for the areas with managed vegetation (T32-1) to have the vegetation sufficiently  
6 established by December 28, 2018.

7           The proposed schedules for Phase 1 and Phase 2 are contingent upon no further discovery  
8 of significant cultural and archeological resources, sufficient climatic conditions to facilitate the  
9 growth of the managed vegetation, and other agencies timely approving a lease amendment and the  
10 numerous permits required to implement the Phase 7a Project. These contingencies should be  
11 included in the modified Order.

12           Second, LADWP requests that 350 acres of Phase 7a subareas T1A-3, T32-1, T37-1 and  
13 T37-2 identified in the Final EIR certified by LADWP (*see Exhibit 2*) that contain CRHR-eligible  
14 sites be removed from the Phase 7a project area to permanently avoid impacts to the cultural  
15 resources in these areas. LADWP also requests that the Order be adjusted to comply with  
16 LADWP's EIR mitigation measure CR-3 that requires protection of three archaeological sites.

17           Third, LADWP requests that the Order be modified to clarify and confirm that LADWP's  
18 selection of approximately 3.4 square miles of the existing Shallow Flooding areas in Phase 7a  
19 subareas T1A-2, T28N, T28S, T30-1a, T30-1b, and T36-1b to be transitioned to a hybrid of BACM  
20 including Managed Vegetation, Gravel Cover and Shallow Flooding (Transition Areas), is  
21 consistent and fully compliant with Paragraphs 7 and 8 of the Order, which provide that during  
22 construction of the Phase 7a project a maximum of 3.0 square miles of Transition Areas may be  
23 without BACM at any time. LADWP's transition of the additional 0.4 square miles of dust control  
24 areas will be accomplished during the non-dust control season. (Draft EIR, § 3.1.8.1.) Therefore,  
25 consistent with the Order, no more than 3.0 square miles of the Transition Areas will be  
26 uncontrolled at any one time.

1 Fourth, LADWP requests that the Phase 7a map and coordinates presently included as  
2 Exhibit 4 to the Order be removed and replaced with Figure 1-1 of the Final EIR (*see Exhibit 3*) so  
3 as to accurately reflect the current Phase 7a Project area, Transition Areas and approved Best  
4 Available Control Measures (BACM).

5 Fifth, LADWP requests that the discovery of cultural resources be expressly recognized as  
6 one of the conditions beyond LADWP's control and for which LADWP is not deemed to be in  
7 violation of the Order. While LADWP believes this circumstance is covered by the Order, the Air  
8 Pollution Control Officer (APCO) has expressed some reservations about whether this  
9 circumstance is covered. Therefore, this request is necessary.

10 Sixth, LADWP requests that the Governing Board issue a modification to Order 080128-01  
11 that is submitted to the California Air Resources Board (CARB) and United States Environmental  
12 Protection Agency (EPA) to conform that order to the these modifications.

13 Seventh, LADWP requests the Governing Board retain jurisdiction over the Order until  
14 December 31, 2018.

15 Finally, by this request, LADWP is not ratifying the Supplemental Control Requirements  
16 Determination (SCRD) discussion in the Order or agreeing to the previous or any future SCRDS.

17 **3. FACTUAL AND PROCEDURAL BACKGROUND.**

18 **A. The Phase 7a Order for Abatement Requirements.**

19 On March 17, 2011, the Governing Board issued the Order requiring LADWP to install  
20 BACM on Phase 7a. Phase 7a, a total area of approximately six square miles, consists of six  
21 separate and discrete Dust Control Areas (DCAs): T37-1, T37-2, T1A-3, T1A-4, T-32-1 and T12-1  
22 (a total of approximately 3.1 square miles), and 3.0 square miles of Transition Areas (identified on  
23 Exhibit 4 to the Order).

24 Paragraph 4(a) of the Order provides that approved BACM shall be fully installed and  
25 operational on all Phase 7a subareas, except for T12-1, and Transition Areas by December 31,  
26 2013, and that Transition Areas controlled by the Managed Vegetation BACM are to achieve fully  
27 compliant BACM vegetation cover by December 31, 2015. Paragraph 4(b) of the Order provides

28

1 that BACM shall be installed and operational on the T-12-1 subarea by December 31, 2015.<sup>1</sup> This  
2 is a massive undertaking. The 6.5 square miles of individual Phase 7a and Transition Areas are  
3 dispersed all over the lakebed. As a basis of comparison, the City of Bishop is approximately 2  
4 square miles in size. In order to install BACM in these Phase 7a and Transition Areas, LADWP  
5 must also construct a new access road, construct three new turn out facilities and modify four  
6 existing turn out facilities, install or reconfigure the berms on areas immediately adjacent to DCAs,  
7 and construct new water supply pipelines.

8 Paragraph 5 of the Order provides that LADWP shall not be in violation of the Order if  
9 LADWP is acting in good faith to comply with the terms of the Order, but is impeded or prevented  
10 from doing so by, among other things, events or circumstances beyond its control. Paragraph 6 of  
11 the Order permits the LADWP Board to adopt a resolution to this effect, and requires that LADWP  
12 notify Great Basin's APCO of any such resolution within 15 days of its adoption. As discussed  
13 below, the LADWP Board fully satisfied the requirements of Paragraph 5 by adopting three  
14 resolutions documenting unavoidable delays resulting from unanticipated cultural resources  
15 findings and timely notifying the APCO. Paragraph 22 of the Order provides that either LADWP  
16 or Great Basin may petition the Governing Board for a modification of the Order with or without a  
17 stipulation.

18 The Governing Board expressly retained jurisdiction over the Order until at least May  
19 2016, which is the amended deadline to install BACM in the T12-1 subarea. (Order, p. 21 (¶ 21).)  
20 The Order also expressly allows for modifications to the Order (¶ 22) and specifically contemplates  
21 that LADWP would be able to seek a modification of the Order, for example, in the event LADWP  
22 is unable to install BACM in Phase 7a in accordance with the deadlines set forth in the Order. (, p.  
23 14 (¶ 6.b.)) The modification provision is not limited to changes caused by conditions beyond  
24 LADWP's control. (Order, p. 21 (¶ 21).)

25  
26  
27 <sup>1</sup> On February 6, 2012, the Governing Board approved the APCO and LADWP's joint petition to  
28 modify the Order to extend the deadline for LADWP to install BACM on the T-12 subarea from  
December 31, 2015, to May 1, 2016 (Board Order No. 120206-07).

1 Board Order 080128-01 recognizes that the exact boundaries of Phase 7a (*i.e.*, the 2006  
2 SDCA) may need to be modified to account for unforeseen project impacts (such as may be  
3 discovered during the course of completing CEQA review) or operational/construction issues, and  
4 that District approval of any formal request for modification by LADWP or the City “shall not be  
5 unreasonably withheld.” Specifically:

6 Upon written request by the City to the District and written approval by the  
7 District’s APCO, minor adjustments may be made to the interior and exterior  
8 boundaries of the 2006 SDCA, for example to avoid impacts to existing  
9 resources or features, or for constructability reasons, which approval shall not  
10 be unreasonably withheld. In the event of such modification, the boundaries of  
11 the 2008 TDCA [2008 Total Dust Control Area] shall also be modified to reflect  
12 the modified 2006 SDCA boundaries.

13 (Board Order 080128-01, ¶6.)

14 **B. Phase 7a Cultural Resources Evaluation.**

15 The 2008 SIP required LADWP to be responsible for conducting any CEQA analysis  
16 beyond the 2008 SIP SEIR in order to implement the control strategy and to obtain any necessary  
17 leases or other approvals from responsible agencies for the project. (*See* 2008 SIP, §§ 8.1, 5.1,  
18 5.2.6). LADWP retained Garcia and Associates (GANDA) to conduct all of the archaeological  
19 investigations necessary to comply with CEQA requirements for Phase 7a. Between May and  
20 August 2011, GANDA conducted a Phase I pedestrian survey of the subareas within Phase 7a and  
21 discovered extensive archaeological and cultural resources throughout the proposed project that  
22 necessitated Phase II testing and evaluation. LADWP was required to obtain an Archaeological  
23 Investigation Permit from California State Lands Commission (CSLC) before conducting the Phase  
24 II testing and evaluation. CSLC approved the permit on September 1, 2011.

25 Immediately after CSLC approved the permit, GANDA commenced Phase II testing and  
26 evaluation of the sites identified during the Phase I pedestrian survey to determine the sites’  
27 eligibility for inclusion in the National Register of Historic Places (NRHP) and CRHR. In October  
28 2011, GANDA completed its Phase II testing and evaluation of the T37-1 and T37-2 subareas.  
GANDA determined that subarea T37-1 contains four archaeological sites that are CRHR-eligible,  
and subarea T37-2 contains 12 archaeological sites, two of which are CRHR-eligible. GANDA

1 advised LADWP to avoid any ground disturbing activities in or near the CRHR-eligible sites and, if  
2 avoidance was not feasible, LADWP would be required to complete a Phase III recovery before  
3 commencing ground disturbing activities in or near the CRHR-eligible sites.

4 In November and December 2011, LADWP evaluated whether it could proceed with the  
5 necessary geotechnical work on the T37-1 and T37-2 subareas while avoiding the disturbance of  
6 the CRHR-eligible sites. LADWP determined that it was infeasible to avoid disturbance of the four  
7 CRHR-eligible sites identified on T37-1 during geotechnical work and, therefore, LADWP did not  
8 proceed with geotechnical work on subarea T37-1. In addition, on December 13, 2011, GANDA  
9 issued a stop work order to LADWP (*see Exhibit 4*), pursuant to its authority under the CSLC  
10 permit, requiring LADWP to stop all geotechnical work or other construction-related ground  
11 disturbing activity on T37-1 until after the completion of Phase III archaeological data recovery  
12 excavations. LADWP determined that the CRHR-eligible sites on T37-2 could be avoided during  
13 geotechnical work. LADWP completed the geotechnical work on T37-2 in December 2011.  
14 LADWP, however, could not avoid any of the CRHR-eligible sites on T37-1 or T37-2 if it  
15 constructed dust control measures in accordance with the Order.

16 LADWP and the APCO met several times to discuss LADWP's progress on Phase 7a and  
17 possible alternatives to the project, including whether a cultural resources recovery effort could be  
18 avoided by increasing dust control efficiencies in other areas of Phase 7a that would enable the  
19 archaeologically-sensitive areas to remain untouched. In August 2012, GANDA completed its final  
20 Phase II Testing Report<sup>2</sup> and evaluation of historical and archaeological resources in all of the  
21 Phase 7a subareas, except for the T12-1 tillage test area. In its January 30, 2012, memorandum (*see*  
22 *Exhibit 5*), GANDA informed LADWP that subarea T1A-3 contains 38 archaeological sites, three  
23 of which are CRHR-eligible. GANDA further informed LADWP that subarea T32-1 contains 15

24 \_\_\_\_\_  
25 <sup>2</sup> The Phase II Testing Report contains sensitive cultural resources information that cannot be  
26 disclosed under protection laws. If requested by the Governing Board, LADWP will provide a  
27 copy of the Phase II Testing Report to the Governing Board for in-camera review subject to the  
28 Phase 7a Confidentiality Agreement between LADWP and Great Basin, dated March 27, 2012.  
GANDA also issued an additional stop work order on September 17, 2012. If requested by the  
Governing Board, LADWP will also provide this document for in-camera review subject to the  
Confidentiality Agreement.

1 archaeological sites, two of which are eligible for inclusion in the CRHR. GANDA recommended  
2 that the CRHR-eligible sites on subareas T1A-3 and T32-1 be completely avoided and that no  
3 geotechnical sampling or other construction-related ground disturbances be performed on T1A-3 or  
4 T32-1, since the CRHR-eligible sites encompass much of T1A-3 and T32-1 and cannot otherwise  
5 be avoided. GANDA further recommended that if avoidance or preservation in place were  
6 determined to be infeasible, then no ground disturbances should occur on T1A-3 or T32-1 until  
7 after the completion of Phase III archaeological data recovery excavations.

8 As a result of its investigations GANDA determined there are eleven sites in the Phase 7a  
9 project area (portions of T1A-3, T32-1, T37-1 and T37-2) eligible for listing in the CRHR. Three  
10 of the eleven sites (CA-NY-7414, CA-INY-7413/H, and CA-INY-7415/H) are locations involving  
11 the Owens Valley Indian Wars. These CRHR-sites are within the Avoidance Area. A summary of  
12 GANDA's Phase 7a investigations was presented to CARB on June 15, 2012, and is attached as  
13 Exhibit 6 [Powerpoint presentation].

14 **A. Phase 7a CEQA Process.**

15 Paragraph 23 of Board Order 080128-01 requires LADWP to comply with applicable  
16 CEQA mitigation measures included in the 2008 SIP SEIR. The mitigation measures require  
17 among other things, that if the Phase I pedestrian survey identified significant unanticipated cultural  
18 and archaeological resources, LADWP must conduct an assessment of potentially impacted cultural  
19 sites – both known and undiscovered – for significance under CEQA through the implementation of  
20 Phase II investigations. (SEIR § 3.3.5; p. 3.3-24; *see also* Appendix R-E [Final Cultural Resources  
21 Technical Report], § 5.3, pp. 5-107-109.).

22 The entire Phase 7a and Transition Areas are considered a single project under CEQA.  
23 (Cal. Code Reg., tit. 14, § 15378, subd. (a).) In accordance with CEQA, one environmental  
24 evaluation was conducted for the entire project, and no single part of the project could be  
25 implemented until CEQA for the entire project was completed. (*Orinda Ass'n v. Bd. of Supervisors*  
26 (1986) 182 Cal.App.3d 1145, 1171-72; *Topanga Beach Renters Ass'n v. Department of General*  
27 *Services* (1976) 58 Cal.App.3d 188, 195-196.) Therefore, even though some of the Phase 7a and  
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1 Transition Areas are not known to contain significant cultural resources, design could not be  
2 completed, permits from other agencies could not be obtained, construction contracts could not be  
3 awarded, and construction of the dust controls could not commence until LADWP had completed  
4 the entire CEQA process for Phase 7a.

5 In May 2011, LADWP prepared a CEQA Initial Study based on State CEQA Guidelines  
6 Appendix G, to determine whether construction and operation of the proposed project would result  
7 in significant effects on the environment. Since potentially significant effects were identified,  
8 LADWP determined that an EIR was needed to analyze those effects. A Notice of Preparation  
9 (NOP) of the EIR, along with the Initial Study, was prepared and filed with the State Clearinghouse  
10 on May 23, 2011. A public scoping meeting for the Phase 7a project was held on June 7, 2011, at  
11 the LADWP office in Keeler, California.

12 LADWP released the draft EIR in January 2013 for a 45 day public comment period. Over  
13 the course of the next several months, LADWP staff considered and responded to public comments,  
14 conducted further consultations with Native American groups and others about project impacts and  
15 comments on the draft EIR, and revised the draft EIR, as necessary, to incorporate any changes to  
16 the project.

17 CEQA requires that an EIR identify a reasonable range of alternatives to the proposed  
18 project (Phase 7a) that “would feasibly attain most of the basic objectives of the project but would  
19 avoid or substantially lessen any of the significant effects of the project,” and then provide detailed  
20 discussion of the comparative merits of each alternative for the decision-making body of the lead  
21 agency (LADWP Board of Commissioners) to consider before deciding which form of the project,  
22 if any, to ultimately approve. (CEQA Guidelines, §§ 15126.6, 15004, subd. (a).) Alternatives were  
23 identified in the EIR that would avoid impacts to cultural resources by excluding CRHR-eligible  
24 areas from the Phase 7a dust control project.

25 The Inyo County General Plan policies were also considered as part of the CEQA decision-  
26 making process. The Land Use/Conservation/Open Space element of the Inyo County General Plan  
27  
28

1 identifies several goals that are related to preserving and promoting the County's historic and  
2 prehistoric cultural heritage, including:

- 3 • **Policy CUL-1.3, Protection of Cultural Resources:** Preserve and protect key  
4 resources that have contributed to the social, political, and economic history and  
5 prehistory of the area, unless overriding considerations are warranted.
- 6 • **Policy CUL-1.4, Regulatory Compliance:** Development and/or demolition shall be  
7 reviewed in accordance with the requirements of CEQA and the National Historic  
8 Preservation Act.
- 9 • **Policy CUL-1.5, Native American Consultation:** The County and private  
10 organizations shall work with appropriate Native American groups when potential  
11 Native American resources could be affected by development proposals.

12 On June 4, 2013, the LADWP Board of Commissioners considered and certified the Final  
13 EIR and approved the Avoidance Alternative for the Phase 7a project. (Exhibits 7, 8, 9, 10 [EIR,  
14 Board Approval Letter, and Resolution].) The Avoidance Alternative involved construction of the  
15 original proposed Phase 7a project in all areas except for 350 acres of Phase 7a subareas T1A-3,  
16 T32-1, T37-1 and T37-2 known to contain significant cultural resources. Because the Avoidance  
17 Alternative would protect these significant cultural resources, increase vegetated area on the lake,  
18 improve the habitat value of the Transition Areas, and achieve the emission reductions originally  
19 expected in the 2008 SIP, it was identified as environmentally superior to the originally proposed  
20 Phase 7a project and to the other alternatives evaluated in the Phase 7a EIR. The EIR also  
21 concluded that a Phase III data investigation and recovery would not be feasible mitigation for  
22 these eleven sites because of the tremendous importance of these sites to both the archaeological  
23 and local Native American communities for their prehistoric and historic value as unique historical  
24 resources. The Board of Commissioners approved the Phase 7a project and certified the Final EIR  
25 subject to and contingent upon the Governing Board's approval of this petition to modify the Order  
26 to remove these 350 acres from the original Phase 7a area, and to make any other additional  
27 changes necessary to ensure consistency between the Order, the Phase 7a project and the Final EIR.

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1           **B. LADWP's Board of Commissioners Adopted Resolution No. 012-170**  
2           **Regarding Phase 7a Subareas T37-1 and T37-2.**

3           On February 7, 2012, in accordance with Paragraphs 5 and 6(a) of the Order, the LADWP  
4 Board passed Resolution No. 012-170, finding that LADWP had acted in good faith to comply with  
5 the terms of the Order, but had been otherwise impeded in meeting the December 31, 2013,  
6 deadline for installing BACM on the T37-1 and T37-2 subareas of Phase 7a due to the unexpected  
7 discovery of extensive archaeological resources. On February 21, 2012, LADWP notified the  
8 APCO in writing of the LADWP Board's Resolution No. 012-170, and proposed a schedule of  
9 increments of progress and deadlines for future actions in compliance with Paragraph 6(a) of the  
10 Order. (See Exhibit 11 [resolution and notice].) The APCO did not object to Resolution No. 012-  
11 170, and thus, waived any objections to the findings in this resolution.

12           **C. LADWP's Board of Commissioners Adopted Resolution No. 012-210**  
13           **Regarding Phase 7a Subareas T1A-3 and T32-1.**

14           On April 3, 2012, the LADWP Board adopted Resolution No. 012-210, finding that  
15 LADWP had acted in good faith to comply with the terms of the Order, but had been otherwise  
16 impeded in meeting the December 31, 2013, deadline for installing BACM on T1A-3 and T32-1 of  
17 the Phase 7a project due to the unexpected discovery of extensive archaeological resources. On  
18 April 17, 2012, LADWP notified the APCO in writing of the LADWP Board's Resolution No. 012-  
19 210, and proposed a schedule of increments of progress and deadlines for future actions in  
20 compliance with Paragraph 6(a) of the Order. (See Exhibit 12 [resolution and notice].) The APCO  
21 did not object to Resolution No. 012-210 and thus, waived any objections to the findings in this  
22 resolution.

23           **D. The September 5, 2012, Governing Board Meeting.**

24           On September 5, 2012, LADWP representatives attended the Governing Board meeting  
25 and presented information about the unanticipated cultural resources discovered in Phase 7a, and  
26 the potential effect the discovery of these resources would have on LADWP's ability to complete  
27 the Phase 7a EIR under CEQA, and install dust controls on Phase 7a by the December 31, 2013,  
28 deadline set forth in the Order. (See Exhibit 13.) LADWP also notified the Governing Board that it

1 would be returning to the Governing Board with the current Petition. LADWP also followed up  
2 with a letter to the Governing Board Chair on February 14, 2013. (See Exhibit 14.)

3 **E. LADWP's Board of Commissioners Adopted Resolution No. 013-157**  
4 **Regarding Phase 7a Subarea T1A-4 and Transition Areas.**

5 On January 11, 2013, the LADWP Board adopted Resolution No. 013-157, finding that  
6 LADWP had acted in good faith to comply with the terms of the Order, but had been otherwise  
7 impeded in meeting the December 31, 2013, deadline for installing BACM on T1A-4 and the  
8 Transition Areas of the Phase 7a project due to the unexpected discovery of extensive  
9 archaeological resources and the resulting delay in completing the Phase 7a EIR. Even though  
10 significant cultural resources have not been discovered in these areas, the schedule for installing  
11 BACM in these areas is affected by the unexpected discoveries in the other Phase 7a area because  
12 CEQA requires one environmental analysis to encompass the entire project. The T1A-4 and the  
13 Transition Areas cannot be excluded from the project under CEQA. On January 23, 2013, LADWP  
14 notified the APCO in writing of the LADWP Board's Resolution No. 013-157 and proposed a  
15 schedule of increments of progress and deadlines for future actions, in compliance with Paragraph  
16 6(a) of the Order. (See Exhibit 15 [resolution and notice].) The APCO responded on February 4,  
17 2013, stating that he did not concur with the findings of Resolution No. 013-517.<sup>3</sup> Thus, the  
18 APCO's objections must be limited to this resolution.

19 **F. LADWP's Board of Commissioners and Great Basin Governing Board Meet**  
20 **and Confer in Accordance with Paragraph 6(c)(ii) of the Order.**

21 Paragraph 6(c)(ii) of the Order provides that, in the event the APCO does not concur with  
22 the Board of Commissioners' resolution, two Great Basin Governing Board members and two  
23 LADWP Board of Commissioners members may meet to make a non-binding recommendation to  
24 the Governing Board as to whether LADWP has met the requirements of Paragraph 5 of the Order  
25 and whether the requested Schedule of Increments should be granted, granted with modifications,  
26 or denied. Following notification of the APCO's non-concurrence with Resolution No. 013-517,

27 <sup>3</sup> On February 28, 2013, LADWP responded to the assertions raised in the APCO's February 4,  
28 2013, letter regarding his refusal to concur with Resolution No. 013-517. A copy of LADWP's  
February 28, 2013, correspondence is attached as Exhibit 16.

1 two members of the LADWP Board of Commissioners (Richard Moss and Jonathan Parfrey) and  
2 two members of the Great Basin Governing Board (Linda Arcularius and Matthew Kingsley) met to  
3 discuss the APCO's refusal to concur with Resolution No. 013-517. LADWP and Great Basin have  
4 since held several meetings and made significant progress towards resolving this matter. These  
5 discussions remain ongoing; consequently, the modifications to the Order requested by this Petition  
6 may need to be amended to reflect the terms of any agreement reached between the parties.

7 **4. THE DISCOVERY OF EXTENSIVE CULTURAL RESOURCES NECESSITATED**  
8 **AN EXTENDED CEQA PROCESS.**

9 In the history of LADWP's dust control efforts in Owens Valley, the quality and quantity  
10 of archaeological resources discovered during the Phase I and II investigations of the Phase 7a area  
11 are unprecedented. LADWP had no reasonable expectation when it stipulated to the Order that it  
12 would later discover extensive archaeological resources in the Phase 7a area because it has never  
13 discovered resources on this scale in any other dust control areas. Great Basin has represented that  
14 the area was submerged under water and exposed only by LADWP's water gathering activities.  
15 Further, the SEIR for the 2008 SIP did not disclose the extensive cultural resources that were  
16 subsequently discovered when LADWP conducted its analysis. Therefore, LADWP would not  
17 expect to discover that the area it was being required to control was not submerged, but actually  
18 inhabited in recent times.

19 In conducting its CEQA assessment, LADWP complied with Paragraph 23 of Board Order  
20 080128-01. This Board Order requires LADWP to comply with applicable CEQA mitigation  
21 measures included in the 2008 SIP SEIR. After the Phase I pedestrian survey identified significant  
22 unanticipated cultural and archaeological resources, LADWP was required by SEIR Mitigation  
23 Measure Cultural-2 to conduct an assessment of potentially impacted cultural sites – both known  
24 and undiscovered – for significance under CEQA through the implementation of Phase II  
25 investigations. (SEIR § 3.3.5; p. 3.3-24; *see also* Appendix R-E [Final Cultural Resources  
26 Technical Report], § 5.3, pp. 5-107-109.) The CEQA analysis was delayed while LADWP's  
27 consultant, GANDA, conducted the required Phase II investigations for the Phase 7a EIR. CEQA  
28 requires that any project that causes a substantial adverse change in the significance of an historical

1 resource, including archaeological resources, is a “significant effect” requiring the preparation of an  
2 EIR. (Pub. Resources Code, §§ 21084.1, 21083.2; 14 Cal. Code Regs., § 15064.5.) Therefore, the  
3 preparation of the Phase 7a EIR was delayed while the Phase II investigations were conducted and  
4 the subsequent analysis of the results were prepared. A summary of LADWP’s diligent efforts to  
5 promptly assess and respond to the cultural resource issues, and the impacts of the cultural resource  
6 investigation upon the Phase 7a project schedule is included in Exhibit 17.

7 LADWP was also required to consult with the Native American Heritage Commission  
8 (NAHC) as part of the EIR process. (Pub. Res. Code, § 5097.97; *Environmental Protection*  
9 *Info. Ctr. v. Johnson* (1985) 170 Cal.App.3d 604, 626.) Under Public Resources Code section  
10 5097.97, the NAHC may also investigate the effect of proposed actions by a public agency if the  
11 proposed action may cause severe or irreparable damage to a Native American sacred site located  
12 on public property and may recommend mitigation measures for consideration by the public agency  
13 if the NAHC finds, after a public hearing, that the proposed action would result in damage to or  
14 interference with access to the sacred site.

15 LADWP also sought the input of the landowner and interested Indian tribes in conducting  
16 its CEQA analysis for the Phase 7a project in light of the significant archaeological findings.  
17 LADWP received a letter dated February 3, 2012, from Mary Wuester, Chairperson of the Lone  
18 Pine Paiute-Shoshone Reservation (Exhibit 18) expressing concern over the fate of the  
19 archaeological resources found in the Phase 7a project area and requesting to be included in the  
20 decision-making process. Similar correspondence was received as part of the public review and  
21 comment process on the EIR. These letters are included in the EIR, Exhibit 7. LADWP  
22 understands that the unique historical and archaeological resources discovered in the Phase 7a area,  
23 including the CRHR-eligible sites in subareas T37-1, T37-2, T1A-3 and T32-1, hold significant  
24 cultural value to Owens Valley residents and local Native American tribes. Given the extent of the  
25 archaeological resources in the Phase 7a project that are of direct significance to the culture and  
26 history of the local Native American tribes, the tribes were necessarily included in the discussion

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1 and evaluation of the significance of the resources, and whether they should remain in place  
2 undisturbed.

3         The required consultation and input from interested Native American tribes were  
4 incorporated into the Phase 7a EIR. As a result of the consultation and input, the project proposed  
5 under CEQA was revised to exclude 350 acres to protect in place certain sites that are eligible for  
6 inclusion in the NRHP and/or CRHR. The LADWP Board of Commissioners, as the lead agency  
7 under CEQA, ultimately determined to adopt this revised project (*i.e.*, the Avoidance Alternative)  
8 as the final Project for Phase 7a after considering the Phase 7a EIR and public comments, including  
9 numerous comments from local Native American tribal representatives, about whether to preserve  
10 the CRHR-eligible sites and other artifacts in place and leave them undisturbed, or to conduct a  
11 Phase III recovery. As noted previously, LADWP could not move forward with the preparation of  
12 final engineering designs and construction contract bidding until the entire CEQA process had been  
13 completed. These extended analyses and consultations significantly lengthened the CEQA process  
14 beyond what it would have been if cultural resources were not such a significant issue for Phase 7a.

15         Portions of the Phase 7a dust control project without cultural resources could not proceed  
16 because the entire dust control area constituted one “project” under CEQA, and LADWP cannot  
17 construct the project without first complying with CEQA. (*Citizens of Goleta Valley v. Bd. of*  
18 *Supervisors* (1990) 52 Cal.3d 553, 564; CEQA Guidelines, §§ 15126.6, 15004, subd. (a).)

19         The deadlines in the Order were impossible to achieve in light of the unanticipated  
20 discovery of the cultural resources. Had LADWP moved forward with construction when it needed  
21 to in order to achieve the deadlines in the Order, there could be serious consequences to LADWP,  
22 including penalties, legal challenges, or other ramifications for violating laws and requirements  
23 under:

- 24             • CEQA
- 25             • Board Order 080128-01
- 26             • SEIR mitigation measures
- 27             • Public Res. Code § 5097.9, Native American Historical, Cultural, and Sacred Sites

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- 1 • CRHR laws
- 2 • GANDA's stop work order issued on December 13, 2011
- 3 • Inyo County Code, § 9.52.050 - Destruction of sites where artifacts or remains have
- 4 been identified is punishable as a misdemeanor by a fine or by imprisonment
- 5 • Cal. Penal Code § 622 ½
- 6 • Archaeological Resources Protection Act of 1979 (16 U.S.C.A. §§ 470aa to
- 7 470mm; 36 C.F.R. § 800 et seq.)
- 8 • Religious Freedom and Restoration Act (RFRA), 42 U.S.C. § 2000bb et seq.
- 9 • Native American Graves Protection and Repatriation Act (25 U.S.C. § 3001 et seq.)
- 10 • California Native American Graves Protection and Repatriation Act of 2001 (Health
- 11 & Saf. Code, § 8010 et seq.)

12 These are exactly the kind of circumstances covered by paragraphs 5 and 6 of the Order.

13 **5. REQUEST TO MODIFY THE ORDER.**

14 LADWP satisfied the conditions set forth in Paragraph 5 of the Order by adopting  
 15 Resolutions 012-170, 012-210, and 013-157 and certifying the Phase 7a EIR contingent upon the  
 16 Governing Board's approval of this Petition to modify the Order so that it is consistent with the  
 17 approved Phase 7a project and Final EIR. Pursuant to Paragraph 22 of the Order and Paragraph 6  
 18 of Board Order 080128-01 (and all other appropriate authority) and the express direction of  
 19 LADWP's Board of Commissioners, LADWP submits this Petition and requests that the Governing  
 20 Board approve the following modifications to the Order:<sup>4</sup>

21 1. LADWP requests that the Governing Board modify the Order to extend the time  
 22 for the installation of BACM on Phase 7a subareas: T37-1, T37-2, T1A-3, T1A-4, and T32-1, and  
 23 the Transition Areas (T1A-2a, T28N, T28S, T30-1a, T30-1b, T35-1, T35-2, and T36-1b).<sup>5</sup> In order

24 \_\_\_\_\_  
 25 <sup>4</sup> In light of the ongoing discussions between representatives of the LADWP Board of  
 26 Commissioners and Great Basin Governing Board pursuant to Paragraph 6(c)(ii) of the Order,  
 LADWP reserves the right to continue, withdraw and/or modify this Petition at any time prior to the  
 upcoming July 15, 2013, Governing Board meeting.

27 <sup>5</sup> For reference, the attached Exhibit 17 provides a comparison of the schedule expected when the  
 28 Order was adopted with the proposed schedule based on the unanticipated extensive discovery of  
 the cultural and archaeological resources.

1 to implement the dust controls as expeditiously as possible, LADWP proposes to implement the  
2 project in two Phases.

### 3 Phase 1 Schedule

4 The proposed Phase 1 schedule covers the following areas:

- 5 • Phase 7a: T1A-4 and T37-2 (except for 14 acres)
- 6 • Transition areas: T1A-2a, T28N, T28S, T30-1a, T30-1b, T35-1, T35-2, and T36-1b

7 In early November 2012, LADWP conducted additional geotechnical work to help  
8 complete the design of Transition Areas. The design and construction specifications for the non-  
9 culturally sensitive areas of Phase 7a, including the Transition Areas, T1A-4 and T37-2, were  
10 completed in May 2013. (See April 30, 2013, Phase 7a Quarterly Report.) LADWP expects to  
11 award a construction contract by early August 2013, and start construction in September 2013.  
12 LADWP estimates that construction of dust control in these areas can be completed over a period of  
13 approximately 20 months after the acquisition of all necessary permits, leases and other approvals  
14 discussed above. The discovery of any further cultural resources in these areas will impact the  
15 construction schedule. A summary of the proposed schedule is as follows:

16	Activity	Time Frame
17	Completion of the design and construction specifications	May 2013
18	Certification of the Phase 7a EIR and Decision on the Project	June 2013
19	Great Basin Issuance of an Order to Comport Order to the Phase	July 2013
20	7a EIR and Project	
21	Issuance of Other Required Permits	August 2013
22	Award of construction contract	August 2013
23	Construction of dust controls begins	September 2013
24	Construction of dust controls completed	April 2015
25	Vegetation and transition areas compliant (T37-2, T1A-2,	March 2017
26	T28N, T28S, T30-1a, T30-1b, and T36-1b)	

27 This schedule represents a 16-month extension of time.

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1           **Phase 2 Schedule**

2           The proposed Phase 2 schedule covers the following areas:

- 3           • Phase 7a: T37-1, T1A-3, and T32-1

4           The design of controls for T37-1, T32-1, and T1A-3 had to be suspended when the  
5 significant cultural resources were identified in order to assess the impacts under CEQA and  
6 identify mitigation, including avoidance. Now that the LADWP Board has approved a Phase 7a  
7 project that requires avoidance of the 350 acres known to contain significant cultural resources,  
8 LADWP will proceed to design the project, and award a construction contract. A summary of the  
9 estimated schedule for Phase 2 is as follows:

Activity	Time Frame
Certification of the Phase 7a EIR and Decision on the Project	June 2013
Great Basin Issuance of an Order to Comport Order to the Phase 7a EIR and Project	July 2013
Completion of the design and construction specifications	December 2013 (approx. six months after EIR certification)
Issuance of Other Required Permits	June 2014
Award of construction contract	June 2014
Construction of Dust Controls	December 2016 (approx. 30 months after contract awarded)
Areas with managed vegetation established (T32-1)	December 2018 (approx. two years after dust controls installed)

25 This schedule represents a 2½ year extension of time.

26           These estimated schedules for Phases 1 and 2 are contingent upon no further discovery of  
27 significant cultural and archeological resources, sufficient climatic conditions to facilitate the  
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1 growth of the managed vegetation, and other agencies timely approving the numerous permits  
2 required to implement the Phase 7a project, including but not limited to the following:

- 3 • A lease amendment for use of state lands will be required from the CSLC prior to project  
4 construction.
- 5 • Consistent with the previous DCMs installed on Owens Lake, a Lakebed Alteration  
6 Agreement pursuant to Section 1602 of the Fish and Game Code will be needed from the  
7 California Department of Fish and Wildlife (CDFW).
- 8 • An amendment to existing Clean Water Act Section 404 permit SPL-2008-00582-BAH  
9 from the U.S. Army Corps of Engineers for Phase 7 to include construction, operations,  
10 and maintenance associated with Phase 7a will be needed.
- 11 • Construction of the Phase 7a project will be completed in compliance with the National  
12 Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water  
13 Discharges Associated with Construction and Land Disturbance Activities (Order No.  
14 2009-0009-DWQ, NPDES NO. CAS000002). Pursuant to the General Permit, a Storm  
15 Water Pollution Prevention Plan (SWPPP) incorporating best management practices  
16 (BMPs) for erosion control will be developed and implemented during project  
17 construction.
- 18 • Discharge of water to the Lake for dust control is currently permitted by the Lahontan  
19 Regional Board through Waste Discharge Requirements (WDR) for the Southern Zones  
20 Dust Control Project (Board Order No. R6V-2006-0036). It is LADWP's current  
21 understanding that the Regional Board has determined that implementation of the Phase  
22 7a project does not warrant a revision or amendment to the existing WDR. If the Regional  
23 Board decides differently, a WDR will need to be obtained.
- 24 • LADWP will need to use the SR 136 right-of-way for gravel transport. This activity will  
25 require approval from the Bureau of Land Management (BLM) and an encroachment  
26 permit from the California Department of Transportation (Caltrans). Caltrans  
27 encroachment permits will also need to be obtained for access roadways, Dirty Socks  
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- 1 Road and other roadways, as necessary. The permits address access, maintenance, legal  
2 sized load restrictions and traffic control (*i.e.*, Traffic Work Safety Plan).
- 3 • A Dust Control Plan will need to be approved by Great Basin.
  - 4 • A permit or non-objection letter from Inyo County for the maintenance of the Highway  
5 395/T37-2 access road will also need to be obtained.
  - 6 • Relevant archaeological investigation and/or excavation permits will need to be obtained  
7 from the CSLC.
  - 8 • Subsequent modifications to the Order, and possibly other Board Orders, to implement the  
9 approved Phase 7a project will need to be adopted by the Governing Board.
  - 10 • The installation of the fuel tank at the construction office to serve the haul trucks will  
11 require the following:
    - 12 1) Permit to Operate (1316-00-06) – An air quality permit from Great Basin related to  
13 vapor recovery.
    - 14 2) Certified Unified Program Agency (CUPA) Facility Permit – A hazardous  
15 material/waste permit and associated contingency and business plan from the Inyo  
16 County Department of Environmental Health Services.
    - 17 3) Spill Prevention Control and Countermeasure (SPCC) Plan – For aboveground oil  
18 tanks of 1,320 gallons or more, and for fuel trucks when fuel will be left in the  
19 truck overnight. The Plan is filed with the Inyo County Department of  
20 Environmental Health Services.
  - 21 2. LADWP requests that 350 acres of Phase 7a subareas T1A-3, T32-1, T37-1 and  
22 T37-2 known to contain CRHR-eligible sites be removed from the Phase 7a project area so as to  
23 allow for permanent avoidance of impacts to resources in these areas (*see Exhibit 2*). The removal  
24 of these 350 acres shall not affect LADWP's ability to proceed with the design and implementation  
25 of dust controls on the remaining Phase 7a areas not known to contain cultural resources and/or  
26 unrelated to these avoidance areas. LADWP also requests that the Order be adjusted to comply  
27 with LADWP's EIR mitigation measure CR-3 that requires protection of three archaeological sites.

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1           3.       LADWP requests that the Order be modified to clarify that the approximately 3.4  
2 square miles of Transition Areas selected by LADWP to be transitioned from Shallow Flooding  
3 into a hybrid of BACM, including Managed Vegetation, Gravel Cover and Shallow Flooding, are  
4 consistent and fully compliant with Paragraphs 7 and 8 of the Order. Paragraphs 7 and 8 provide  
5 that a maximum of 3.0 square miles of Transition Areas may be without BACM at any time during  
6 construction of the Phase 7a project. LADWP's transition of the additional 0.4 square miles of dust  
7 control areas (above the allowable 3.0 square miles) will be accomplished during the non-dust  
8 control season. (Draft EIR, § 3.1.8.1.) Therefore, consistent with the Order, no more than 3.0  
9 square miles of the Transition Areas will be uncontrolled at any one time.

10           4.       LADWP requests that the Phase 7a map and coordinates presently included as  
11 Exhibit 4 to the Order be removed and replaced with Figure 1-1 of the Final EIR (*see Exhibit 3*) in  
12 order to accurately reflect the current Phase 7a Project areas, Transition Areas and the approved  
13 BACM.

14           5.       LADWP requests that the discovery of cultural resources be expressly recognized  
15 as one of the conditions beyond LADWP's control and for which LADWP is not deemed to be in  
16 violation of the Order.

17           6.       LADWP requests that the Governing Board issue a modification to Order 080128-  
18 01 that is submitted to CARB and EPA to conform that order to the these modifications.

19           7.       LADWP requests the Governing Board retain jurisdiction over the Order until  
20 December 31, 2018.

21           LADWP reserves the right to introduce further evidence to support its petition prior to or at  
22 the hearing.

23       **6. CONCLUSION.**

24           The unexpected discovery of significant cultural and archaeological resources in the Phase  
25 7a area that are beyond LADWP's control will prevent LADWP from installing BACM by the  
26 deadlines anticipated in the Order. LADWP has satisfied the requirements of Paragraphs 5 and 6  
27 of the Order by adopting the three resolutions and completing the CEQA process for Phase 7a.

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1 The modifications to the Order sought by this Petition are necessary to ensure consistency between  
 2 the Order and the Phase 7a project and EIR approved/certified by the LADWP Board of  
 3 Commissioners. Therefore, LADWP respectfully requests that the Order be modified as requested.

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DATED: June 14, 2013

Respectfully Submitted,

CITY OF LOS ANGELES, DEPARTMENT OF  
WATER AND POWER

By:   
 Michelle M. Lyman  
 Attorneys for CITY OF LOS ANGELES ACTING  
 BY AND THROUGH ITS DEPARTMENT OF  
 WATER AND POWER

**ATTACHMENT C**

Exhibit 3

Term Sheet Agreement approved by LADWP Board of Commissioners  
on June 26, 2013 and District Governing Board on June 27, 2013

**GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT  
AND  
LOS ANGELES DEPARTMENT OF WATER AND POWER**

**PHASE 7a AND KEELER DUNES  
SETTLEMENT TERMS  
JUNE 25, 2013**

The following constitutes the Settlement Terms (the “Terms”) for the Phase 7a Stipulated Order for Abatement (SOA) and Keeler Dunes issues between the Great Basin Governing Board (GB) and the Los Angeles Department of Water and Power (LADWP):

**I. MODIFICATION OF SOA**

A. GB and LADWP agree that GB shall modify the Phase 7a SOA to do the following:

1. Deadline Extensions

- a) Existing December 31, 2013 deadline for all infrastructure for BACM and compliant operation (other than Managed Vegetation Compliance) to be installed and fully operational extended to December 31, 2015.
- b) Existing December 31, 2015 deadline for Managed Vegetation Controls (fully compliant managed vegetation cover) extended to December 31, 2017.

2. Assumptions for Extension of Deadlines

- a) Timely Availability of necessary leases from State Lands and of necessary permits from other agencies

- b) Acceptance by GB of 328 acres of Eligible Cultural Resource (ECR) areas. ECR areas are defined as California Register of Historical Resources (CRHR)-eligible areas plus necessary buffer areas and are to be removed from Phase 7a and placed into Phase 7b (see below) and potentially the subject of a new future Board order. A confidential map of the existing 328-acre ECR areas shall be attached to the amended SOA.
- c) Force majeure process of original SOA to be followed for newly discovered potential ECRs.

#### B. Creation of Phase 7b

1. Phase 7b would be created for the treatment of the 328 acres of ECR areas plus any newly discovered cultural resources within Phase 7a that are determined by LADWP's state certified archaeologist to be CRHR-eligible and necessary buffer areas (the "Additional Phase 7b Areas") and whose determination is confirmed by a second, state certified archaeologist mutually agreeable to GB, LADWP and State Lands (the "Second Archaeologist").
2. Initially Phase 7b would include 328 acres of previously identified ECR areas from Phase 7a (the "Initial Phase 7b Areas").
3. Any areas in Phase 7a (beyond the Initial Phase 7b Areas ) where ECRs are located during Phase 7a construction shall be handled as part of Phase 7b (the "Additional Phase 7b Areas"). Promptly upon discovery of any cultural resources during the Phase 7a construction process, LADWP shall promptly notify GB of, and confer with GB about, such discovery, and LADWP's state certified archeologist shall fulfill their legal obligations relative to assessing and making recommendations for cultural resources. LADWP's state certified archaeologist shall be responsible for evaluating whether any newly discovered cultural resource areas within Phase 7a are CRHR-eligible, and if so, the additional buffer areas necessary to address disturbance of the

CRHR eligible areas; such evaluations shall be confirmed by the Second Archaeologist. Newly identified CRHR eligible areas and necessary buffer areas shall become ECR areas and become part of the Additional Phase 7b Areas.

#### 4. Cultural Resource Task Force

- a) The amended SOA will establish a Cultural Resource Task Force (CRTF). The CRTF will be an advisory group consisting of LADWP, GB, State Lands, State Historical Preservation Office, and Local Tribal Representatives. The CRTF shall be able to draw upon outside resources and experts, as needed, to aid the CRTF's process. LADWP shall be responsible for paying the reasonable costs of the CRTF, including reimbursements for travel expenses of CRTF members.
- b) The CRTF will initially be charged to make recommendations to GB and LADWP as to the best course of action and timing for the treatment of the Initial Phase 7b Areas. Such treatment could include whether particular areas should be permanently avoided, subject to Phase III cultural recovery or subject to some less intensive form of cultural recovery to protect cultural resources in the Initial Phase 7b Areas. The CRTF will make non-binding recommendations to the GB Governing Board and LADWP regarding treatment of the Initial Phase 7b Areas on or before December 31, 2014. LADWP and GB shall commit to form the CRTF and host its initial meeting within ninety (90) days after the effective date of the amended SOA.
- c) The CRTF shall also make non-binding recommendations to GB and LADWP with respect to the treatment of ECRs that may become part of the Additional Phase 7b Areas. After making its recommendations for the Initial Phase 7b Areas, the CRTF shall remain in existence to make recommendations for any Additional Phase 7b Areas that may be designated ECRs by LADWP's state certified archaeologist and confirmed by the Second Archaeologist.

- d) If after considering the non-binding recommendations of the CRTF, GB exercises its discretion to order LADWP to install dust controls in either the Initial Phase 7b Areas or in the Additional Phase 7b Areas, GB will issue a new Board order or orders after receiving input from LADWP and will determine if any SIP amendment is necessary. The new Board order or orders shall include control completion deadlines that take into account project circumstances, including but not limited to, recovery and additional environmental work necessary to complete the project at issue. The new Board order or orders shall recognize that the construction period shall be subject to all time-extensions-for-cause provisions of Paragraphs 5 and 6 of the SOA.
- e) Like the SOA for Phase 7a, any future order or orders issued by GB pertaining to Phase 7b will give due consideration to the shared goals of GB and LADWP to control air pollution and decrease the use of water for dust control at Owens Lake. In making its recommendations, the CRTF will also give due consideration to GB's and LADWP's shared water saving and air pollution control goals.
- f) The CRTF will be advisory in nature only, and GB and LADWP will retain final determination as to the treatment of ECR areas. GB reserves the right to issue a future order or orders requiring LADWP to install dust controls on Phase 7b areas and LADWP reserves the right to contest any such order.
- g) Permanent avoidance of any portion of the Phase 7b Areas will be considered by GB, which, upon approval, shall amend the 2008 SIP and Board Order 080128-01 in order to get USEPA approval.

### C. No Fines

1. GB shall not fine, issue fees or impose any other type of penalty upon LADWP with respect to any areas of Phase 7a, provided that the Phase 7a dust controls are put into place within the time frames set forth in Section I.A.1.

2. GB shall not fine LADWP for any areas in the Initial Phase 7b Areas and the Additional Phase 7b Areas pursuant to the SOA and this agreement.

D. Modification of SOA

1. The amended SOA shall clarify that the discovery of any cultural resources that are determined by LADWP's state-certified archeologist to be potentially CRHR-eligible shall be included in the SOA's existing time-extensions-for-cause, as set forth in SOA Paragraphs 5 and 6.
2. The amended SOA shall reiterate that GB and LADWP shall make every effort to develop, approve and deploy high-confidence waterless dust control measures in all areas where dust controls are ordered.
3. The amended SOA shall state that the modification of the SOA by GB and LADWP shall not be construed as a waiver by either party of any rights, remedies, legal theories or positions that either party may choose to assert in any hearing, proceeding, tribunal or action now or in the future except with respect to the particular subject matter contained in the amended SOA and the Keeler and Other Dunes Release".<sup>1</sup>
4. The effective date of the amended SOA shall be the date upon which the necessary decision makers of the City of Los Angeles and the GB Governing Board agree to enter into this agreement to modify the SOA.

E. Clarification on BACM

1. GB hereby approves Reduced Thickness Gravel BACM (2 inches of gravel with geotextile fabric underlay).

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<sup>1</sup> LADWP disputes the legality of and does not agree to the Supplemental Control Requirements Determination (SCRD) process. GB asserts that LADWP agreed to the SCR process in the original Phase 7a SOA and elsewhere, and the SCR process is now the law. GB and LADWP have a continuing disagreement on this point.

2. GB hereby approves Brine Shallow Flooding BACM as a subcategory of Shallow Flooding BACM. GB and LADWP acknowledge and agree that the foregoing approval of Brine Shallow Flooding BACM shall not make LADWP liable for maintenance of the natural Brine Pool on Owens Lake. "Brine Pool" is defined as those areas below elevation 3,553.55 feet.
  
3. GB will commit to work with the LADWP on an accelerated testing schedules and BACM approval, if warranted, for Roughness Elements and Tillage in soil type areas where these controls can be applied. Within 30 days of the effective date of the amended SOA, GB and LADWP shall agree upon accelerated testing schedules for the candidate Roughness Elements and Tillage BACMs in soil types where these control can be applied. Said schedules will include consideration for BACM approval of these candidate measures by the GB Board within one year of completion of the schedules (within 13 months of the effective date of the amended SOA). If the accelerated testing does not result in approved BACM designation for the candidate measures, LADWP and the GB Board will jointly assess why the accelerated testing did not result in BACM approvals. GB and LADWP also will commit to work on accelerated testing schedules and BACM approvals for other forms of BACM.
  
4. GB will memorialize its approvals set forth in Sections I E. (1) and (2) and any future approvals pursuant to Section I E. (3) in formal GB board resolutions and orders. GB and LADWP will jointly appeal to State Lands to approve use of new BACMs promptly upon their approval by GB and, with respect to the approvals set forth in Sections I E. (1) and (2) within 90 days of the effective date of the amended SOA.

## II. KEELER DUNES

### A. Keeler Dunes Dust Control Project

1. LADWP shall provide \$10 Million to GB as a public benefit contribution to and will support GB's "Keeler Project" (as defined herein below) to control PM10 emissions from the Keeler Dunes. LADWP shall tender the \$10 Million in a single payment to GB within 90 days after the effective date of the amended SOA and the following two actions are completed: 1) delivery to LADWP of the "Keeler and Other Dunes Release" (defined herein below) and 2) the submittal to the California Air Resources Board (CARB) as described in Paragraph II.B.1.c., below. The "Keeler and Other Dunes Release" shall not be effective until GB receives the \$10 Million payment.
2. GB shall use the funds for environmental impact analysis, design, permitting, construction, operation, maintenance, management, monitoring and directly related activities for a dust emission control project at Keeler Dunes (the "Keeler Project"). No funds shall be used for the purpose of attorney fees, public affairs or governmental relations (collectively, "Public Affairs") or contractors or subcontractors for Public Affairs. The Keeler Project includes all those portions of the Keeler Dunes owned by LADWP and BLM. GB shall have exclusive authority over, and responsibility for, the Keeler Project. LADWP shall have no responsibility for the design, permitting, construction, operation, maintenance, management, monitoring and other activities directly and exclusively related to the Keeler Project for as long as dust controls are required.
3. Upon delivery of the "Keeler and Other Dunes Release" (defined herein below) and the SIP and Board Order 080128-01 amendment submittal to the CARB as described in Paragraph II.B.1.c., below, LADWP will immediately provide GB with access to its property in the Keeler Dunes area in order to complete environmental impact analyses and for all design, permitting, construction, operation, maintenance, management, monitoring and activities directly and exclusively related to the Keeler

Project. So long as such access is provided by LADWP, GB shall indemnify in perpetuity, defend and hold LADWP (and the City of LA) harmless for personal injuries caused by the negligence or willful misconduct of GB with respect to all activities undertaken by GB and its employees, agents and contractors on LADWP's property and GB shall promptly repair any damage to LADWP's property caused by GB's activities on LADWP's property except that GB shall not be required to repair any alteration of the property that is part of or related to the design or implementation of the dust control measures for the Keeler Project. Any dust monitoring undertaken by GB on LADWP's Keeler Dunes property shall exclusively be for the Keeler Project and shall not be used for any other purpose.

4. LADWP, at its sole cost and expense, shall have the right (without obligation) to audit GB's books and records on an annual basis to verify that the \$10 Million contributed by LADWP has been exclusively used to fund the Keeler Project in accordance with the amended SOA, the amended SIP, the Keeler and Other Dunes Release and any other document memorializing the Terms, and for no other purpose. GB shall fully co-operate with any annual audit of the Keeler Project initiated by LADWP.

B. Release of LADWP/LA City for Keeler and Other Dunes Areas

1. Upon the effective date of the amended SOA, GB shall deliver to LADWP a release (the "Keeler and Other Dunes Areas Release") as follows:
  - a) Release for Keeler Dunes:

GB forever releases LADWP from any and all liability under any and all federal, state and local laws that GB can enforce and settle, including but not limited to the Health and Safety Code, those portions of the SIP that can be enforced by GB, and fugitive dust emissions rules, for dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of Keeler Dunes owned by LADWP. GB forever agrees not to request, encourage or join in an enforcement

action by any other agency against LADWP related to dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of the Keeler Dunes owned by LADWP. A map defining the geographical boundaries of the Keeler Dunes is attached and incorporated into this agreement.

- b) Release for Swansea and Olancha Dunes (collectively these dunes are defined as the Other Dunes Areas):

GB forever releases LADWP from any and all liability under any and all federal, state and local laws that GB can enforce and settle, including but not limited to the Health and Safety Code, those portions of the SIP that can be enforced by GB, and fugitive dust emissions rules, for dust emissions, regardless of origin, from the Other Dunes Areas in the vicinity of Owens Lake, including but not limited to portions of such dunes that may be owned by LADWP. GB forever agrees not to request, encourage or join in an enforcement action by any other agency against LADWP related to dust emissions, regardless of origin, from the Other Dunes Areas in the vicinity of Owens Lake. This agreement does not release LADWP from liability for dust emissions resulting from any future groundwater pumping by LADWP at or below the 3600-foot contour in the Owens Lake area. Maps defining the geographical boundaries of the Other Dunes Areas in the vicinity of Owens Lake are attached and incorporated into this agreement.

- c) SIP and Board Order Amendment:

Great Basin shall amend the SIP and Board Order 080128-01 consistent with the terms of this agreement and the “Keeler and Other Dunes Areas Release” and shall request the USEPA and CARB to approve the amended SIP.

2. LADWP reserves the right to contest and defend any alleged violations not covered by the releases herein, including but not limited to the right to contest and defend any alleged violations of Rule 401, or alleged violations of H&S 42316 below the 3600-foot elevation and above the 3600-foot elevation in those areas outside the Keeler

Dunes and Other Dunes Areas. GB reserves the right to assert that any such defenses are barred or otherwise not legally supported.

3. After the date of this agreement, GB shall hold no hearings regarding LADWP's liability/responsibility for dust emissions from the Keeler Dunes or from the Other Dunes Areas.

### **III. GENERAL SETTLEMENT CONDITIONS**

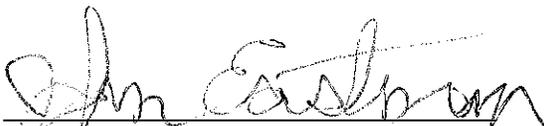
- A. All Settlements and other matters contained in the amended SOA and Keeler Release shall be subject to final approval by LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles.
- B. All Settlements and other matters contained in the amended SOA and Keeler Release shall be subject to approval of GB Board and shall be memorialized in GB Board modification of SOA and appropriate GB resolutions, the 2008 SIP, if required, and Board orders.
- C. GB and LADWP shall memorialize the Terms in formal settlement documents, including the amended SOA, the Keeler Release and the Other Dunes Area Release, within 30 days after approval of the Terms by the GB Board and by the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles. Prior to such approvals and until such time that public disclosure is mandated by law, GB and LADWP shall not disclose the Terms or the existence and content of the SOA Mediation and shall keep the Terms confidential.
- D. Once the Terms are fully approved by the GB Board and by the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles, GB and LADWP shall issue a joint press release to announce the successful conclusion of the SOA Mediation, the Terms, the amended SOA and the Keeler Release.

- E. The parties to the SOA Mediation shall each execute a copy of this document to evidence that it contains the final and complete statement of the Terms resulting from the SOA Mediation that will be submitted for approval to the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles and to the GB Board.
  
- F. Prior to the public announcement of this Agreement, LADWP and GB will develop a mutually agreeable joint communication, which announces and explains this Agreement. The Parties agree not to disclose or divulge the content and substance of the Settlement Terms to any third parties, including, but not limited to members of the press or media, unless and until LADWP and the District have approved a final settlement. The confidentiality requirements do not extend to the undersigned participants' discussions with their respective party's legal counsel and governing boards, regarding the settlement meetings.

In witness thereof, the parties hereto have set their hands to this agreement on June 27, 2013.

Great Basin Unified  
Air Pollution Control District

Los Angeles  
Department of Water and Power

By: 

By: 

Name: John Eastman

Name: RONALD O. NICHOLS

Title: Governing Board Chair

Title: General Manager

Date: June 27, 2013

Date: 7/25/13

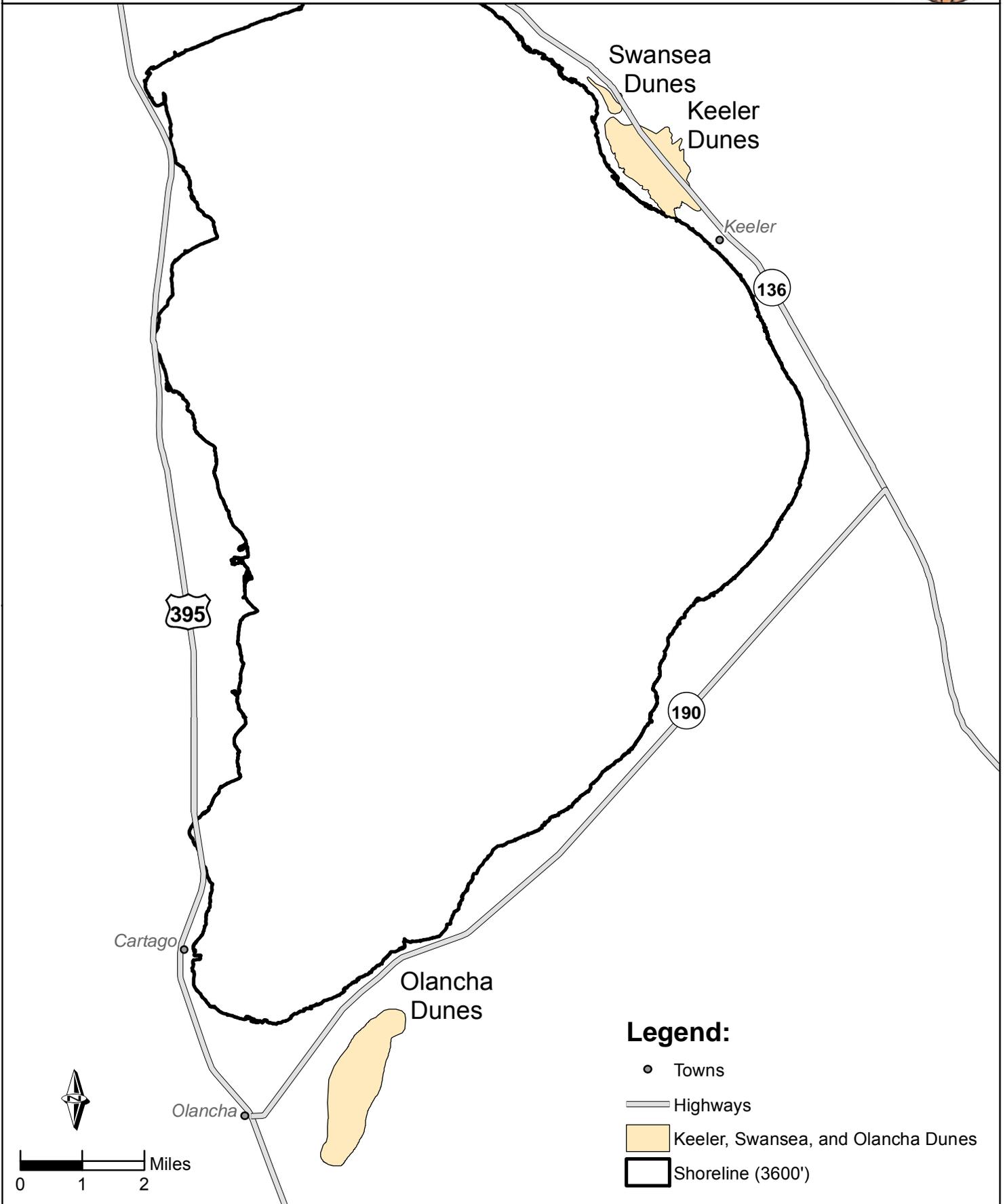
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APPROVED AS TO FORM AND LEGALITY  
CARMEN A. TRUTANICH, CITY ATTORNEY

JUL 22 2013  
  
MICHELLE LYMAN  
DEPUTY CITY ATTORNEY



# Keeler, Swansea, and Olancha Dunes



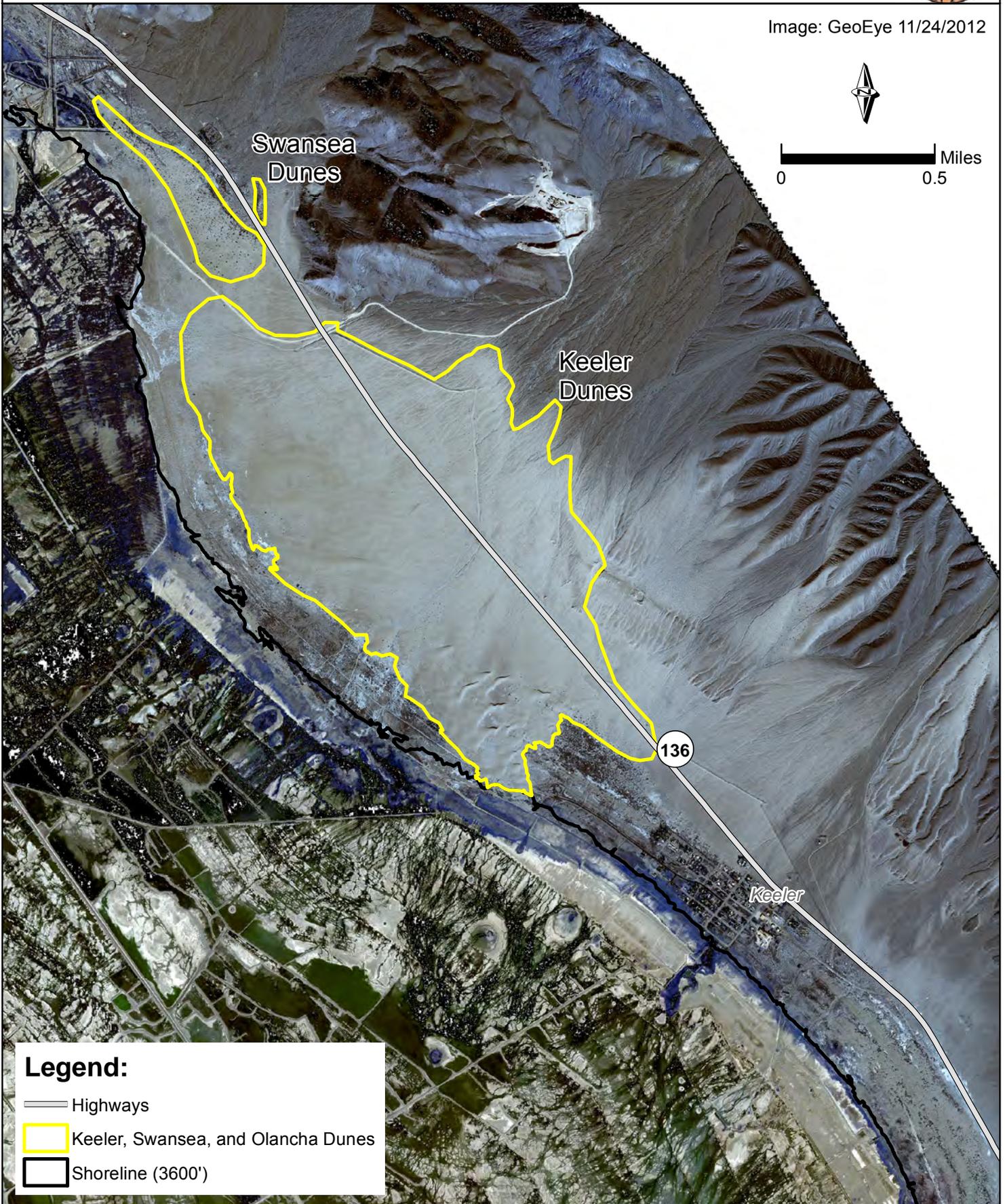


# Keeler and Swansea Dunes - Detail

Image: GeoEye 11/24/2012



0 0.5 Miles

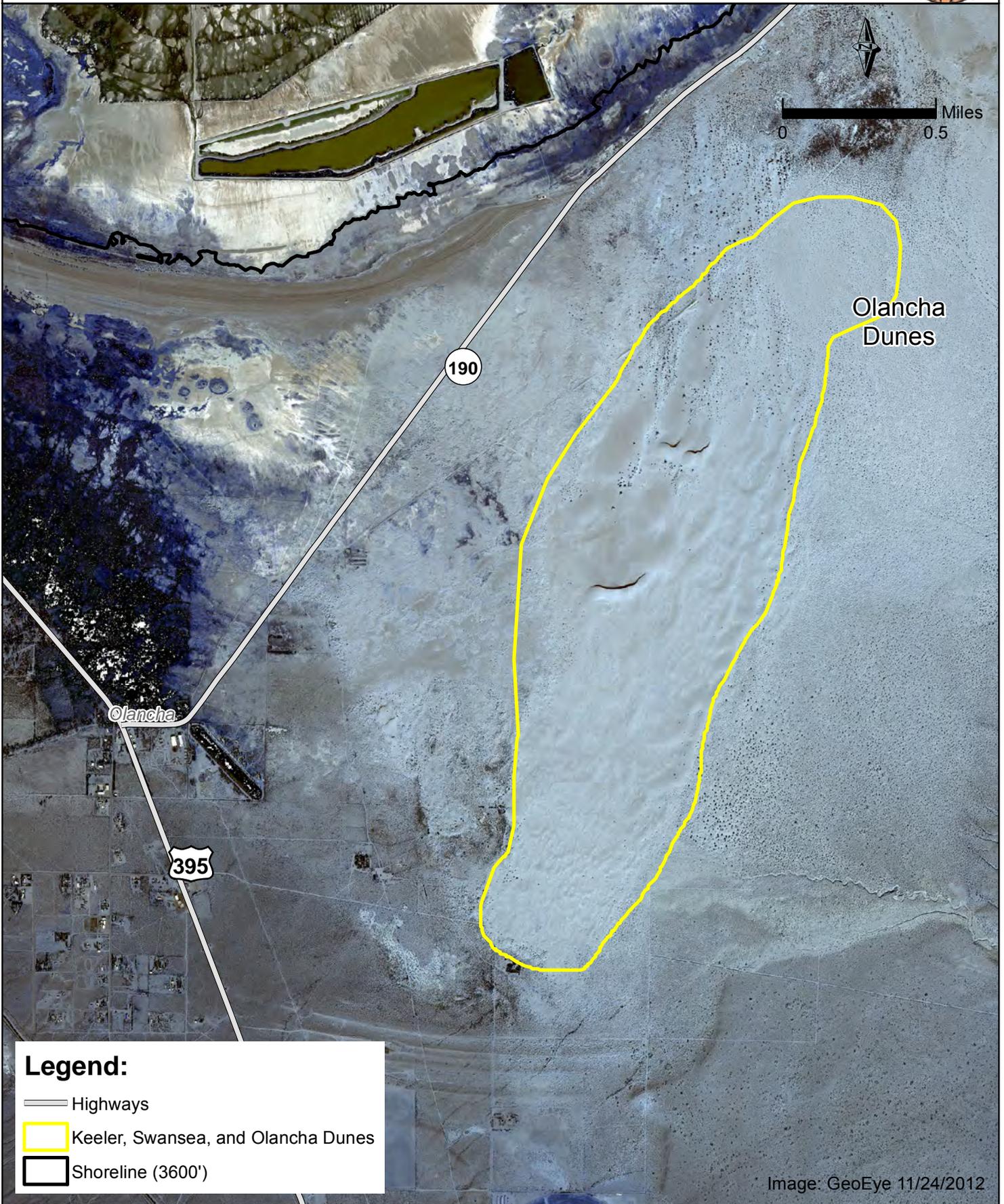


### Legend:

-  Highways
-  Keeler, Swansea, and Olancha Dunes
-  Shoreline (3600')



# Olancha Dunes - Detail



**ATTACHMENT C**

Exhibit 4

Staff Report for June 27, 2013 Special District Governing Board Meeting

Theodore D. Schade  
Air Pollution Control Officer



## GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

157 Short Street, Bishop, California 93514-3537

Tel: 760-872-8211

### BOARD REPORT

**Mtg. Date:** June 27, 2013

**To:** District Governing Board

**From:** Theodore D. Schade, Air Pollution Control Officer

**Subject:** Consideration of an Agreement regarding Settlement Terms with the LADWP regarding Owens Lake Phase 7a and Keeler Dunes dust controls

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#### **Background**

In 2006, Great Basin and the Los Angeles Department of Water and Power entered into a Settlement agreement regarding additional Owens Lake dust controls. The Agreement required the LADWP to deploy approximately 13 square miles of additional dust controls onto the lakebed, including a 3.1 square-mile area known as "Phase 7a." The original deadline for constructing the Phase 7a controls was October 2009. Due to a number of circumstances, LADWP failed to meet the October 2009 deadline and received a one-year extension, until October 2010, from the District Hearing Board. In return for the one-year extension, LADWP agreed to construct two additional square miles of dust controls known as "Phase 8."

LADWP also did not meet the October 2010 deadline for the Phase 7a controls and in March 2011 it received an extension until December 2013 from the District Governing Board by means of a Stipulated Order for Abatement (SOA). The SOA (#110317-01) is attached to this report. In addition to providing additional time for Phase 7a, LADWP was required to pay \$6.5 million into an "excess air pollution offset fund." The District is using these funds to reduce other sources of air pollution in the District. The SOA provides that, if LADWP fails to meet future deadlines, it agrees to make late payments of up to \$10,000 per day until all 3.1 square miles of Phase 7a controls are in place.

However, once again, due to a number of circumstances, including the purported discovery of a significant quantity of important cultural resources within the Phase 7a area, LADWP asserts it will be unable to meet the December 2013 deadline for Phase 7a controls. The 2011 SOA provides a procedure for LADWP to be granted additional time due to circumstances beyond its control. In January 2013, LADWP initiated the procedure in the SOA (Order Paragraphs 5 and 6) by which two LADWP Board Commissioners could meet with two Great Basin Board members to develop a non-binding recommendation to the full Great Basin Board as to whether, and under what conditions, LADWP should be granted additional time to complete the dust controls.

Over the past two months LADWP Commissioners Jonathan Parfrey and Richard Moss have been meeting with Great Basin Board members Larry Johnston, Matt Kingsley and Linda Arcularius in an

attempt to develop a mutually agreeable path forward. The Air Pollution Control Officer deeply appreciates the time and dedication these five leaders devoted to this difficult task. With the assistance of staff and attorneys from both agencies, on Monday, June 24, agreement was reached on a number of issues related to the Phase 7a dust controls, as well as other issues of concern, including a plan for the protection of cultural resources and control of dust from the Keeler Dunes. A proposed “Agreement of Settlement Terms” (Settlement) has been drafted and is being presented to both the LADWP Board of Commissioners and the Great Basin Governing Board for consideration and approval. The proposed agreement is attached to this report.

### **Discussion**

The proposed Settlement is a framework which will later be developed into a more formal agreement consistent with the terms with the Settlement. The formal agreement will then be incorporated into an amendment to the 2011 SOA that is to be considered by the Board within 30 days (before July 27, 2013).

In addition to considering amending the SOA within 30 days, the Settlement requires the Board to consider amending the 2008 Owens Valley State Implementation Plan (SIP) to incorporate some of the provisions of the Settlement into the SIP. In order to amend the SIP, the District is required to have a 30-day public comment period.

Therefore, a three-step process is required to approve and implement the Settlement: 1) Today’s consideration of the settlement terms, 2) Consideration of a more specific SOA amendment within 30 days (prior to July 27), and 3) Consideration of a SIP amendment after at least 30 days public notice.

The proposed Settlement contains a number of provisions and staff encourages the Board members to carefully read through the document. In summary, the Settlement contains the following major components:

#### **I. Phase 7a Dust Controls**

1. The deadline for completion of construction of the Phase 7a infrastructure is extended by two years from December 2013 to December 2015. Any vegetation planted for dust control must be fully compliant (about 20% cover) by December 2017.
2. 328 acres of Phase 7a area that contains sensitive cultural resources is to be removed from the Phase 7a project and will be known as the “Phase 7b” project. Phase 7a contains about 2,000 acres, so Phase 7b is about 17 percent of the total area.
3. Any additional significant cultural resource areas encountered during Phase 7a construction will be moved to Phase 7b.
4. A “Cultural Resource Task Force” (CRTF) will be formed of interested parties, including local Indian Tribes to make recommendations for Phase 7b regarding the balance between protection of cultural resources and air pollution control requirements. The CRTF will make recommendations to LADWP and the District. The District Board, after considering the CRTF’s recommendations, will issue additional orders regarding the Phase 7b areas, if appropriate.

5. As long as all Phase 7a and Phase 7b deadlines are met, LADWP will not be subject to fines.

## II. Best Available Control Measures (BACM)

6. The District approves two modified BACMs: “Reduced Thickness Gravel” (2 inches of gravel over a geotextile fabric underlay) and “Brine Shallow Flooding.” The District and LADWP agree that LADWP is not liable for maintenance of the natural brine pool remnant of Owens Lake.
7. The District and LADWP agree to work on accelerated testing of “Tillage” and “Roughness Elements” as candidate BACMs. It is both agencies’ intentions to have the District Board make a BACM decision on these measures within 13 months.

## III. Keeler Dunes

8. LADWP will pay the District \$10 million as a public-benefit contribution for and will support the District’s effort to implement a dust control project on the Keeler Dunes. The District will be solely responsible for implementing the Keeler Dunes project. LADWP will make the \$10 million payment within 90 days of: 1) the District releasing LADWP from liability for the Keeler, Swansea and Olancha Dunes and 2) District submittal to the California Air Resources Board of a SIP revision incorporating the agreement provisions into the 2008 SIP.
9. LADWP can audit the District’s records to verify the appropriate expenditure of the \$10 million.
10. The District agrees to release the LADWP from any and all liability under any and all federal, state and local laws that the District can enforce regarding dust emissions from the Keeler, Swansea and Olancha Dunes. The District also agrees not to request, encourage or join in an enforcement action by any other agency related to dust emissions from these three dune areas.
11. The District agrees to hold no further hearings regarding LADWP’s liability or responsibility for dust emissions from the three dune areas.

## **Staff Recommendation**

Staff has been closely involved in the development of the proposed Settlement and recommends the following three actions:

1. That the full Board approve the draft Settlement as presented,
2. That the Board set the date, within 30 days, for a special meeting to consider incorporating the provisions of the Agreement into Stipulated Order for Abatement 110317-01, and
3. That the Board set the date, after a 30-day public review and comment period, for a meeting to consider amending the 2008 Owens Valley PM-10 State Implementation Plan to incorporate the modified Abatement order.

Attachments:

Stipulated Order for Abatement 110317-01

Phase 7a and Keeler Dunes Settlement Terms Agreement dated June 25, 2013

13062601

**ATTACHMENT C**

Exhibit 5

Settlement Agreement between District and LADWP,  
approved by District Governing Board August 19, 2013

**STAFF DRAFT – SUBJECT TO REVISION AND NOT REVIEWED OR APPROVED  
BY THE LADWP BOARD OF COMMISSIONERS**

**SETTLEMENT AGREEMENT AND RELEASE BETWEEN THE GREAT BASIN UNIFIED AIR  
POLLUTION CONTROL DISTRICT AND CITY OF LOS ANGELES ACTING BY AND THROUGH ITS  
DEPARTMENT OF WATER AND POWER CONCERNING MODIFICATION TO PHASE 7A  
STIPULATED ORDER FOR ABATEMENT NO. 110317 AND KEELER DUNES PROJECT**

*August 19, 2013*

THIS SETTLEMENT AGREEMENT AND RELEASE ("**Agreement**") is entered into on this 19<sup>th</sup> day of August, 2013, by and between the **Great Basin Unified Air Pollution Control District**, an agency organized pursuant to Division 16, Part 3, Chapter 3 of the California Health and Safety Code ("**District**"), on one hand, and the **City of Los Angeles acting by and through its Department of Water and Power ("LADWP")**, a municipal corporation organized under the Los Angeles City Charter and the Constitution and laws of the State of California, on the other hand. The District and LADWP may be referred to herein individually as "**Party**" or collectively as the "**Parties.**"

WHEREAS, on March 17, 2011, the District Governing Board issued Stipulated Order for Abatement, Order No. 110317-01 ("**Original Abatement Order**"). The Original Abatement Order requires LADWP to construct a dust control project, known as Phase 7a, on approximately 3.1 square miles of the Owens Lakebed, which includes six Dust Control Areas ("**DCAs**"), T37-1, T37-2, T1A-3, T1A-4, T-32-1 and T12-1 ("**Phase 7a areas**"). The Original Abatement Order allows LADWP to transition approximately 3.0 square miles of existing dust control areas ("**Transition Areas**"). These areas are identified in Exhibit 4 of the Original Abatement Order.

WHEREAS, the Original Abatement Order requires LADWP to install Best Available Control Measures ("**BACM**") in DCAs T37-1, T37-2, T1A-3, T1A-4 and T-32-1 and provides for LADWP to change BACM in the Transition Areas to conserve water, by no later than December 31, 2013, and to install BACM in the T12-1 tillage test area by May 1, 2016. (*See also* Governing Board Order No. 120206-07.) Under the Original Abatement Order, all Phase 7a Areas and Transition Areas controlled by Managed Vegetation BACM are to achieve fully-compliant BACM vegetation cover by December 31, 2015. Installation of BACM on the Phase 7a DCAs and Transition Areas entails ground disturbing activities such as grading, planting, dirt moving, boring, trenching and road, berm, pipeline and other construction.

WHEREAS, LADWP was required under District Governing Board Order No. 080128-01 ("**Board Order 080128-01**"), the enforcement Board order for the 2008 Owens Valley PM10 Planning Area Demonstration of Attainment State Implementation Plan ("**2008 SIP**"), to conduct environmental review for the Phase 7a project in compliance with the California Environmental Quality Act ("**CEQA**"). LADWP unexpectedly discovered significant cultural and archaeological resources in the Phase 7a area during the CEQA process that required LADWP to undertake additional investigations under CEQA and to comply with mitigation measures

included in the District supplemental environmental impact report for the 2008 SIP (“SEIR”), both of which resulted in unanticipated CEQA and project design and construction delays that LADWP determined are outside of its control.

WHEREAS, LADWP released the draft Phase 7a EIR for public review and comment in January 2013 for a 45 day public comment period. LADWP staff considered and responded to public comments, conducted further consultations with Native American groups and others about project impacts and comments on the draft EIR, and revised the draft EIR, as necessary, to incorporate any changes to the project. Alternatives were identified in the EIR that would avoid impacts to cultural resources by excluding California Register of Historic Resources (“CRHR”)-eligible areas from the Phase 7a project, including the Avoidance Alternative, which involved construction of the originally proposed Phase 7a project, except for 350 acres of Phase 7a subareas T1A-3, T32-1, T37-1 and T37-2 known to contain significant cultural resources.

WHEREAS, on June 4, 2013, LADWP’s Board of Water and Power Commissioners considered and certified the final Phase 7a EIR and approved the Avoidance Alternative for the Phase 7a project, subject to and contingent upon the District Governing Board’s approval of a petition to modify the Original Abatement Order to remove these 350 acres from the original Phase 7a area, and to make any other additional changes necessary to ensure consistency between the Original Abatement Order, the Phase 7a project and the Final EIR, including, but not limited to, obtaining extensions of time for completing the Phase 7a project necessitated by the unexpected discovery of significant cultural resources in the Phase 7a areas.

WHEREAS, paragraph 5 of the Original Abatement Order outlines circumstances that allow LADWP to seek an extension of time to comply with the Original Abatement Order, without penalty, when it is acting in good faith to comply with the terms of the Original Abatement Order but is impeded by circumstances beyond its control. In compliance with the Original Abatement Order, LADWP’s Board of Water and Power Commissioners adopted three resolutions on February 7, 2012 (Resolution No. 012-170), April 3, 2012 (Resolution No. 012-210), and January 11, 2013 (Resolution No. 013-157), finding that LADWP has acted in good faith to comply with the Original Abatement Order, but has been impeded by the unexpected discovery of significant cultural resources in the Phase 7a areas. In compliance with paragraph 6 of the Original Abatement Order, LADWP notified the District’s Air Pollution Control Officer (“APCO”) of each resolution and proposed schedules of increments of progress. The APCO objected to LADWP’s Resolution No. 013-157 on February 4, 2013. Pursuant to paragraph 5 of the Original Abatement Order, LADWP requested a meeting with District Governing Board members to attempt to resolve the dispute.

WHEREAS, designated members of the LADWP and District Boards have engaged in several meetings (“Settlement Meetings”) in April, May and June 2013 to resolve the dispute related to the Original Abatement Order. During the Settlement Meetings, the Parties also attempted to resolve a separate dispute related to the development and origin of the Keeler Dunes and a possible future District order requiring control of emissions at the Keeler Dunes. The District Governing Board has not made any findings or issued any order concluding that the

Keeler Dunes are anthropogenic in nature and/or caused by LADWP's activities in the production, diversion, storage, or conveyance of water. The District Governing Board has not made any findings or issued any order concluding that LADWP is liable for, or that LADWP's activities in the production, diversion, storage, or conveyance of water has caused or contributed to any violations of state or federal air quality standards in the Keeler Dunes or other dunes areas, including the Swansea and Olancho Dunes, in the vicinity of Owens Lake.

WHEREAS, the Settlement Meetings resulted in an agreement on settlement terms dated June 17, 2013 ("**Term Sheet**") that was approved by LADWP's Water and Power Commissioners on June 26, 2013, and the District's Governing Board on June 27, 2013, and are memorialized in this Agreement. This Agreement does not result in any waiver by the District or LADWP of arguments raised in other proceedings or disputed issues that are not covered under this Agreement, including but not limited to the District's Supplemental Control Requirements Determination ("**SCRD**") process, SB 270 budgets, and fees.

For good and valuable consideration, the Parties agree as follows:

- I. **PHASE 7a DUST CONTROLS.** [*Corresponds to Term Sheet section I.A.*] The District Governing Board shall approve a modification to the Original Abatement Order ("**Modified Abatement Order**") that reflects the following terms:
  - a. **Deadline Extensions.** [*Corresponds to Term Sheet sections I.A.1.-I.A.2.*]
    - i. The deadline for LADWP to construct all infrastructure and install fully-compliant BACM in the Phase 7a areas and Transition Areas, except for those areas controlled by Managed Vegetation BACM, as set forth in paragraphs 1 and 4(a) of the Original Abatement Order, shall be extended from December 31, 2013, to December 31, 2015. All infrastructure and plant materials for Managed Vegetation BACM will be installed by December 31, 2015.
    - ii. The deadline to achieve fully-compliant BACM vegetation cover for areas controlled by Managed Vegetation BACM in the Phase 7a areas and Transition Areas, as set forth in paragraphs 1 and 4(a) of the Original Abatement Order, shall be extended from December 31, 2015, to December 31, 2017.
    - iii. The extensions of the deadlines set forth in section I(a)(i)-(ii) shall be contingent upon all of the following:
      - (1) LADWP timely receiving from California State Lands Commission ("**CSLC**") and all other agencies all of the required permits, approvals, or leases necessary to allow LADWP to construct BACM within the deadlines required by the Modified Abatement Order.
      - (2) The timely removal from the Original Abatement Order of all CRHR-eligible areas plus necessary buffer areas, referred to as the "Eligible Cultural Resource ("**ECR**")"

areas.” The ECR areas initially consist of 328 acres of the Phase 7a areas identified in Exhibit 1 (the “**Initial Phase 7b Areas**”), which is incorporated into this Agreement. Because Exhibit 1 identifies the locations of cultural resources, it is confidential and shall not be made publically available. The Initial ECR areas and any newly discovered CRHR-eligible and necessary buffer areas are considered part of Phase 7b, as set forth in section 1(b)(i) below. A confidential map of the initial 328-acre ECR area shall be attached to the Modified Abatement Order.

- (3) The Original Abatement Order being revised to state explicitly that any newly discovered potential ECRs in the Phase 7a areas is considered a condition of force majeure under paragraph 5(d) of the Original Abatement Order.
- iv. If any one of the above contingencies is not met, LADWP may seek further extensions of time under the provisions of paragraph 5 of the Original Abatement Order, as modified by the Modified Abatement Order, and paragraphs 6 and 22 of the Original Abatement Order, which shall not be unreasonably denied by the District.
- b. **Creation of Phase 7b.** [*Corresponds to Term Sheet sections I.B.1.-I.B.3., I.D.1*]
- i. Phase 7b shall consist of the Initial 328 acres of Phase 7b Areas and any other areas in Phase 7a that LADWP’s state-certified archaeologist has determined, and which are confirmed by a second, state-certified archaeologist mutually agreeable to the District, LADWP and CSLC (the “**Second Archaeologist**”) to be CRHR-eligible and necessary buffer areas (the “**Additional Phase 7b Areas**”). The difference between the 328 acres defined in this Agreement as the Initial Phase 7b areas, and the 350 acres identified in the Avoidance Alternative in the Phase 7a EIR, will also be subject to the Phase 7b process, if necessary, as described in this Agreement. The Additional Phase 7b Areas are not limited to the 350 acres described in the Avoidance Alternative in the Phase 7a EIR. All areas in Phase 7b shall be considered removed from the Original Abatement Order.
- ii. LADWP shall promptly notify and confer with the District if any cultural resources are discovered during the construction of Phase 7a. The discovery of any cultural resources that are determined by LADWP’s state-certified archeologist to be potentially CRHR-eligible shall be subject to the procedure set forth in paragraph 5 of the Original Abatement Order, as modified by the Modified Abatement Order, and paragraph 6 of the Original Abatement Order. Upon the discovery of the cultural resources, LADWP will request that its state-certified archeologist fulfill his or her legal obligations relative to assessing and making recommendations for cultural resources. LADWP’s state-certified archaeologist shall be responsible for evaluating whether any of the newly discovered cultural resource areas within Phase 7a are CRHR-eligible, and if so, define the additional buffer areas necessary to address disturbance of the CRHR-eligible areas. LADWP’s state-certified

archeologist's recommendations shall be reviewed by the Second Archaeologist. If confirmed by the Second Archaeologist, the newly identified CRHR-eligible areas and necessary buffer areas shall become ECR areas that are withdrawn from the Original Abatement Order and included in Phase 7b.

- c. Cultural Resource Task Force ("**CRTF**") [*Corresponds to Term Sheet sections I.B.4*]
- i. LADWP and District commit to form the CRTF and host its initial meeting within ninety (90) days after the Effective Date of the Modified Order. The CRTF will be an advisory group consisting of representatives from LADWP, the District, CSLC, State Historical Preservation Office, and Local Tribal Representatives. The CRTF may draw upon outside resources and experts, as needed, to aid the CRTF's process. LADWP shall be responsible for paying the CRTF's reasonable costs, including reimbursing CRTF members for reasonable travel expenses. The CRTF shall exist to make recommendations for the Initial Phase 7b Areas and any Additional Phase 7b Areas.
  - ii. The CRTF will be advisory in nature only, and the District and LADWP will each retain its final decision-making authority as to the treatment of ECR areas. The District reserves the right to issue a future order or orders requiring LADWP to install dust controls on Phase 7b areas and LADWP reserves the right to contest any such order or orders.
  - iii. The CRTF will initially make non-binding recommendations to the District Governing Board and LADWP on or before December 31, 2014, as to the best course of action and timing for the treatment of the Initial Phase 7b Areas, which could include whether particular areas should be permanently avoided, subject to Phase III cultural recovery, or subject to some less intensive form of cultural recovery to protect cultural resources in the Initial Phase 7b Areas. In making its recommendations, the CRTF shall give due consideration to the District's and LADWP's shared water saving and air pollution control goals.
  - iv. The CRTF shall also make non-binding recommendations to the District Governing Board and LADWP with respect to the treatment of the Additional Phase 7b Areas. In making its recommendations, the CRTF shall give due consideration to the District's and LADWP's shared water saving and air pollution control goals.
  - v. If, after considering the CRTF's non-binding recommendations and input from LADWP, the District Governing Board exercises its discretion and orders LADWP to install dust controls in either the Initial Phase 7b Areas or in the Additional Phase 7b Areas, the District Governing Board will do so by issuing a new Board order or orders. The new Board order or orders shall include deadlines for constructing dust controls that accommodate project circumstances, including but not limited to, the time to complete a Phase III cultural resources recovery and perform additional environmental work required under CEQA to approve the new project. The new Board order or orders shall incorporate the provisions in paragraph 5 of the Original

Abatement Order as amended by section I(a) and the Modified Abatement Order. In issuing the new Board order or orders, the District Governing Board will determine if any amendment to the 2008 SIP is necessary. LADWP is not waiving its right to contest the new Board order or orders.

- vi. Any future order or orders issued by the District for Phase 7b will give due consideration to the shared goal of the District and LADWP to control air pollution and decrease the use of water as a dust control measure at Owens Lake.
- d. **No Fines Imposed.** [*Corresponds to Term Sheet sections I.C.1.-I.C.2.*]
- i. The District shall not fine, issue fees or impose any other type of penalty upon LADWP with respect to any Phase 7a areas if LADWP constructs the dust controls in the Phase 7a areas within the modified time frames set forth in sections I(a)(i)-(ii), or any modified time frames resulting from sections I(a)(iii)-(iv).
  - ii. The District shall not fine LADWP for any areas in the Initial Phase 7b Areas and the Additional Phase 7b Areas pursuant to the Original Abatement Order, this Agreement, and the Modified Abatement Order.
- e. **Other Abatement Order Modifications.** [*Corresponds to Term Sheet sections I.D.2.-I.D.4.*]
- i. The Modified Abatement Order shall reiterate that the District and LADWP shall make every effort to develop, approve and deploy high-confidence, waterless dust control measures in all areas where dust controls are ordered on Owens Lake.
  - ii. The Modified Abatement Order shall state that the District's and LADWP's agreement to modify the Original Abatement Order shall not be construed as a waiver by either Party of any rights, remedies, legal theories or positions that either Party may choose to assert in any hearing, proceeding, tribunal or action now or in the future, except with respect to the particular subject matter contained in this Agreement and the Modified Abatement Order.
  - iii. The date the District Governing Board adopts the Modified Abatement Order shall be the effective date upon which the necessary decision makers of LADWP, the City of Los Angeles, and District Governing Board agree to enter into this Agreement to modify the Original Abatement Order, the "**Effective Date.**"
- f. **BACM Clarifications.** [*Corresponds to Term Sheet sections I.E.1.-I.E.4.*]
- i. District hereby approves Reduced Thickness Gravel as a BACM. "Reduced Thickness Gravel is defined as per the 2008 Owens Valley PM10 State Implementation Plan except that the gravel thickness is reduced from a minimum of four inches (4") to two inches (2") and all reduced thickness gravel areas shall be underlain with

geotextile fabric. All geotextile fabric shall be Class I woven or nonwoven geotextile fabric meeting the minimum specifications set forth in the National Standard Materials Specification “Material Specification 592—Geotextile” (National Engineering Handbook, Chapter 3, Part 642), or equivalent.

- ii. The District hereby approves Brine Shallow Flooding BACM as a subcategory of Shallow Flooding BACM. District and LADWP acknowledge and agree that the foregoing approval of Brine Shallow Flooding BACM shall not make LADWP liable for maintenance of the natural Brine Pool on Owens Lake. The existing “Brine Pool” is defined as those areas at Owens Lake below elevation 3,553.55 feet.
- iii. The District shall work with LADWP on accelerated testing schedules and BACM approval, if warranted, for Roughness Elements and Tillage in soil type areas where these controls can be applied. Within 30 days of the Effective Date of the Modified Abatement Order, the District and LADWP shall agree upon accelerated testing schedules for the candidate Roughness Elements and Tillage BACMs in soil types where these control can be applied. The schedules shall include the District Governing Board’s consideration of BACM approval of these candidate measures within one year of completion of the schedule (within 13 months of the Effective Date of the Modified Abatement Order). If the accelerated testing does not result in approved BACM for the candidate measures, the District’s and LADWP’s respective Boards shall jointly assess why the accelerated testing did not result in the District Board’s BACM approval. The District and LADWP shall also work on accelerated testing schedules and BACM approvals for other forms of BACM.
- iv. The District shall memorialize its approvals set forth in sections I(f)(i)-(ii), and any future approvals pursuant to section I(f)(iii), in formal District Board resolutions and orders, including but not limited to, modifications to the 2008 SIP and Board Order 080128-01. The District and LADWP shall jointly apply to CSLC for approval to use new BACMs promptly upon their approval by the District and, with respect to the approvals set forth in Sections I(f)(i)-(ii), within 90 days of the Effective Date of the Modified Abatement Order.

## II. KEELER DUNES.

- a. Keeler Dunes Dust Control Project. [*Corresponds to Term Sheet sections II.A.1.-II.A.4.*]
  - i. LADWP shall provide ten million dollars (\$10,000,000) to the District as a public benefit contribution to support the District’s “**Keeler Project**” (as defined in section II(a)(ii)) to control PM10 emissions from the Keeler Dunes. LADWP shall tender the \$10,000,000 in one single payment to the District within 90 days after: (1) the date of approval of the Modified Abatement Order, which is also the Effective Date of this Agreement that includes the “**Keeler and Other Dunes Release**” defined in section II(b); and (2) the District Governing Board approves amendments to the 2008 SIP and Board Order 080128-01, and such amendments are submitted to the California

Air Resources Board (“**CARB**”) pursuant to section II(b)(iii). The Keeler and Other Dunes Release in this Agreement shall not be effective until the District receives the \$10,000,000 contribution.

- ii. The District shall use the \$10,000,000 for environmental impact analysis, design, permitting, construction, operation, maintenance, management, monitoring and directly-related activities for a dust emission control project at Keeler Dunes (the “**Keeler Project**”), including work previously conducted by the District in connection with the Keeler Project that was funded by Owens Lake Trust Fund monies. The District shall not seek from LADWP any reimbursement of Owens Lake Trust Fund monies used to pay for work conducted in connection with the Keeler Project through future SB 270 assessments or otherwise. No portion of the \$10,000,000 shall be used to pay for the District’s attorneys’ fees, public affairs or governmental relations (collectively, “**Public Affairs**”) or contractors or subcontractors for Public Affairs. The Keeler Project includes all those portions of the Keeler Dunes owned by LADWP and the United States Bureau of Land Management (“**BLM**”). The District shall have exclusive authority over, and responsibility for, the Keeler Project. LADWP shall have no responsibility for the design, permitting, construction, operation, maintenance, management, monitoring and any other activities directly and exclusively related to the Keeler Project for as long as dust controls are required.
- iii. Upon the effective date of the Keeler and Other Dunes Release pursuant to section II(b) of this Agreement, and the 2008 SIP and Board Order 080128-01 amendments submittal to CARB as described in section II(b)(iii) of this Agreement, LADWP will immediately provide the District access to its property in the Keeler Dunes area in order for the District to complete the environmental impact analyses and for all design, permitting, construction, operation, maintenance, management, monitoring and activities directly and exclusively related to the Keeler Project. So long as access is provided by LADWP, the District shall indemnify in perpetuity, defend and hold the City of Los Angeles and LADWP harmless for personal injuries caused by the negligence or willful misconduct of the District with respect to all activities undertaken by the District and its employees, agents and contractors on LADWP’s property, except that the District shall not be required to repair any alteration of the property that is part of or related to the design or implementation of the dust control measures for the Keeler Project. Any dust monitoring undertaken by the District on LADWP’s Keeler Dunes property shall exclusively be for the Keeler Project and shall not be used for any other purpose.
- iv. LADWP, at its sole cost and expense, shall have the right (without obligation) to audit the District’s books and records on an annual basis to verify that the \$10,000,000 contributed by LADWP has been exclusively used to fund the Keeler Project in accordance with this Agreement, which includes the Keeler Dunes and Other Dunes Release, the Modified Abatement Order, the amended 2008 SIP and

Board Order 080128-01, and any other document memorializing Term Sheet, and for no other purpose. The District shall fully co-operate with any annual audit of the Keeler Project initiated by LADWP.

- b. **District's Release of the City/LADWP for Keeler and Other Dunes Areas.** [*Corresponds to Term Sheet sections II.B.1.-II.B.4.*] The following Keeler and Other Dunes Release shall apply to the City of Los Angeles and LADWP and shall become effective upon the date the Modified Abatement Order is adopted and after the District has received the \$10,000,000 contribution from LADWP:
- i. Release for Keeler Dunes: The District forever releases LADWP from any and all liability under any and all federal, state and local laws that the District can enforce and settle, including but not limited to the Health and Safety Code, those portions of the 2008 SIP that can be enforced by the District, and fugitive dust emission rules, for dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of the Keeler Dunes owned by LADWP. The District forever agrees not to request, encourage, or join in an enforcement action by any other agency against LADWP related to dust emissions from the Keeler Dunes, regardless of origin, including but not limited to portions of the Keeler Dunes owned by LADWP. A map defining the geographical boundaries of the Keeler Dunes is attached as Exhibit 2 and incorporated into this Agreement.
  - ii. Release for Swansea and Olancho Dunes (collectively these dunes are defined as the "**Other Dunes Areas**"): The District forever releases LADWP from any and all liability under any and all federal, state, and local laws that the District can enforce and settle, including but not limited to the Health and Safety Code, those portions of the 2008 SIP that can be enforced by the District, and fugitive dust emission rules, for dust emissions from the Other Dunes Areas in the vicinity of Owens Lake, regardless of origin, including but not limited to portions of the Other Dunes Areas that may be owned by LADWP. The District forever agrees not to request, encourage, or join in an enforcement action by any other agency against LADWP related to dust emissions from the Other Dunes Areas in the vicinity of Owens Lake, regardless of origin. This Agreement does not release LADWP from liability for dust emissions resulting from any future groundwater pumping by LADWP at or below the 3600-foot contour in the Owens Lake area. Maps defining the geographical boundaries of the Other Dunes Areas is attached as Exhibit 2 and incorporated into this Agreement.
  - iii. 2008 SIP and Board Order 080128-01 Amendments: The District shall amend the 2008 SIP and Board Order 080128-01 consistent with the terms of this Agreement, including the Keeler and Other Dunes Release as defined in sections II(b)(i)-(ii), and shall request the United States Environmental Protection Agency ("**EPA**") and CARB to approve the amended SIP.
  - iv. LADWP reserves the right to contest and defend any alleged violations not encompassed in the Keeler and Other Dunes Release, including but not limited to,

the right to contest and defend any alleged violations of Rule 401, or alleged liability or violations of Health and Safety Code section 42316 below the 3600-foot elevation and above the 3600-foot elevation in those areas outside the Keeler Dunes and Other Dunes Areas. The District reserves the right to assert that any such defenses are barred or otherwise not legally supported.

- v. Upon the Effective Date of this Agreement, the District shall hold no hearings regarding LADWP's liability/responsibility for dust emissions from the Keeler Dunes or from the Other Dunes Areas.

III. **GENERAL SETTLEMENT CONDITIONS.** [*Corresponds to Term Sheet sections III.A.-III.E.*]

a. **Approval by District Board, LADWP Board, and City of Los Angeles.**

- i. All settlement terms and other matters contained in this Agreement (which includes the Keeler and Other Dunes Release) and the Modified Abatement Order shall be subject to final approval by the LADWP Board of Water and Power Commissioners and all other necessary decision makers at the City of Los Angeles.
- ii. All settlement terms and other matters contained in this Agreement (which includes the Keeler and Other Dunes Release) and the Modified Abatement Order shall be subject to approval of the District Governing Board and shall be memorialized in the District Governing Board's approval of the Modified Abatement Order and other appropriate District Board resolutions and orders, including modifications to the 2008 SIP, if required, and Board orders, including Order 080128-01.

b. **Binding Effect.** The provisions of this Agreement shall be binding upon and inure to the benefit of the Parties. There are no third-party beneficiaries to this Agreement.

c. **Representations.** The Parties represent that on and as of the date of this Agreement, they have full capacity, right, power and authority to execute, deliver and perform under this Agreement. The individuals signing this Agreement are duly authorized to sign the same on the Parties' behalves and to bind the Parties thereto. This Agreement is and shall be binding upon and enforceable against the Parties in accordance with its respective terms.

d. **Integration.** This Agreement is intended by the Parties to memorialize the terms in the Term Sheet, which is attached as Exhibit 3 to this Agreement, and to be the final expression of their agreement with respect to the subject matter of this Agreement and the complete and exclusive statement of the terms of this Agreement between the Parties, and supersedes any prior understandings between the Parties, whether oral or written.

e. **Interpretation.** In all cases, the language in all parts of this Agreement shall be construed simply, according to its fair meaning and not strictly for or against any Party,

with the view of preserving and protecting the intent and purposes of the Agreement, it being agreed that the Parties or their agents have all participated in the preparation of this Agreement.

- f. **Governing Law.** The Parties agree that this Agreement is made, executed and entered into, and is intended to be formed within the State of California and that this Agreement is to be interpreted and enforced under the laws of the State of California. Any federal law claims shall be interpreted and enforced under federal law.
- g. **Counterparts.** This Agreement may be executed in two or more identical counterparts, each of which shall be deemed to be an original and each of which shall be deemed to be one and the same instrument when each Party signs each such counterpart.
- h. **Recitals.** Each of the Recitals is incorporated into this Agreement.
- i. **Definitions; Attachments.** Capitalized terms used herein shall have the respective meanings specified in the text of this Agreement. Unless otherwise indicated, references in this Agreement to sections, paragraphs, clauses, exhibits, attachments and schedules are those contained in or attached to this Agreement and all exhibits and schedules referenced herein are incorporated herein by this reference as though fully set forth in this Agreement.
- j. **Parties.** All references to the Parties shall include all officials, officers, personnel, employees, agents, assigns, and subcontractors of the Parties.

*“Great Basin Unified Air Pollution Control District”*

Dated: \_\_\_\_\_

By: \_\_\_\_\_

*Governing Board Chair*

APPROVED AS TO LEGAL FORM:

By: \_\_\_\_\_

District Counsel

*“Los Angeles Department of Water and Power”*

*Dated:* \_\_\_\_\_

*By:* \_\_\_\_\_

*Board of Commissioners Chair*

APPROVED AS TO LEGAL FORM:

By: \_\_\_\_\_

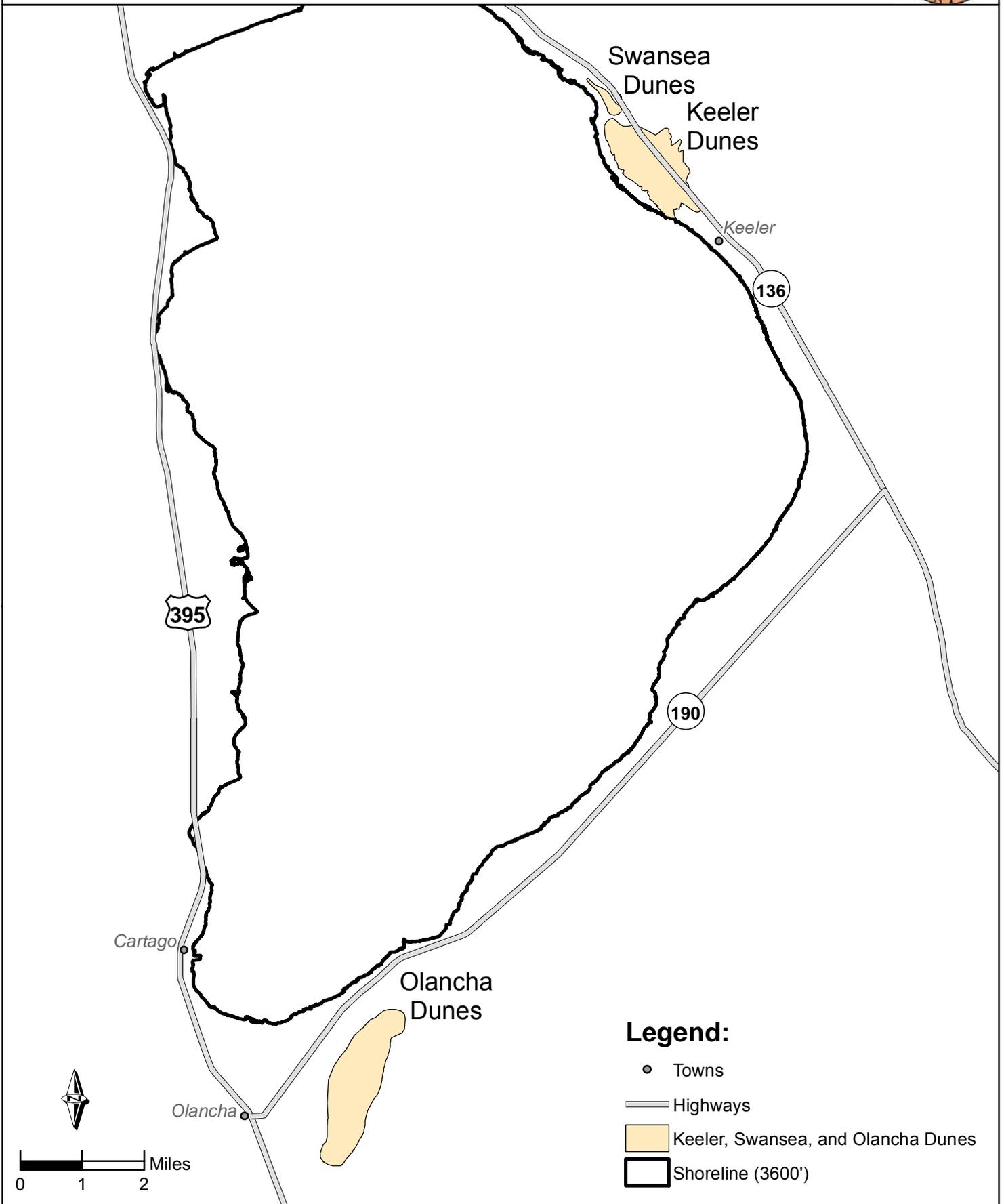
City Attorney

**List of Exhibits**

- Exhibit 1      **CONFIDENTIAL** – Maps of Initial Phase 7b areas (X Pages)
- Exhibit 2      Maps of the Keeler and Other Dunes Areas (3 pages)
- Exhibit 3      Term Sheet Term Sheet approved by the LADWP Board of Commissioners on June 26, 2013, and the District Governing Board on June 27, 2013

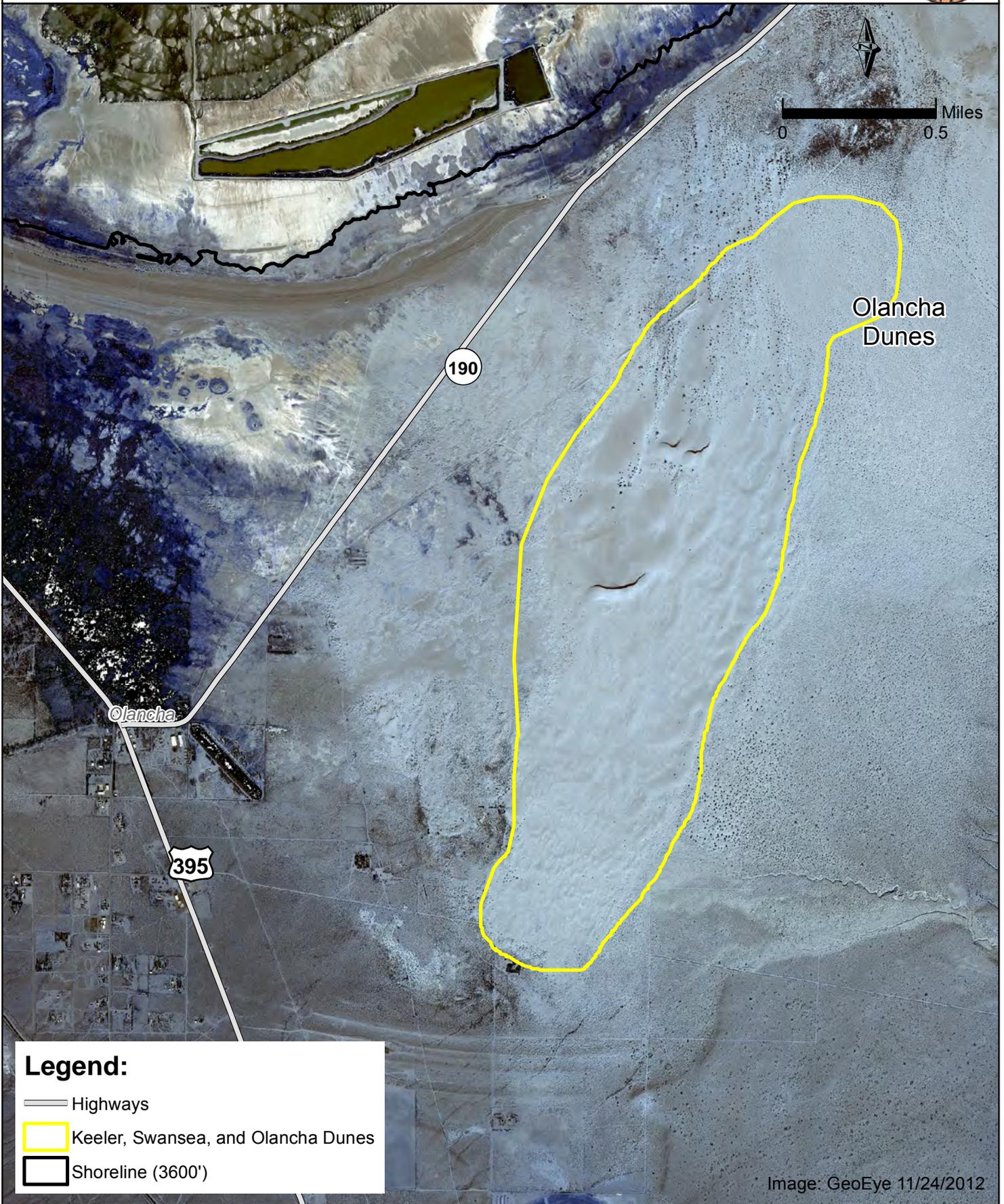


# Keeler, Swansea, and Olancha Dunes





# Olancha Dunes - Detail



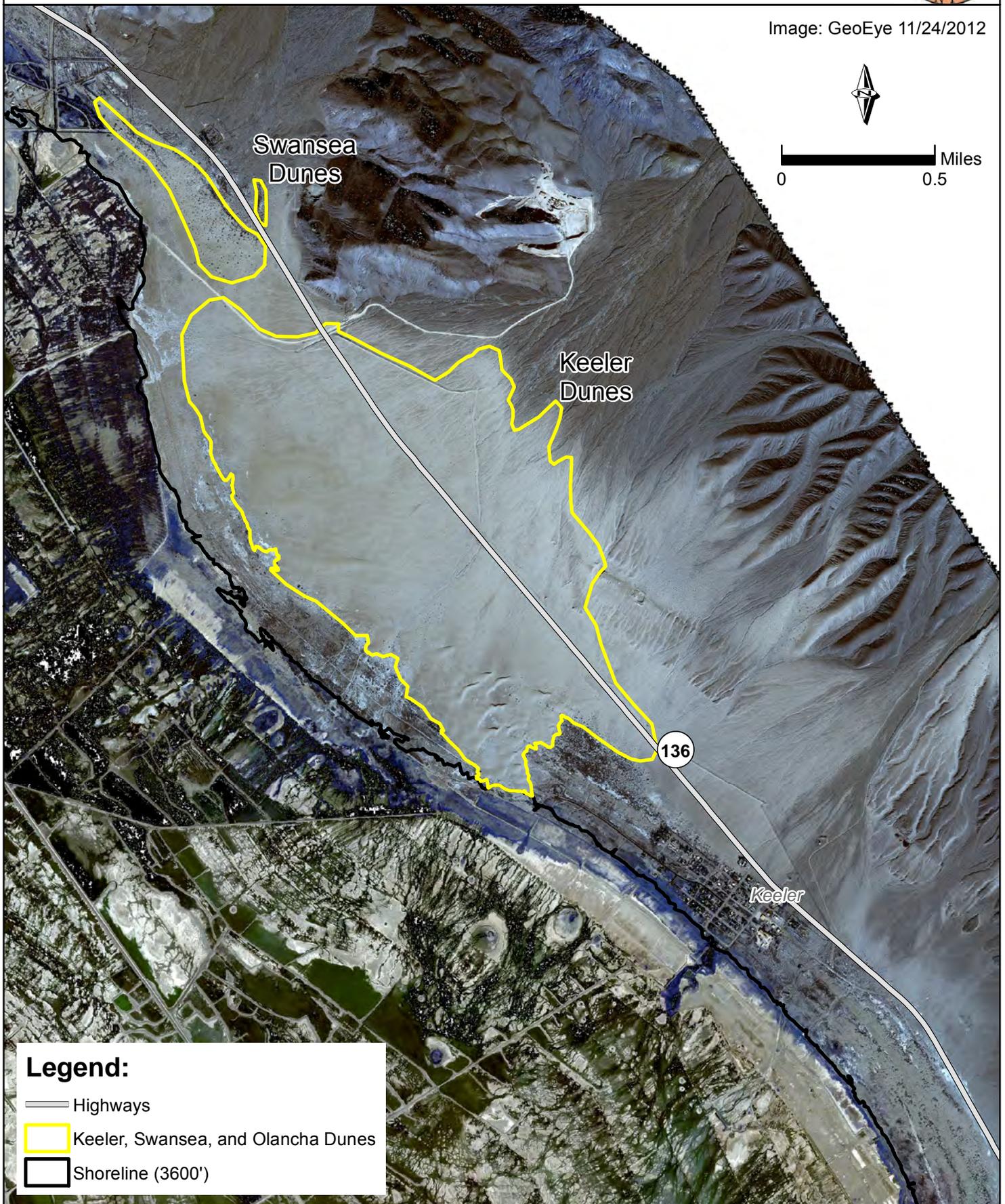


# Keeler and Swansea Dunes - Detail

Image: GeoEye 11/24/2012



0 0.5 Miles



### Legend:

-  Highways
-  Keeler, Swansea, and Olancha Dunes
-  Shoreline (3600')

**GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT  
AND  
LOS ANGELES DEPARTMENT OF WATER AND POWER  
  
PHASE 7a AND KEELER DUNES  
SETTLEMENT TERMS  
JUNE 25, 2013**

The following constitutes the Settlement Terms (the “Terms”) for the Phase 7a Stipulated Order for Abatement (SOA) and Keeler Dunes issues between the Great Basin Governing Board (GB) and the Los Angeles Department of Water and Power (LADWP):

**I. MODIFICATION OF SOA**

A. GB and LADWP agree that GB shall modify the Phase 7a SOA to do the following:

1. Deadline Extensions

- a) Existing December 31, 2013 deadline for all infrastructure for BACM and compliant operation (other than Managed Vegetation Compliance) to be installed and fully operational extended to December 31, 2015.
- b) Existing December 31, 2015 deadline for Managed Vegetation Controls (fully compliant managed vegetation cover) extended to December 31, 2017.

2. Assumptions for Extension of Deadlines

- a) Timely Availability of necessary leases from State Lands and of necessary permits from other agencies

- b) Acceptance by GB of 328 acres of Eligible Cultural Resource (ECR) areas. ECR areas are defined as California Register of Historical Resources (CRHR)-eligible areas plus necessary buffer areas and are to be removed from Phase 7a and placed into Phase 7b (see below) and potentially the subject of a new future Board order. A confidential map of the existing 328-acre ECR areas shall be attached to the amended SOA.
- c) Force majeure process of original SOA to be followed for newly discovered potential ECRs.

#### B. Creation of Phase 7b

1. Phase 7b would be created for the treatment of the 328 acres of ECR areas plus any newly discovered cultural resources within Phase 7a that are determined by LADWP's state certified archaeologist to be CRHR-eligible and necessary buffer areas (the "Additional Phase 7b Areas") and whose determination is confirmed by a second, state certified archaeologist mutually agreeable to GB, LADWP and State Lands (the "Second Archaeologist").
2. Initially Phase 7b would include 328 acres of previously identified ECR areas from Phase 7a (the "Initial Phase 7b Areas").
3. Any areas in Phase 7a (beyond the Initial Phase 7b Areas ) where ECRs are located during Phase 7a construction shall be handled as part of Phase 7b (the "Additional Phase 7b Areas"). Promptly upon discovery of any cultural resources during the Phase 7a construction process, LADWP shall promptly notify GB of, and confer with GB about, such discovery, and LADWP's state certified archeologist shall fulfill their legal obligations relative to assessing and making recommendations for cultural resources. LADWP's state certified archaeologist shall be responsible for evaluating whether any newly discovered cultural resource areas within Phase 7a are CRHR-eligible, and if so, the additional buffer areas necessary to address disturbance of the

CRHR eligible areas; such evaluations shall be confirmed by the Second Archaeologist. Newly identified CRHR eligible areas and necessary buffer areas shall become ECR areas and become part of the Additional Phase 7b Areas.

#### 4. Cultural Resource Task Force

- a) The amended SOA will establish a Cultural Resource Task Force (CRTF). The CRTF will be an advisory group consisting of LADWP, GB, State Lands, State Historical Preservation Office, and Local Tribal Representatives. The CRTF shall be able to draw upon outside resources and experts, as needed, to aid the CRTF's process. LADWP shall be responsible for paying the reasonable costs of the CRTF, including reimbursements for travel expenses of CRTF members.
- b) The CRTF will initially be charged to make recommendations to GB and LADWP as to the best course of action and timing for the treatment of the Initial Phase 7b Areas. Such treatment could include whether particular areas should be permanently avoided, subject to Phase III cultural recovery or subject to some less intensive form of cultural recovery to protect cultural resources in the Initial Phase 7b Areas. The CRTF will make non-binding recommendations to the GB Governing Board and LADWP regarding treatment of the Initial Phase 7b Areas on or before December 31, 2014. LADWP and GB shall commit to form the CRTF and host its initial meeting within ninety (90) days after the effective date of the amended SOA.
- c) The CRTF shall also make non-binding recommendations to GB and LADWP with respect to the treatment of ECRs that may become part of the Additional Phase 7b Areas. After making its recommendations for the Initial Phase 7b Areas, the CRTF shall remain in existence to make recommendations for any Additional Phase 7b Areas that may be designated ECRs by LADWP's state certified archaeologist and confirmed by the Second Archaeologist.

- d) If after considering the non-binding recommendations of the CRTF, GB exercises its discretion to order LADWP to install dust controls in either the Initial Phase 7b Areas or in the Additional Phase 7b Areas, GB will issue a new Board order or orders after receiving input from LADWP and will determine if any SIP amendment is necessary. The new Board order or orders shall include control completion deadlines that take into account project circumstances, including but not limited to, recovery and additional environmental work necessary to complete the project at issue. The new Board order or orders shall recognize that the construction period shall be subject to all time-extensions-for-cause provisions of Paragraphs 5 and 6 of the SOA.
- e) Like the SOA for Phase 7a, any future order or orders issued by GB pertaining to Phase 7b will give due consideration to the shared goals of GB and LADWP to control air pollution and decrease the use of water for dust control at Owens Lake. In making its recommendations, the CRTF will also give due consideration to GB's and LADWP's shared water saving and air pollution control goals.
- f) The CRTF will be advisory in nature only, and GB and LADWP will retain final determination as to the treatment of ECR areas. GB reserves the right to issue a future order or orders requiring LADWP to install dust controls on Phase 7b areas and LADWP reserves the right to contest any such order.
- g) Permanent avoidance of any portion of the Phase 7b Areas will be considered by GB, which, upon approval, shall amend the 2008 SIP and Board Order 080128-01 in order to get USEPA approval.

### C. No Fines

1. GB shall not fine, issue fees or impose any other type of penalty upon LADWP with respect to any areas of Phase 7a, provided that the Phase 7a dust controls are put into place within the time frames set forth in Section I.A.1.

2. GB shall not fine LADWP for any areas in the Initial Phase 7b Areas and the Additional Phase 7b Areas pursuant to the SOA and this agreement.

D. Modification of SOA

1. The amended SOA shall clarify that the discovery of any cultural resources that are determined by LADWP's state-certified archeologist to be potentially CRHR-eligible shall be included in the SOA's existing time-extensions-for-cause, as set forth in SOA Paragraphs 5 and 6.
2. The amended SOA shall reiterate that GB and LADWP shall make every effort to develop, approve and deploy high-confidence waterless dust control measures in all areas where dust controls are ordered.
3. The amended SOA shall state that the modification of the SOA by GB and LADWP shall not be construed as a waiver by either party of any rights, remedies, legal theories or positions that either party may choose to assert in any hearing, proceeding, tribunal or action now or in the future except with respect to the particular subject matter contained in the amended SOA and the Keeler and Other Dunes Release".<sup>1</sup>
4. The effective date of the amended SOA shall be the date upon which the necessary decision makers of the City of Los Angeles and the GB Governing Board agree to enter into this agreement to modify the SOA.

E. Clarification on BACM

1. GB hereby approves Reduced Thickness Gravel BACM (2 inches of gravel with geotextile fabric underlay).

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<sup>1</sup> LADWP disputes the legality of and does not agree to the Supplemental Control Requirements Determination (SCRD) process. GB asserts that LADWP agreed to the SCRD process in the original Phase 7a SOA and elsewhere, and the SCRD process is now the law. GB and LADWP have a continuing disagreement on this point.

2. GB hereby approves Brine Shallow Flooding BACM as a subcategory of Shallow Flooding BACM. GB and LADWP acknowledge and agree that the foregoing approval of Brine Shallow Flooding BACM shall not make LADWP liable for maintenance of the natural Brine Pool on Owens Lake. "Brine Pool" is defined as those areas below elevation 3,553.55 feet.
3. GB will commit to work with the LADWP on an accelerated testing schedules and BACM approval, if warranted, for Roughness Elements and Tillage in soil type areas where these controls can be applied. Within 30 days of the effective date of the amended SOA, GB and LADWP shall agree upon accelerated testing schedules for the candidate Roughness Elements and Tillage BACMs in soil types where these control can be applied. Said schedules will include consideration for BACM approval of these candidate measures by the GB Board within one year of completion of the schedules (within 13 months of the effective date of the amended SOA). If the accelerated testing does not result in approved BACM designation for the candidate measures, LADWP and the GB Board will jointly assess why the accelerated testing did not result in BACM approvals. GB and LADWP also will commit to work on accelerated testing schedules and BACM approvals for other forms of BACM.
4. GB will memorialize its approvals set forth in Sections I E. (1) and (2) and any future approvals pursuant to Section I E. (3) in formal GB board resolutions and orders. GB and LADWP will jointly appeal to State Lands to approve use of new BACMs promptly upon their approval by GB and, with respect to the approvals set forth in Sections I E. (1) and (2) within 90 days of the effective date of the amended SOA.

## II. KEELER DUNES

### A. Keeler Dunes Dust Control Project

1. LADWP shall provide \$10 Million to GB as a public benefit contribution to and will support GB's "Keeler Project" (as defined herein below) to control PM10 emissions from the Keeler Dunes. LADWP shall tender the \$10 Million in a single payment to GB within 90 days after the effective date of the amended SOA and the following two actions are completed: 1) delivery to LADWP of the "Keeler and Other Dunes Release" (defined herein below) and 2) the submittal to the California Air Resources Board (CARB) as described in Paragraph II.B.1.c., below. The "Keeler and Other Dunes Release" shall not be effective until GB receives the \$10 Million payment.
2. GB shall use the funds for environmental impact analysis, design, permitting, construction, operation, maintenance, management, monitoring and directly related activities for a dust emission control project at Keeler Dunes (the "Keeler Project"). No funds shall be used for the purpose of attorney fees, public affairs or governmental relations (collectively, "Public Affairs") or contractors or subcontractors for Public Affairs. The Keeler Project includes all those portions of the Keeler Dunes owned by LADWP and BLM. GB shall have exclusive authority over, and responsibility for, the Keeler Project. LADWP shall have no responsibility for the design, permitting, construction, operation, maintenance, management, monitoring and other activities directly and exclusively related to the Keeler Project for as long as dust controls are required.
3. Upon delivery of the "Keeler and Other Dunes Release" (defined herein below) and the SIP and Board Order 080128-01 amendment submittal to the CARB as described in Paragraph II.B.1.c., below, LADWP will immediately provide GB with access to its property in the Keeler Dunes area in order to complete environmental impact analyses and for all design, permitting, construction, operation, maintenance, management, monitoring and activities directly and exclusively related to the Keeler

Project. So long as such access is provided by LADWP, GB shall indemnify in perpetuity, defend and hold LADWP (and the City of LA) harmless for personal injuries caused by the negligence or willful misconduct of GB with respect to all activities undertaken by GB and its employees, agents and contractors on LADWP's property and GB shall promptly repair any damage to LADWP's property caused by GB's activities on LADWP's property except that GB shall not be required to repair any alteration of the property that is part of or related to the design or implementation of the dust control measures for the Keeler Project. Any dust monitoring undertaken by GB on LADWP's Keeler Dunes property shall exclusively be for the Keeler Project and shall not be used for any other purpose.

4. LADWP, at its sole cost and expense, shall have the right (without obligation) to audit GB's books and records on an annual basis to verify that the \$10 Million contributed by LADWP has been exclusively used to fund the Keeler Project in accordance with the amended SOA, the amended SIP, the Keeler and Other Dunes Release and any other document memorializing the Terms, and for no other purpose. GB shall fully co-operate with any annual audit of the Keeler Project initiated by LADWP.

B. Release of LADWP/LA City for Keeler and Other Dunes Areas

1. Upon the effective date of the amended SOA, GB shall deliver to LADWP a release (the "Keeler and Other Dunes Areas Release") as follows:
  - a) Release for Keeler Dunes:

GB forever releases LADWP from any and all liability under any and all federal, state and local laws that GB can enforce and settle, including but not limited to the Health and Safety Code, those portions of the SIP that can be enforced by GB, and fugitive dust emissions rules, for dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of Keeler Dunes owned by LADWP. GB forever agrees not to request, encourage or join in an enforcement

action by any other agency against LADWP related to dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of the Keeler Dunes owned by LADWP. A map defining the geographical boundaries of the Keeler Dunes is attached and incorporated into this agreement.

- b) Release for Swansea and Olancho Dunes (collectively these dunes are defined as the Other Dunes Areas):

GB forever releases LADWP from any and all liability under any and all federal, state and local laws that GB can enforce and settle, including but not limited to the Health and Safety Code, those portions of the SIP that can be enforced by GB, and fugitive dust emissions rules, for dust emissions, regardless of origin, from the Other Dunes Areas in the vicinity of Owens Lake, including but not limited to portions of such dunes that may be owned by LADWP. GB forever agrees not to request, encourage or join in an enforcement action by any other agency against LADWP related to dust emissions, regardless of origin, from the Other Dunes Areas in the vicinity of Owens Lake. This agreement does not release LADWP from liability for dust emissions resulting from any future groundwater pumping by LADWP at or below the 3600-foot contour in the Owens Lake area. Maps defining the geographical boundaries of the Other Dunes Areas in the vicinity of Owens Lake are attached and incorporated into this agreement.

- c) SIP and Board Order Amendment:

Great Basin shall amend the SIP and Board Order 080128-01 consistent with the terms of this agreement and the “Keeler and Other Dunes Areas Release” and shall request the USEPA and CARB to approve the amended SIP.

2. LADWP reserves the right to contest and defend any alleged violations not covered by the releases herein, including but not limited to the right to contest and defend any alleged violations of Rule 401, or alleged violations of H&S 42316 below the 3600-foot elevation and above the 3600-foot elevation in those areas outside the Keeler

Dunes and Other Dunes Areas. GB reserves the right to assert that any such defenses are barred or otherwise not legally supported.

3. After the date of this agreement, GB shall hold no hearings regarding LADWP's liability/responsibility for dust emissions from the Keeler Dunes or from the Other Dunes Areas.

### **III. GENERAL SETTLEMENT CONDITIONS**

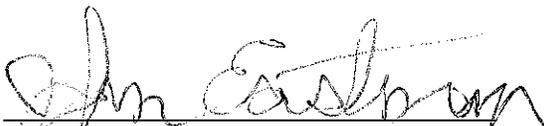
- A. All Settlements and other matters contained in the amended SOA and Keeler Release shall be subject to final approval by LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles.
- B. All Settlements and other matters contained in the amended SOA and Keeler Release shall be subject to approval of GB Board and shall be memorialized in GB Board modification of SOA and appropriate GB resolutions, the 2008 SIP, if required, and Board orders.
- C. GB and LADWP shall memorialize the Terms in formal settlement documents, including the amended SOA, the Keeler Release and the Other Dunes Area Release, within 30 days after approval of the Terms by the GB Board and by the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles. Prior to such approvals and until such time that public disclosure is mandated by law, GB and LADWP shall not disclose the Terms or the existence and content of the SOA Mediation and shall keep the Terms confidential.
- D. Once the Terms are fully approved by the GB Board and by the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles, GB and LADWP shall issue a joint press release to announce the successful conclusion of the SOA Mediation, the Terms, the amended SOA and the Keeler Release.

- E. The parties to the SOA Mediation shall each execute a copy of this document to evidence that it contains the final and complete statement of the Terms resulting from the SOA Mediation that will be submitted for approval to the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles and to the GB Board.
  
- F. Prior to the public announcement of this Agreement, LADWP and GB will develop a mutually agreeable joint communication, which announces and explains this Agreement. The Parties agree not to disclose or divulge the content and substance of the Settlement Terms to any third parties, including, but not limited to members of the press or media, unless and until LADWP and the District have approved a final settlement. The confidentiality requirements do not extend to the undersigned participants' discussions with their respective party's legal counsel and governing boards, regarding the settlement meetings.

In witness thereof, the parties hereto have set their hands to this agreement on June 27, 2013.

Great Basin Unified  
Air Pollution Control District

Los Angeles  
Department of Water and Power

By: 

By: 

Name: John Eastman

Name: RONALD O. NICHOLS

Title: Governing Board Chair

Title: General Manager

Date: June 27, 2013

Date: 7/25/13

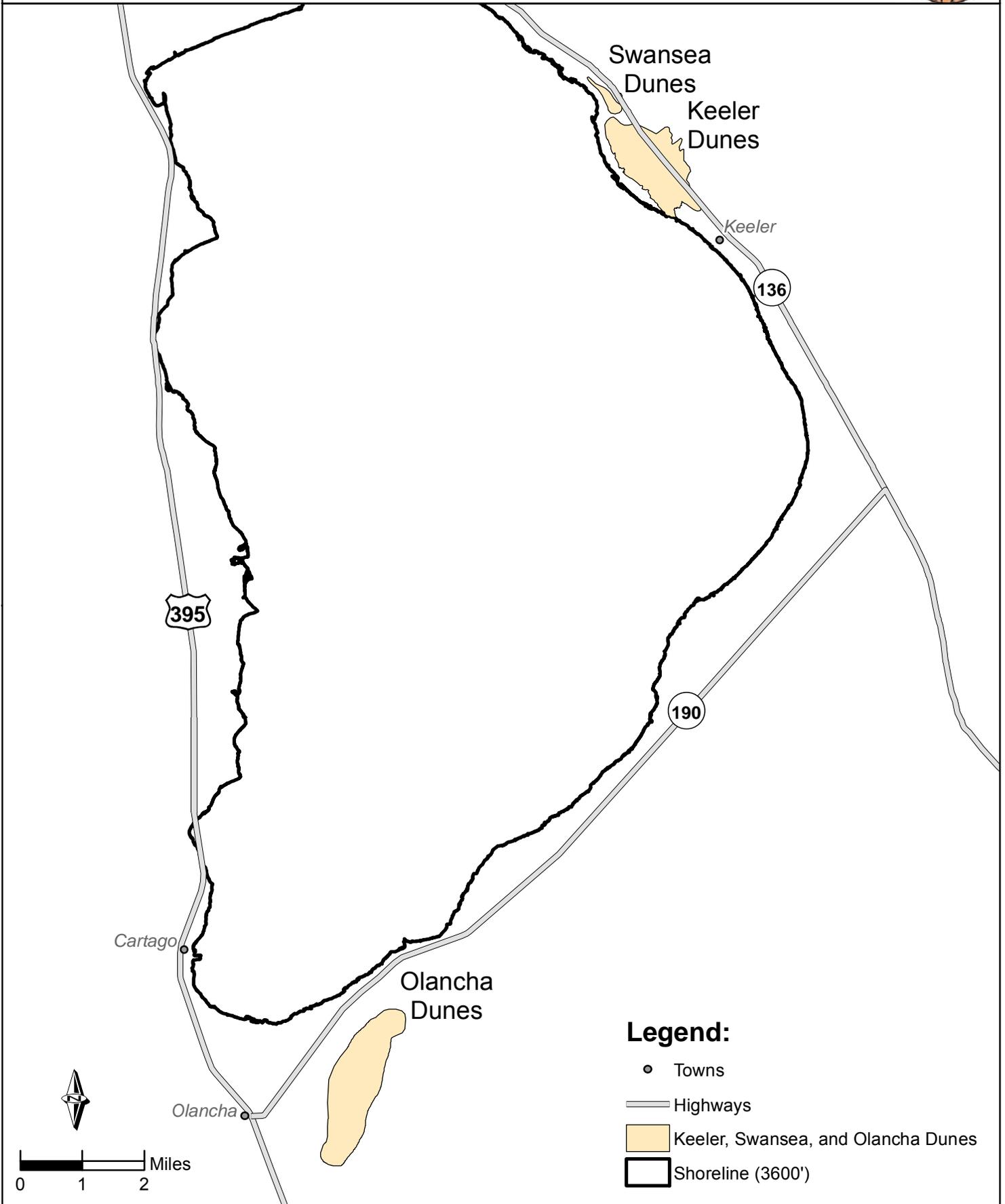
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APPROVED AS TO FORM AND LEGALITY  
CARMEN A. TRUTANICH, CITY ATTORNEY

JUL 22 2013  
  
MICHELLE LYMAN  
DEPUTY CITY ATTORNEY



# Keeler, Swansea, and Olancha Dunes



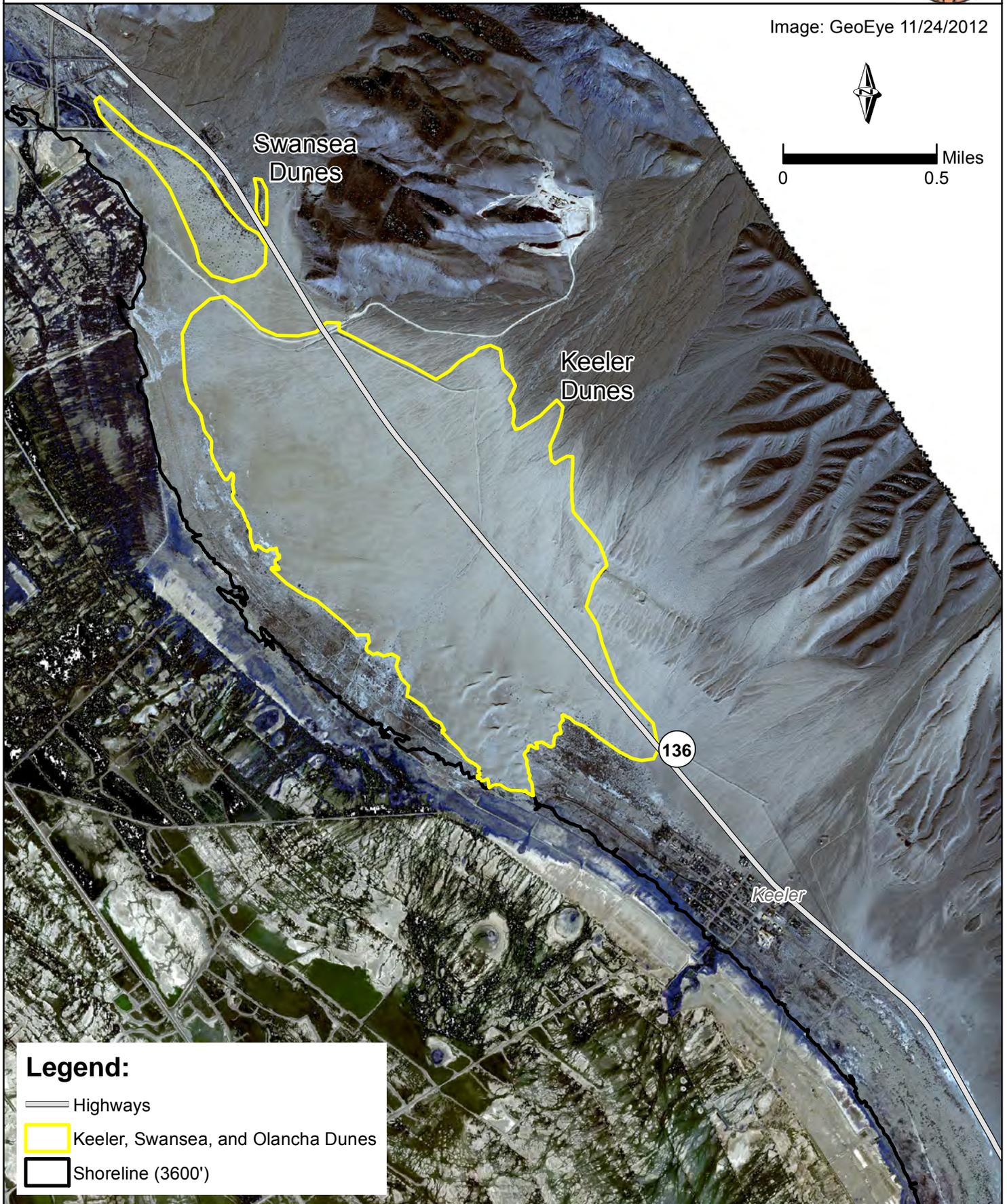


# Keeler and Swansea Dunes - Detail

Image: GeoEye 11/24/2012



0 0.5 Miles

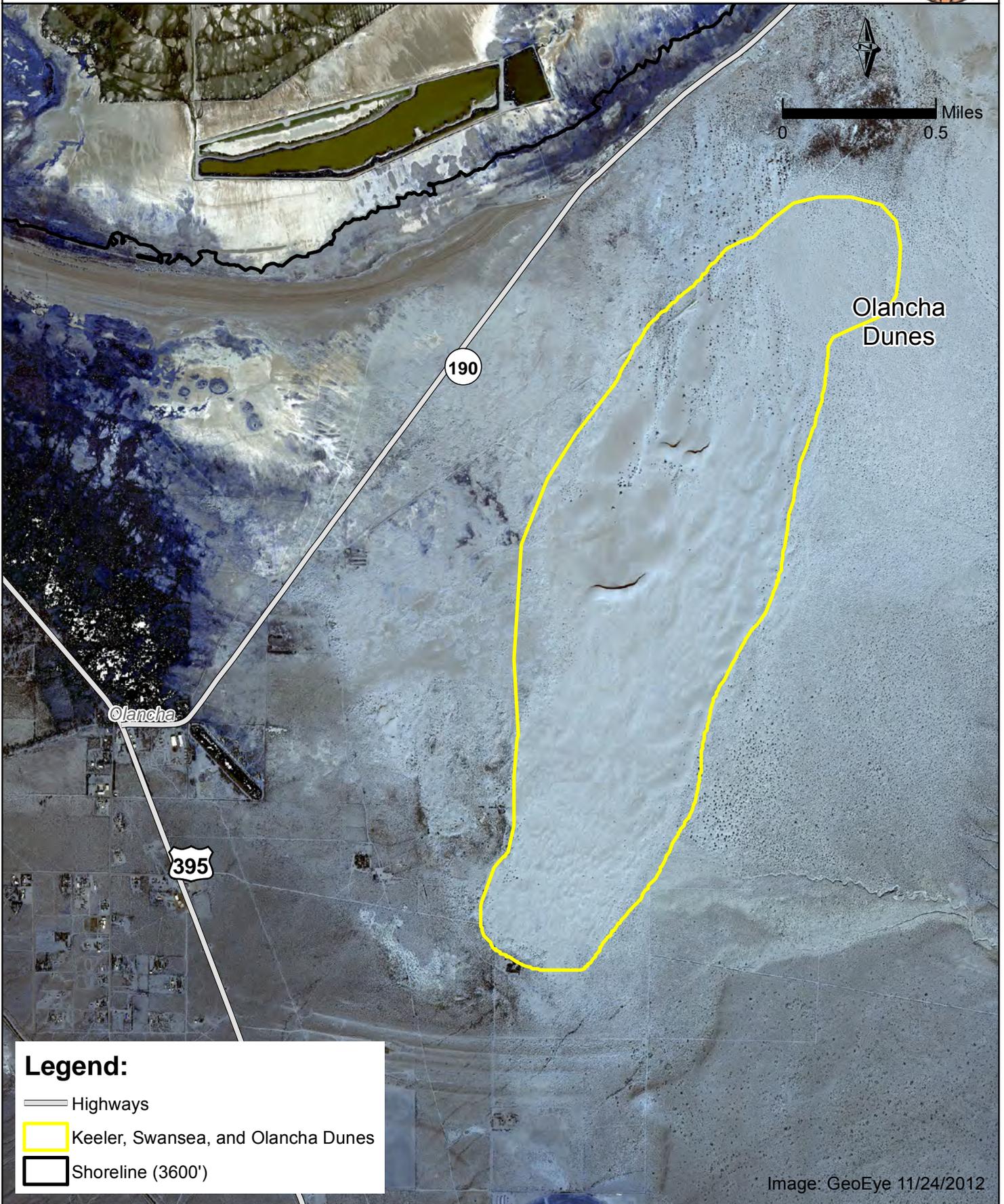


### Legend:

-  Highways
-  Keeler, Swansea, and Olancha Dunes
-  Shoreline (3600')



# Olancha Dunes - Detail



**ATTACHMENT C**

Exhibit 6

**CONFIDENTIAL** Map of 328-Acre

Initial Eligible Cultural Resource Areas (Phase 7b Areas)

This map contains sensitive cultural resources information that cannot be  
publicly disclosed under protection laws.

**ATTACHMENT C**

Exhibit 7

Map of Phase 7a Modified Areas and Phase 7a Transition Areas

(Map to be provided by the LADWP prior to  
August 19, 2013 Special District Governing Board meeting)

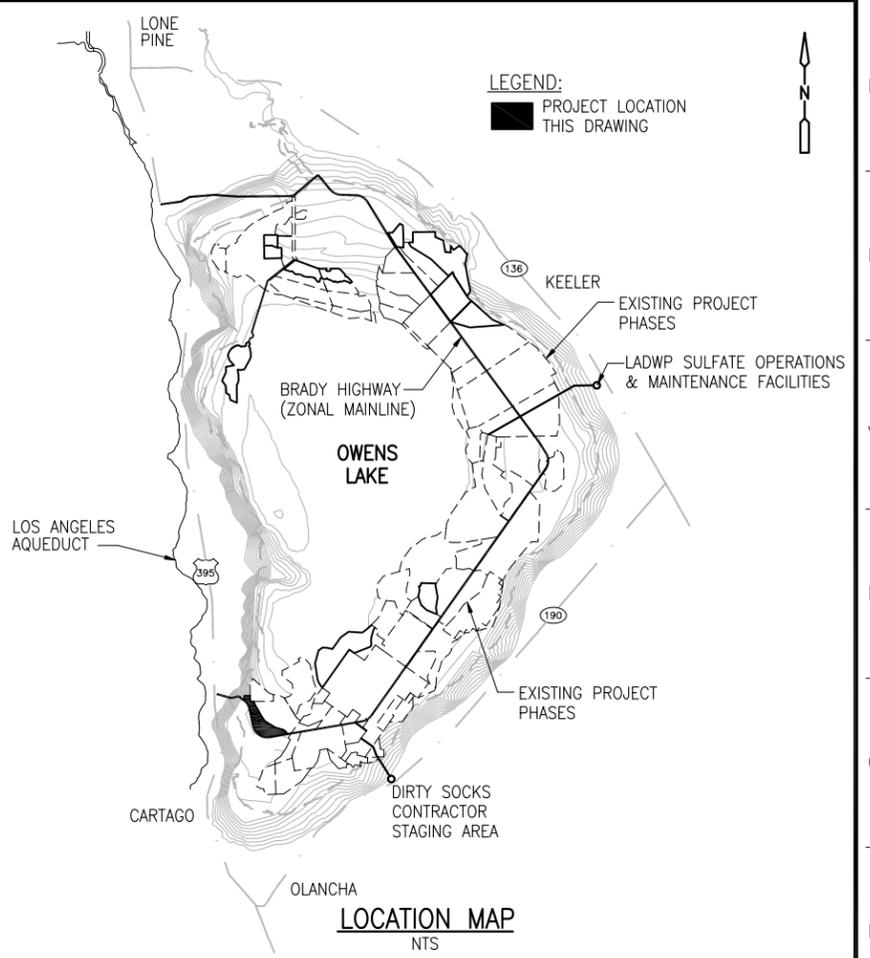
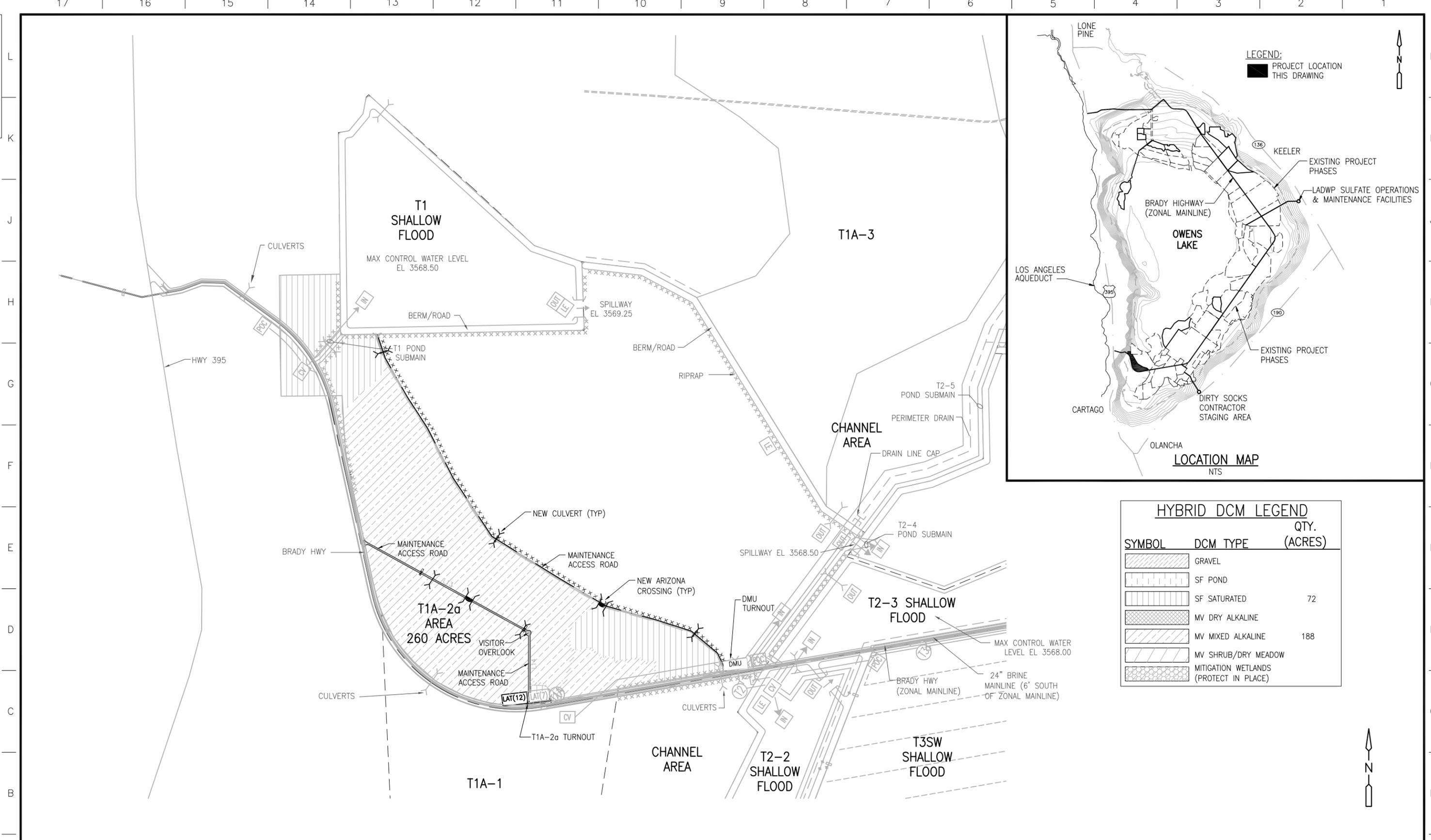
***Great Basin Unified Air Pollution Control District***

2013 Amendment to the Owens Valley PM<sub>10</sub> SIP

**Board Order 130916-01**

Exhibit 7: Map of Phase 7a Areas

D5887-Z-11M



HYBRID DCM LEGEND		
SYMBOL	DCM TYPE	QTY. (ACRES)
	GRAVEL	
	SF POND	
	SF SATURATED	72
	MV DRY ALKALINE	
	MV MIXED ALKALINE	188
	MV SHRUB/DRY MEADOW	
	MITIGATION WETLANDS (PROTECT IN PLACE)	



IN ASSOCIATION WITH  
**AHBE**  
 LANDSCAPE ARCHITECTS  
 8738 WASHINGTON BOULEVARD  
 CULVER CITY, CALIFORNIA 90232  
 T: 818 898 0418 F: 818 201 2864

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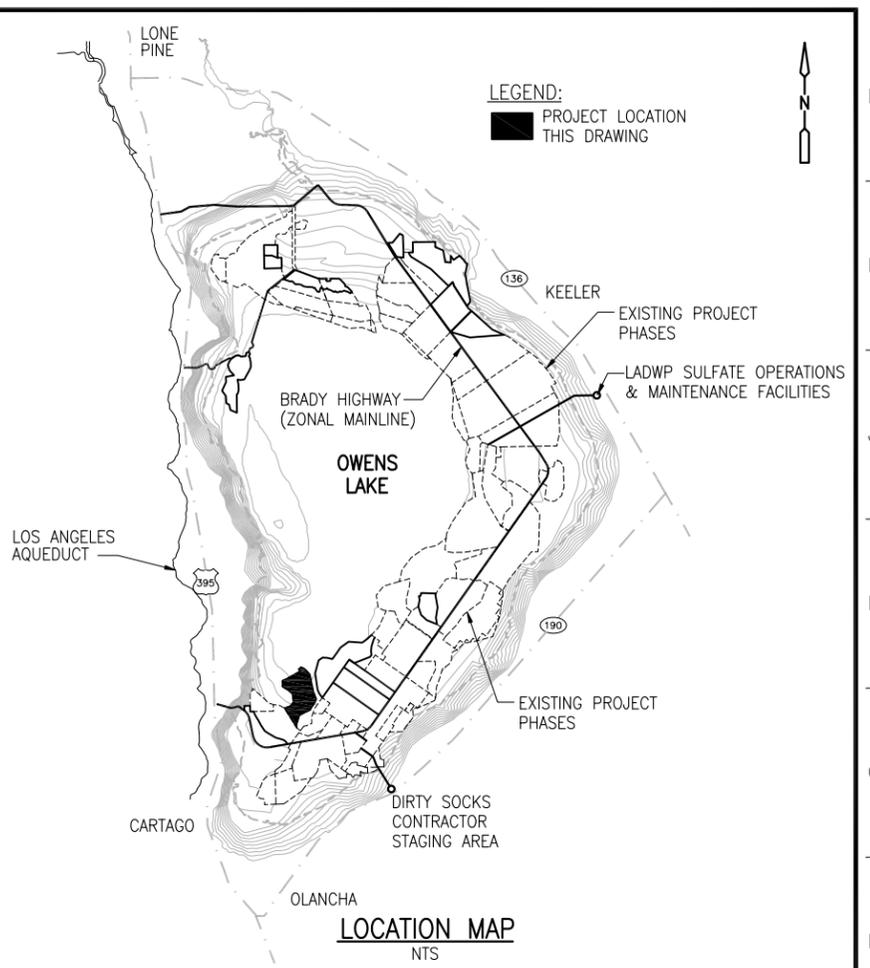
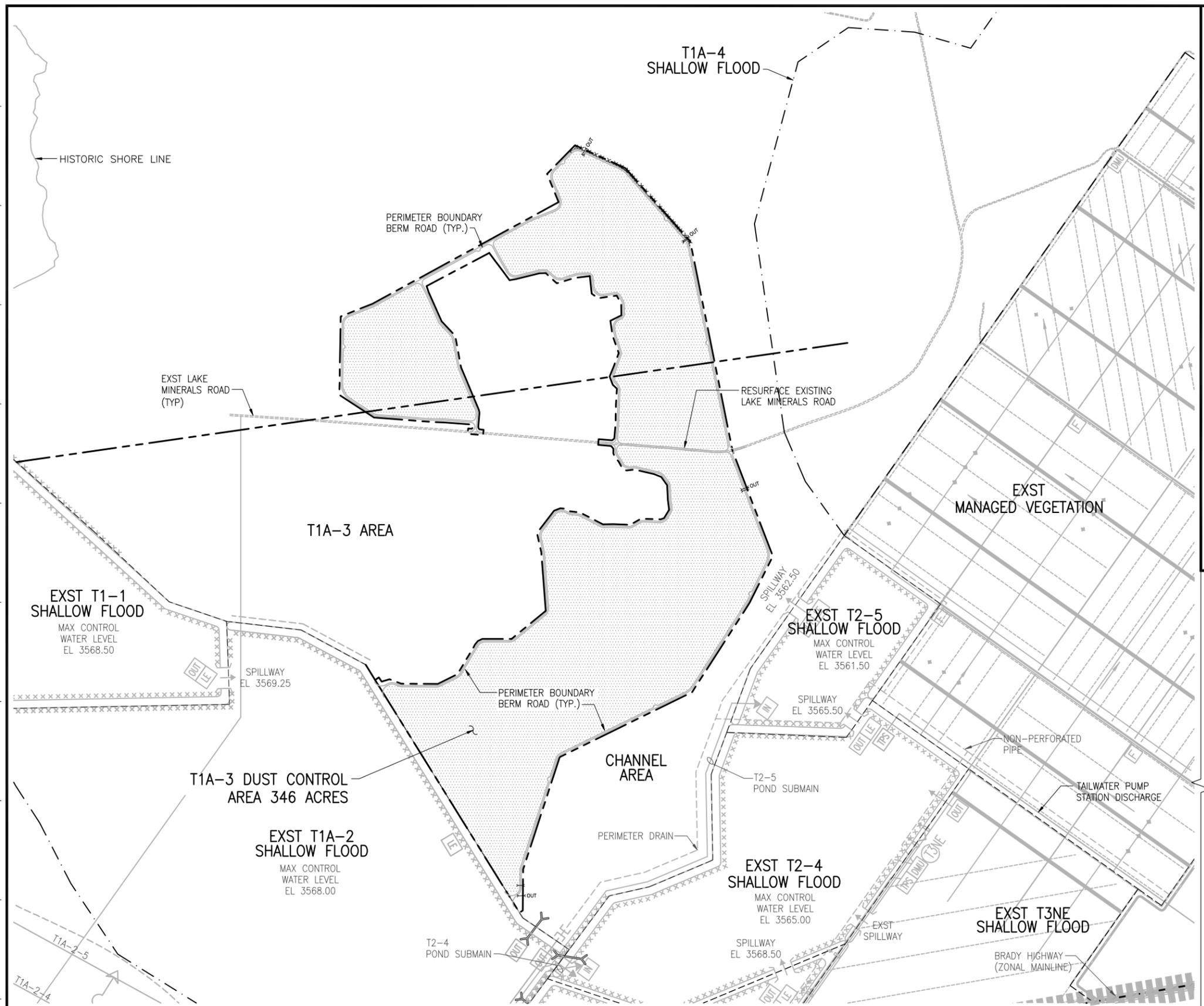
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ASSISTANT	5/13
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CHECKED BY	5/13
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RECOMMENDED	5/13
LOUIS G. RUBALCABA	5/13
WILLIAM T. VANWAGONER	5/13

**OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a**  
**OVERALL SITE PLAN T1A-2a AREA-HYBRID**

DEPARTMENT OF WATER AND POWER  
 WATER SERVICES ORGANIZATION CITY OF LOS ANGELES

DRAWING NUMBER  
**D5887-Z-11M**

D5887-Z-13P



REVISIONS				
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ASSISTANT		5/13		AS TO OPERATIONS	MARTIN L. ADAMS	5/13	
DRAWN BY	B. HARRIS	5/13					
CHECKED BY	V. BADANI	5/13					
LAST UPDATE		5/13					
RECOMMENDED							
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WILLIAM T. VANMAGNER	5/13						

**OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a**

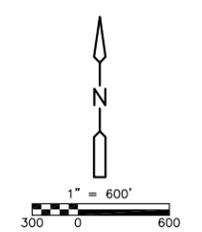
**OVERALL SITE PLAN**

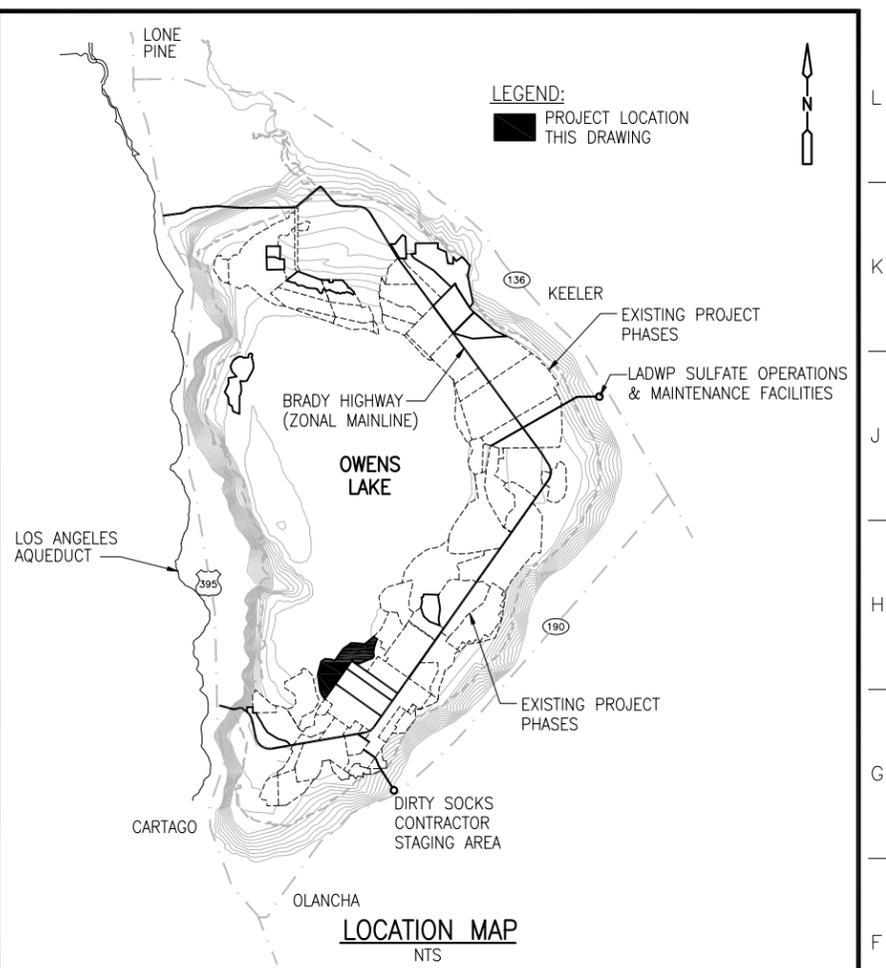
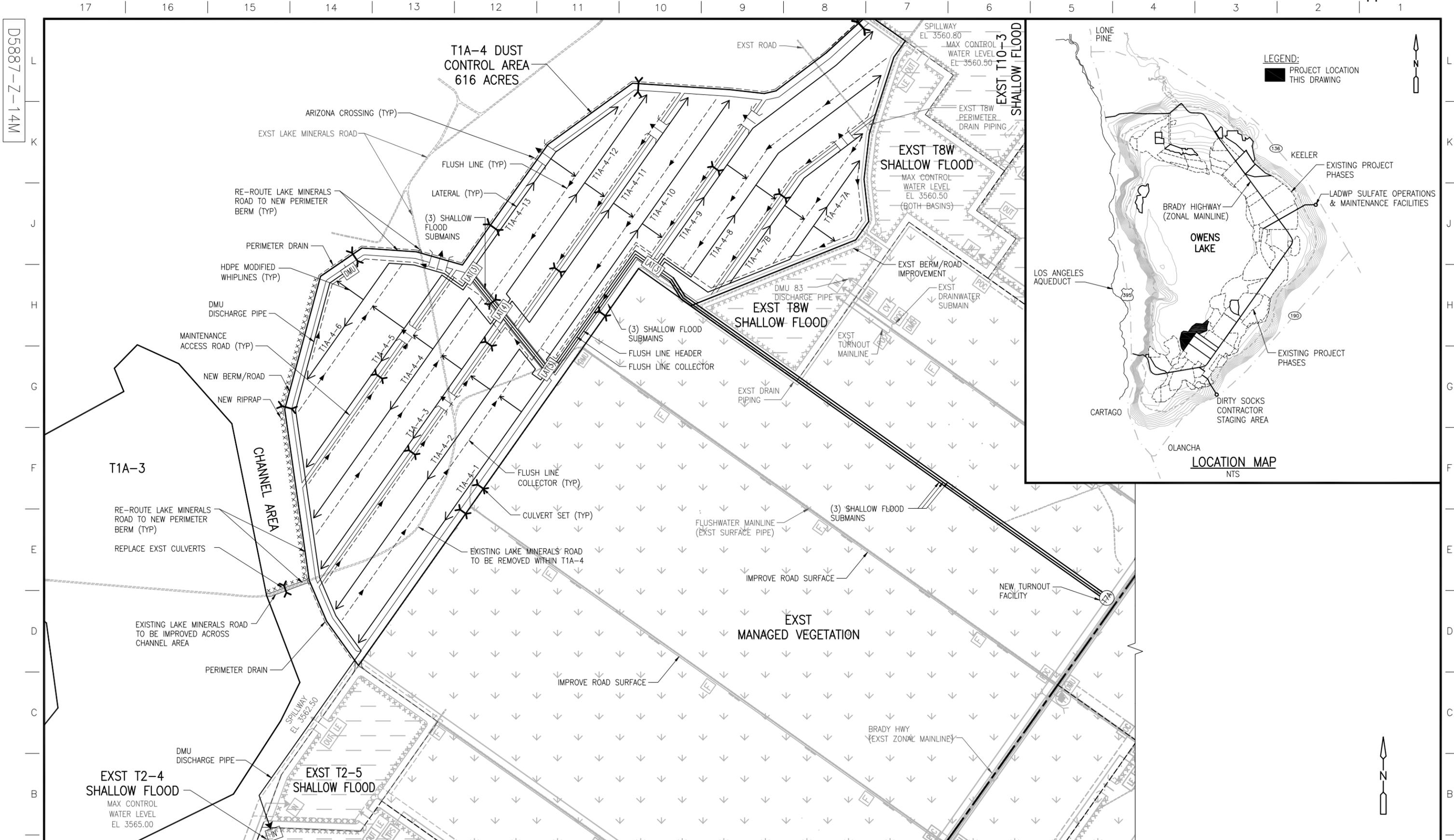
**T1A-3 AREA - GRAVEL COVER**

**DEPARTMENT OF WATER AND POWER**

**WATER SERVICES ORGANIZATION CITY OF LOS ANGELES**

**DRAWING NUMBER**  
**D5887-Z-13P**

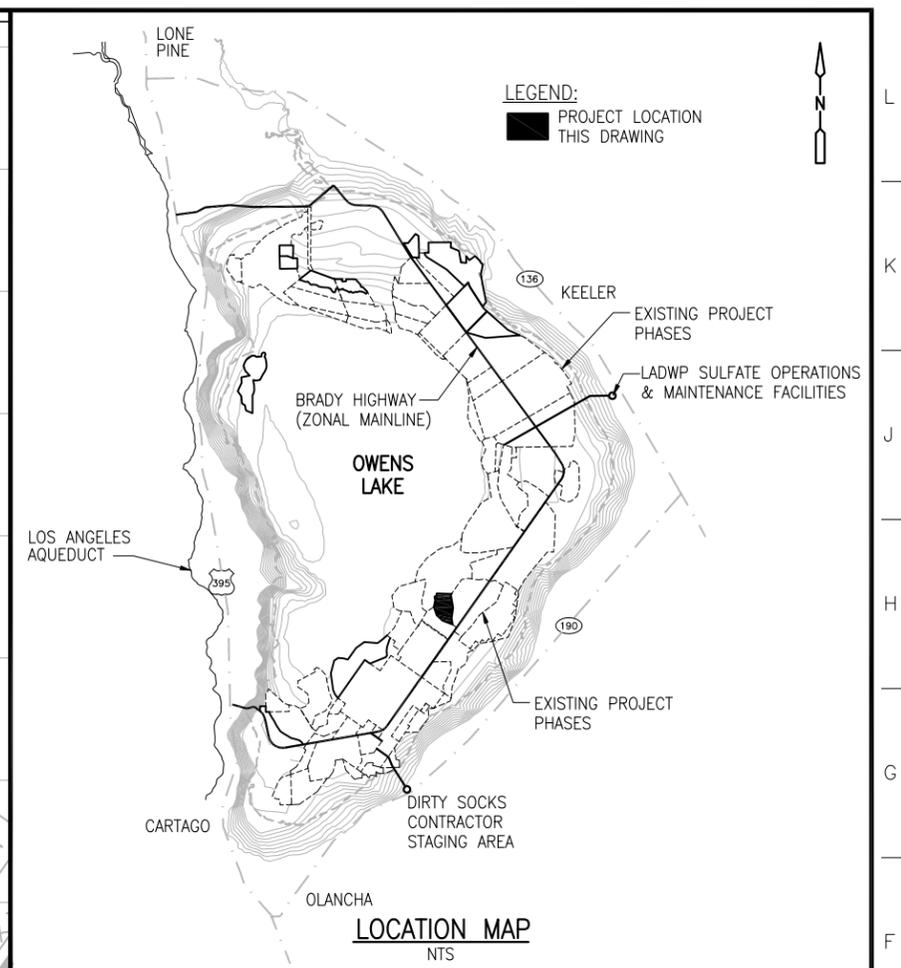
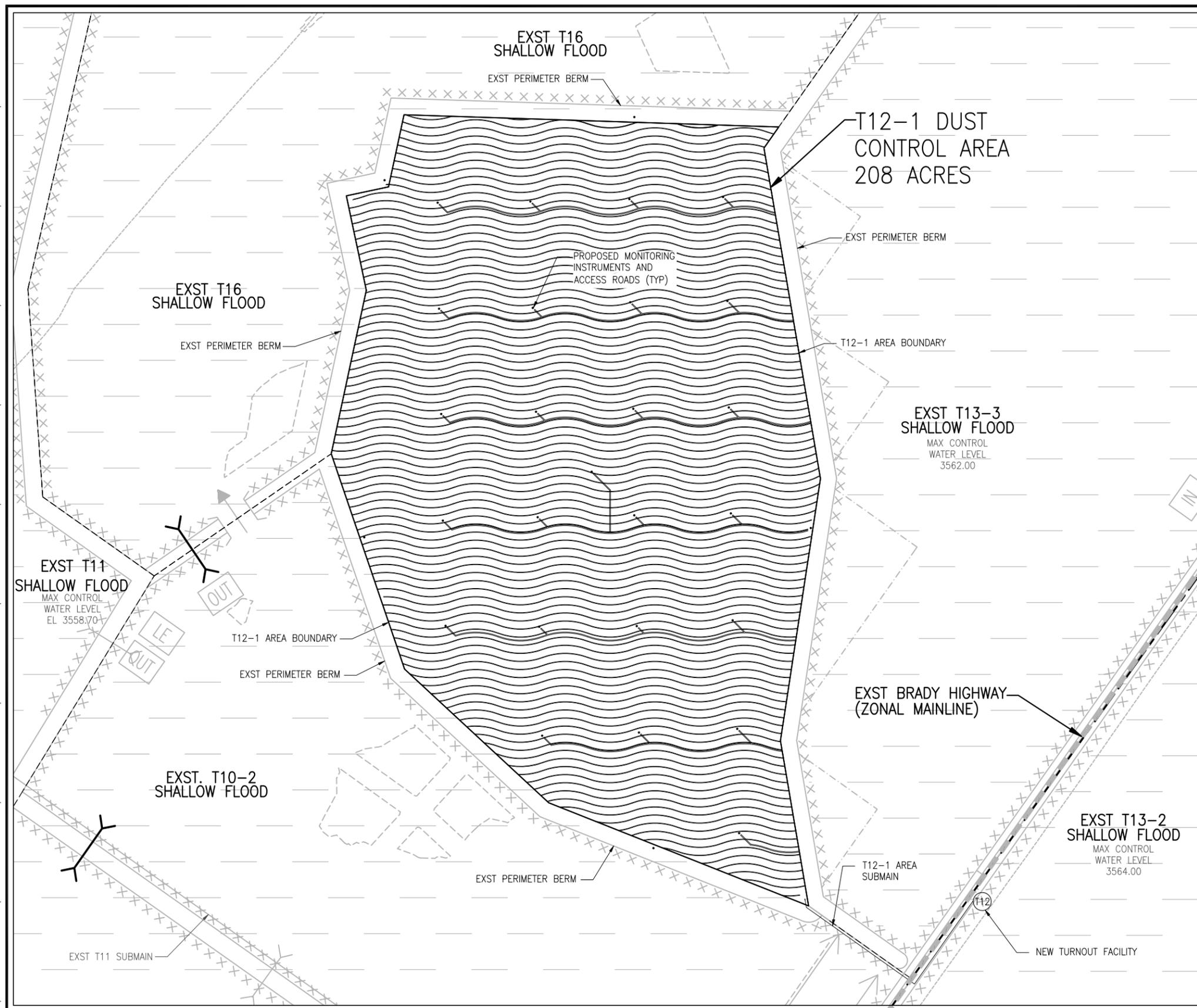




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						D. BERKOFF	5/13	MARTIN L. ADAMS	5/13	
						C. BILDERBACK	5/13	MARTIN L. ADAMS	5/13	
						L. WOELZ	5/13			
						L. WOELZ	5/13			
							5/13			

OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a  
 OVERALL SITE PLAN T1A-4 AREA - SHALLOW FLOOD  
 DEPARTMENT OF WATER AND POWER  
 WATER SERVICES ORGANIZATION CITY OF LOS ANGELES  
 DRAWING NUMBER: D5887-Z-14M

D5887-Z-15M



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ASSISTANT	D. BERKOFF	5/13	MARTIN L. ADAMS	5/13
DRAWN BY	C. BILDERBACK	5/13		
CHECKED BY	L. VOELZ	5/13		
LAST UPDATE		5/13		

RECOMMENDED	DATE	GENERAL MANAGER AND CHIEF ENGINEER
LOUIS G. RUBALCABA	5/13	
WILLIAM T. VANWAGONER	5/13	

FILE NAME: 5887Z015M.dwg

**OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a**

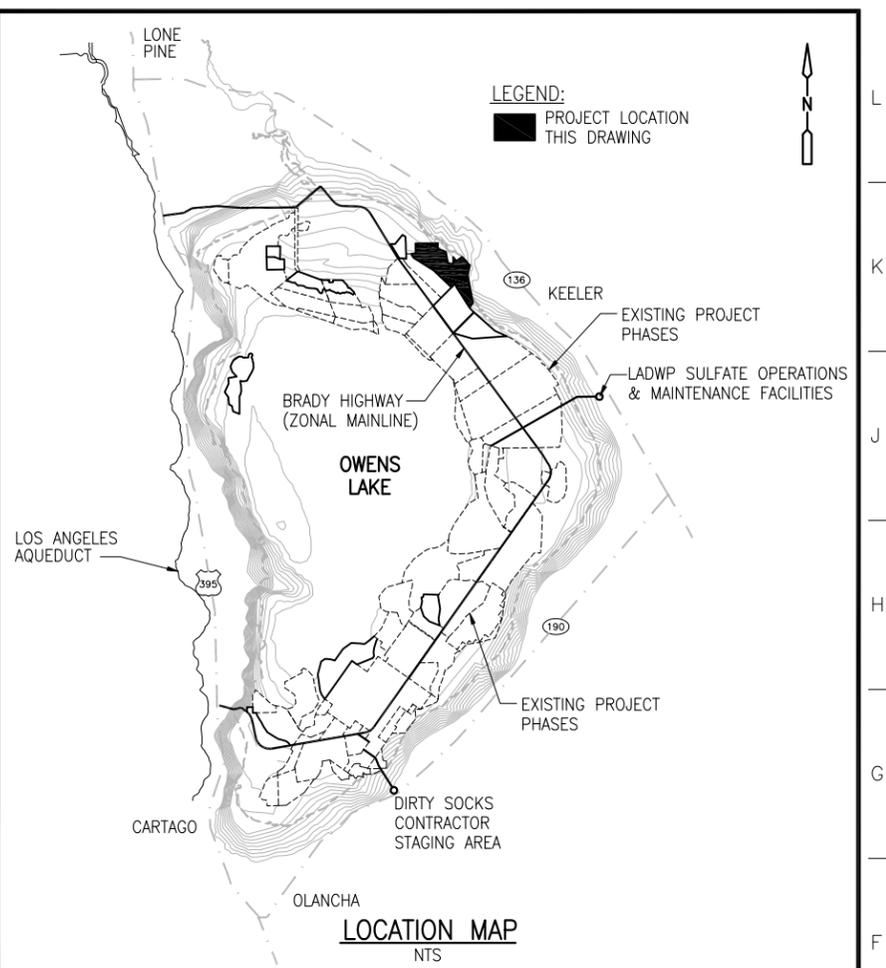
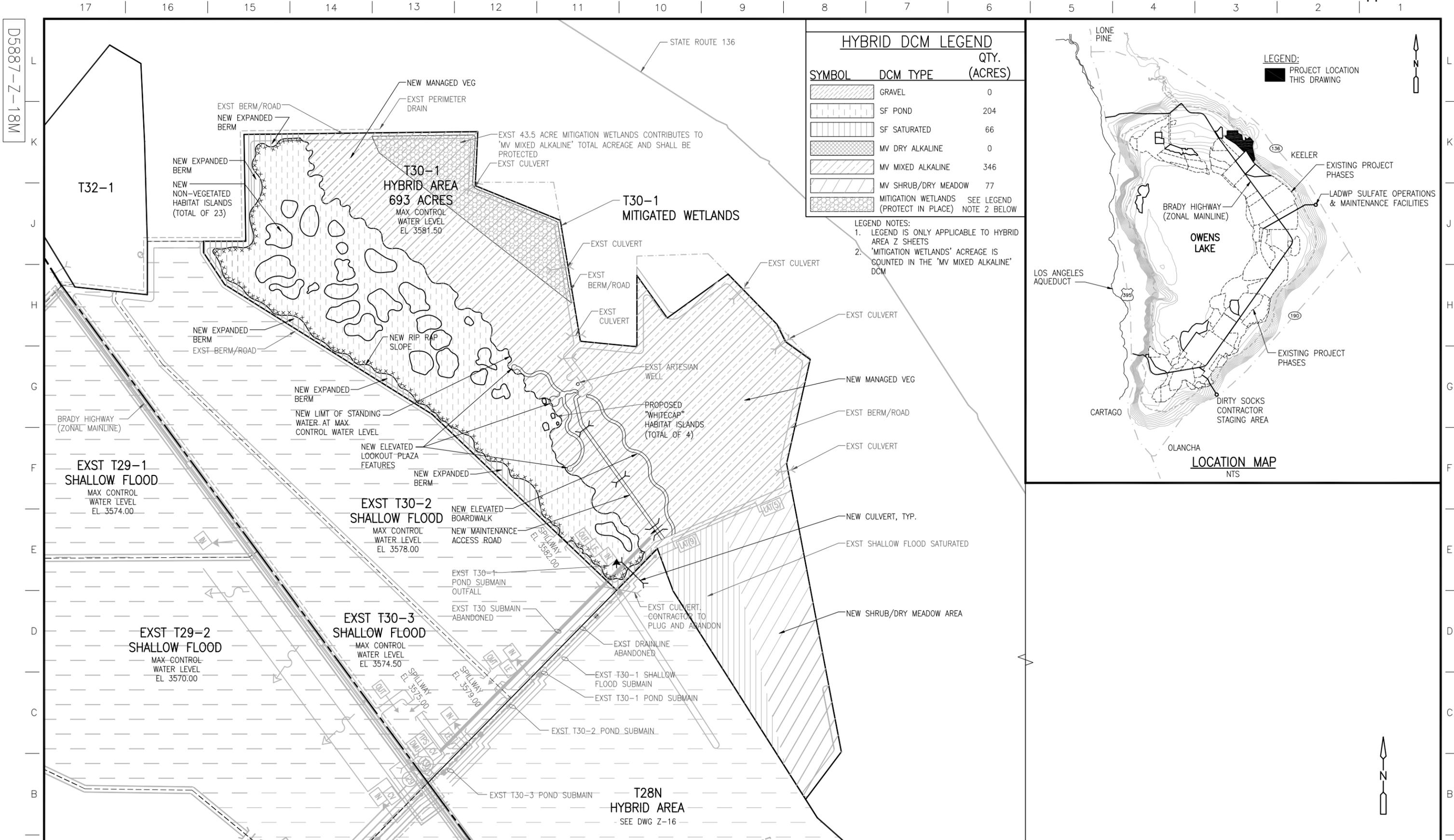
**OVERALL SITE PLAN**

**T12-1 AREA - TILLAGE**

**DEPARTMENT OF WATER AND POWER**  
WATER SERVICES ORGANIZATION CITY OF LOS ANGELES

**DRAWING NUMBER**  
D5887-Z-15M





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ASSISTANT	T. MUNOZ	5/13
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	WILLIAM T. VANWAGONER	5/13

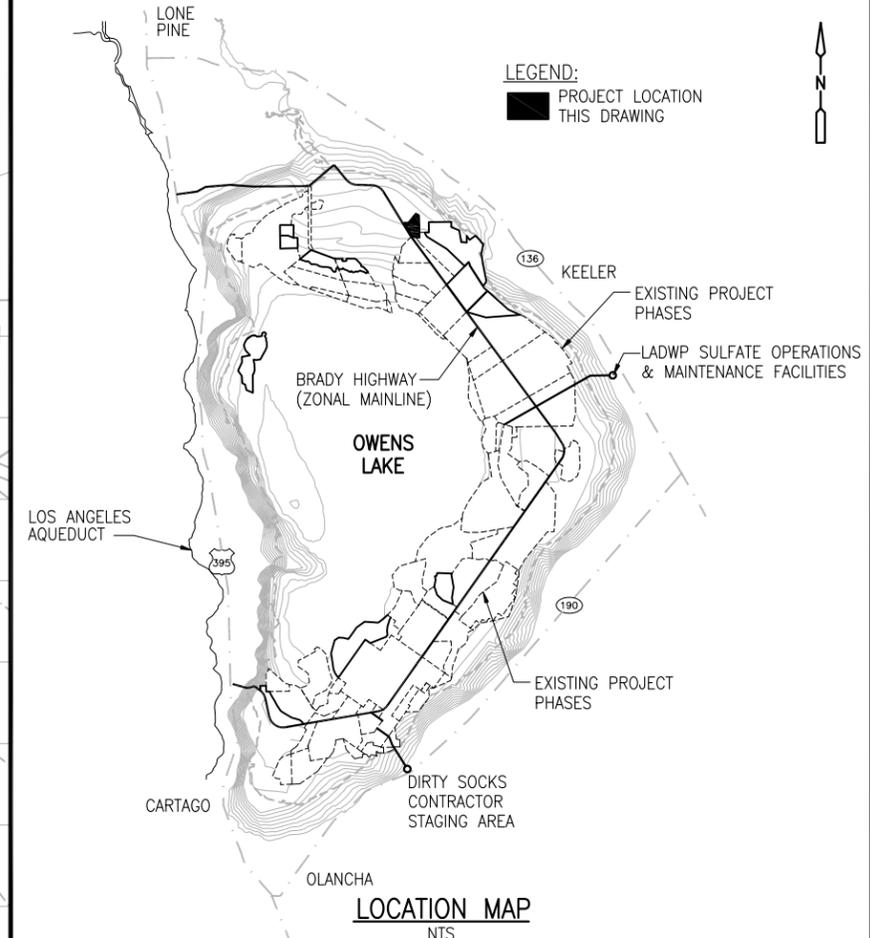
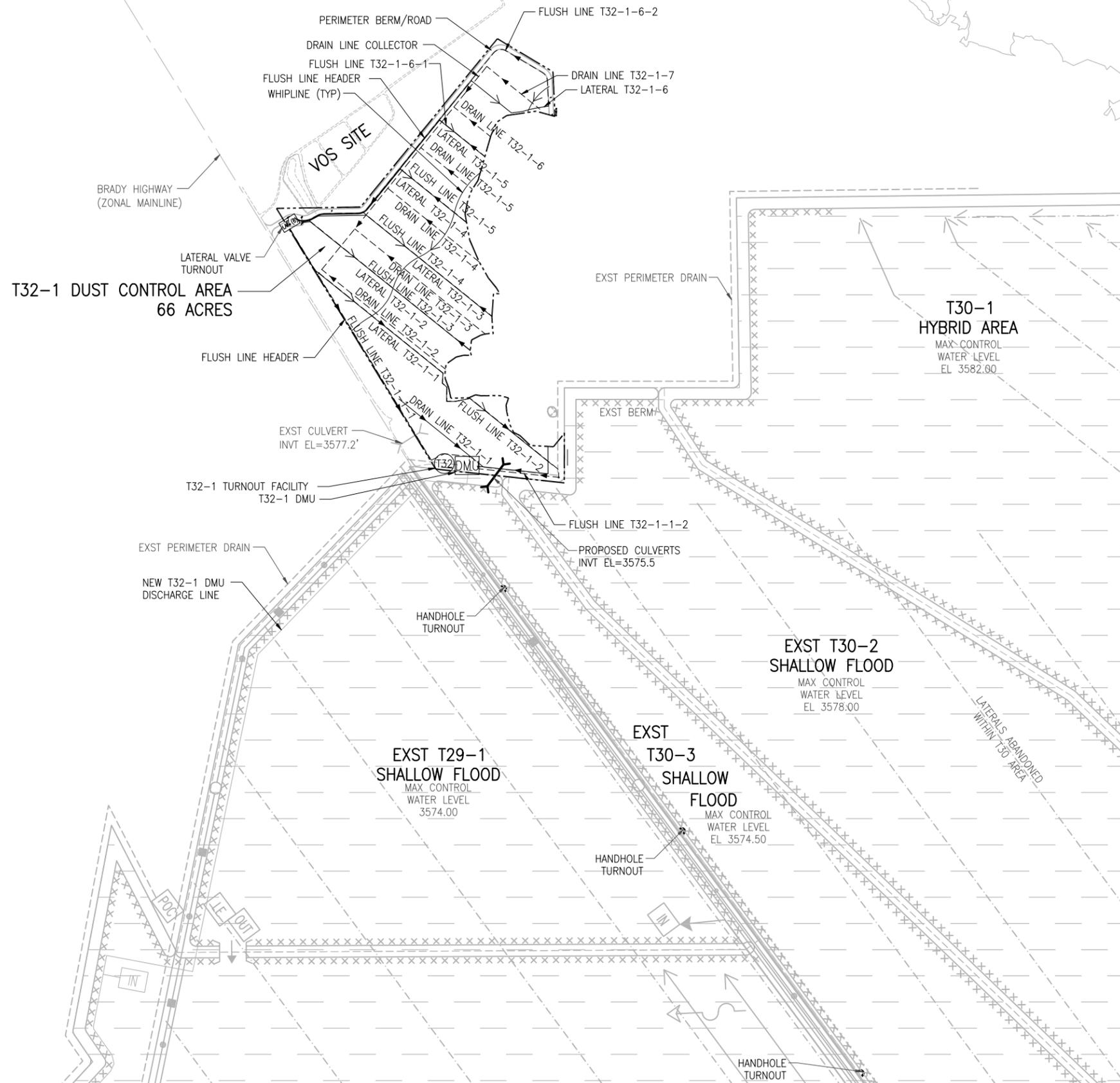
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AS TO OPERATIONS	MARTIN L. ADAMS	5/13
GENERAL MANAGER AND CHIEF ENGINEER		

**OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a**  
**OVERALL SITE PLAN T30-1 AREA - HYBRID**

**DEPARTMENT OF WATER AND POWER**  
 WATER SERVICES ORGANIZATION CITY OF LOS ANGELES

DRAWING NUMBER  
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D5887-Z-20P



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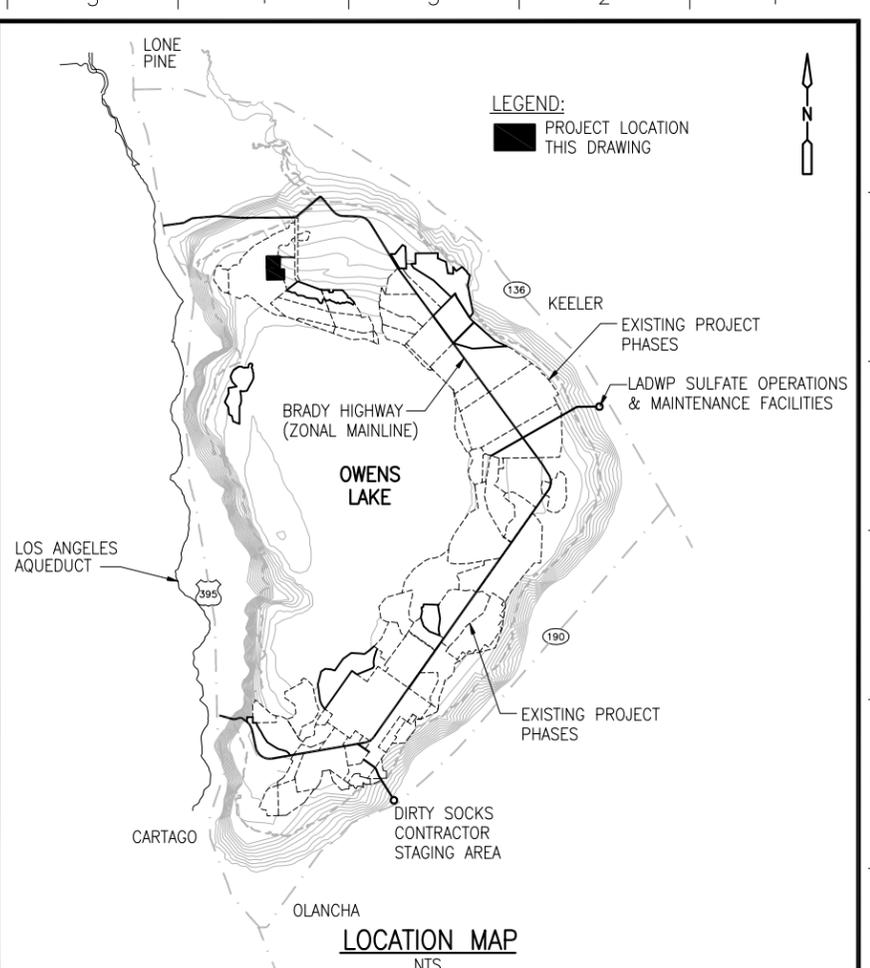
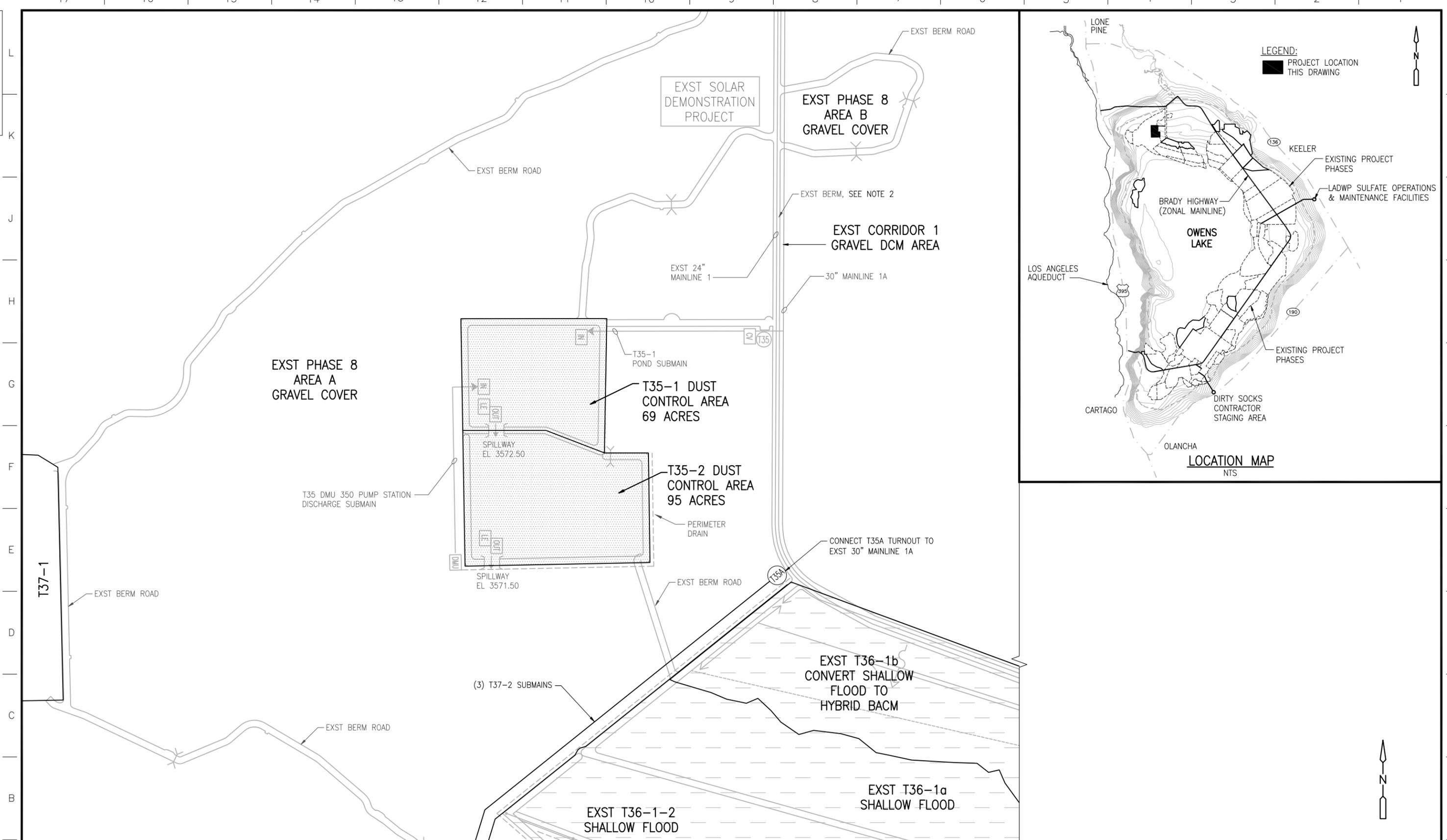
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ASSISTANT	D. GINS	5/13	MARTIN L. ADAMS	5/13
DRAWN BY	D. GINS	5/13	MARTIN L. ADAMS	5/13
CHECKED BY	V. BAPNA	5/13	MARTIN L. ADAMS	5/13
LAST UPDATE		5/13		

**OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a**  
**OVERALL SITE PLAN**  
**T32-1 AREA - MANAGED VEGETATION**

DEPARTMENT OF WATER AND POWER  
 WATER SERVICES ORGANIZATION CITY OF LOS ANGELES

DRAWING NUMBER  
**D5887-Z-20P**

D5887-Z-21M



REVISIONS					
NUMBER	DATE	INITIALS	LOCATION	DESCRIPTION	APPROVED

REFERENCES	

SCALE	AS SHOWN	DATE	APPROVED	DATE
DESIGNER	C. KNATZ	5/13	AS TO DESIGN	MARTIN L. ADAMS
ASSISTANT	D. BERKOFF	5/13	AS TO OPERATIONS	MARTIN L. ADAMS
DRAWN BY	C. BILDERBACK	5/13		
CHECKED BY	L. WOELZ	5/13		
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RECOMMENDED			GENERAL MANAGER AND CHIEF ENGINEER	
	LOUIS G. RUBALCABA	5/13		
	WILLIAM T. VANWAGONER	5/13		

**OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a**  
**OVERALL SITE PLAN T35-1 AND T35-2**

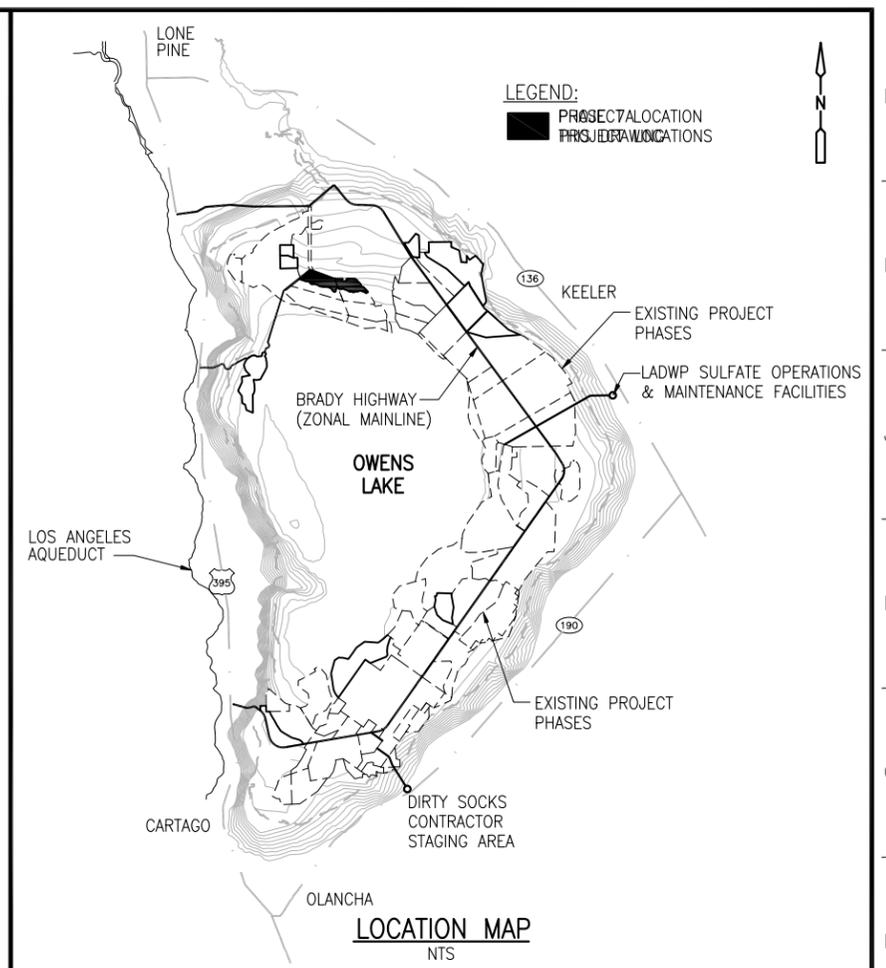
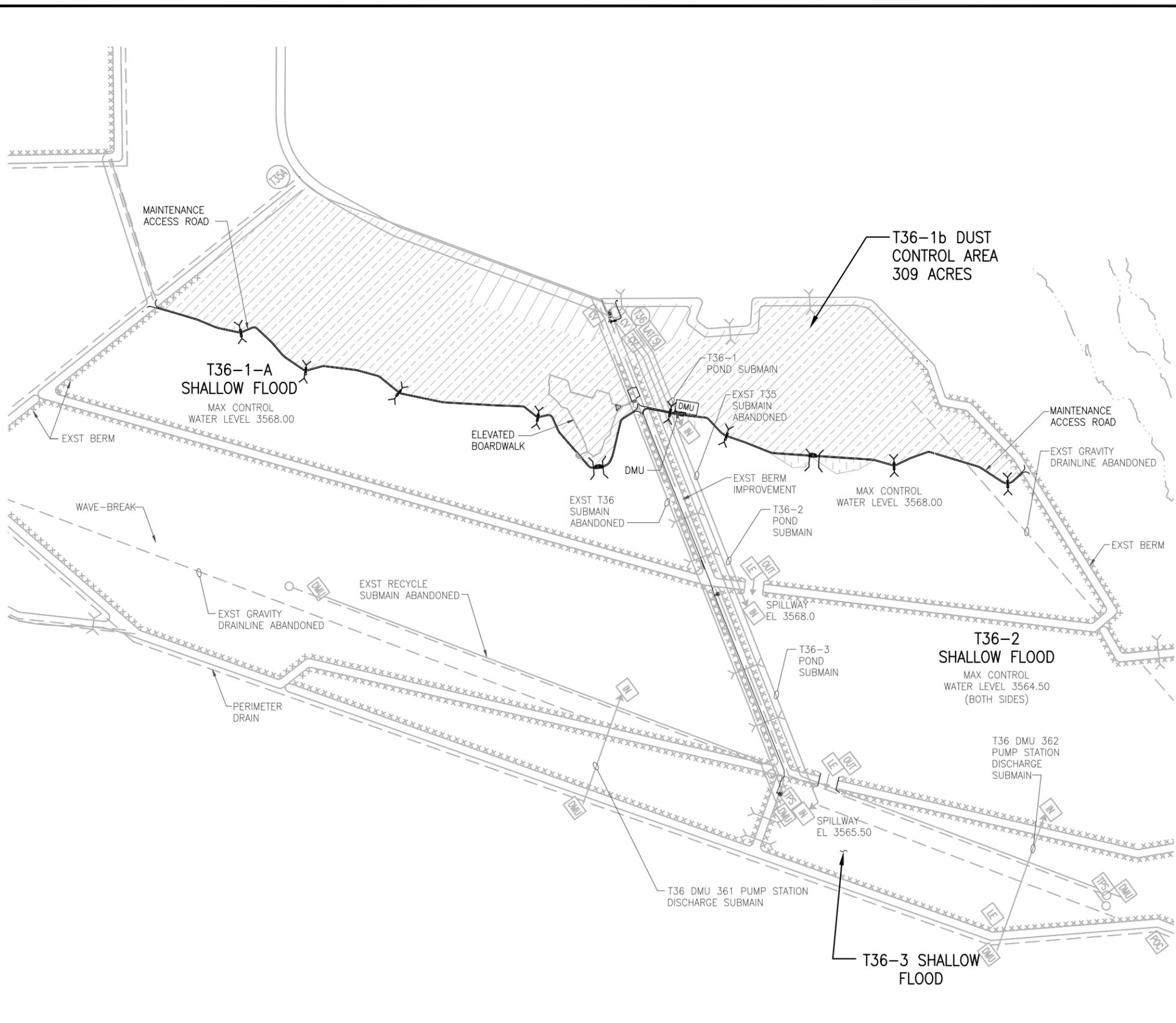
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 WATER SERVICES ORGANIZATION CITY OF LOS ANGELES

DRAWING NUMBER  
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5/31/13

FILE NAME 5887Z021M.dwg

D5887-Z-22M



**HYBRID DCM LEGEND**

SYMBOL	DCM TYPE	QTY. (ACRES)
[Hatched Pattern]	GRAVEL	
[Vertical Line Pattern]	SF POND	5
[Horizontal Line Pattern]	SF SATURATED	
[Cross-hatch Pattern]	MV DRY ALKALINE	
[Diagonal Line Pattern]	MV MIXED ALKALINE	279
[Dotted Pattern]	MV SHRUB/DRY MEADOW	25
[Stippled Pattern]	MITIGATION WETLANDS (PROTECT IN PLACE)	



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 LANDSCAPE ARCHITECTS  
 8738 WASHINGTON BOULEVARD  
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 T: 818 838 0418 F: 818 207 2861

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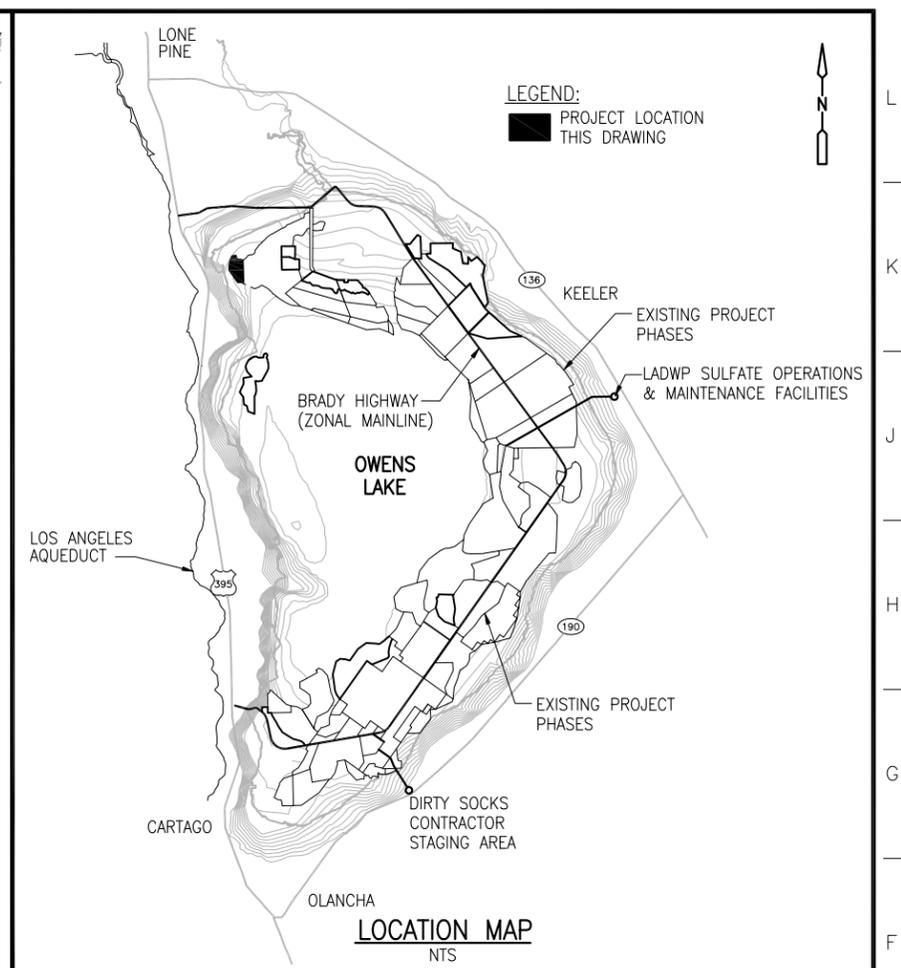
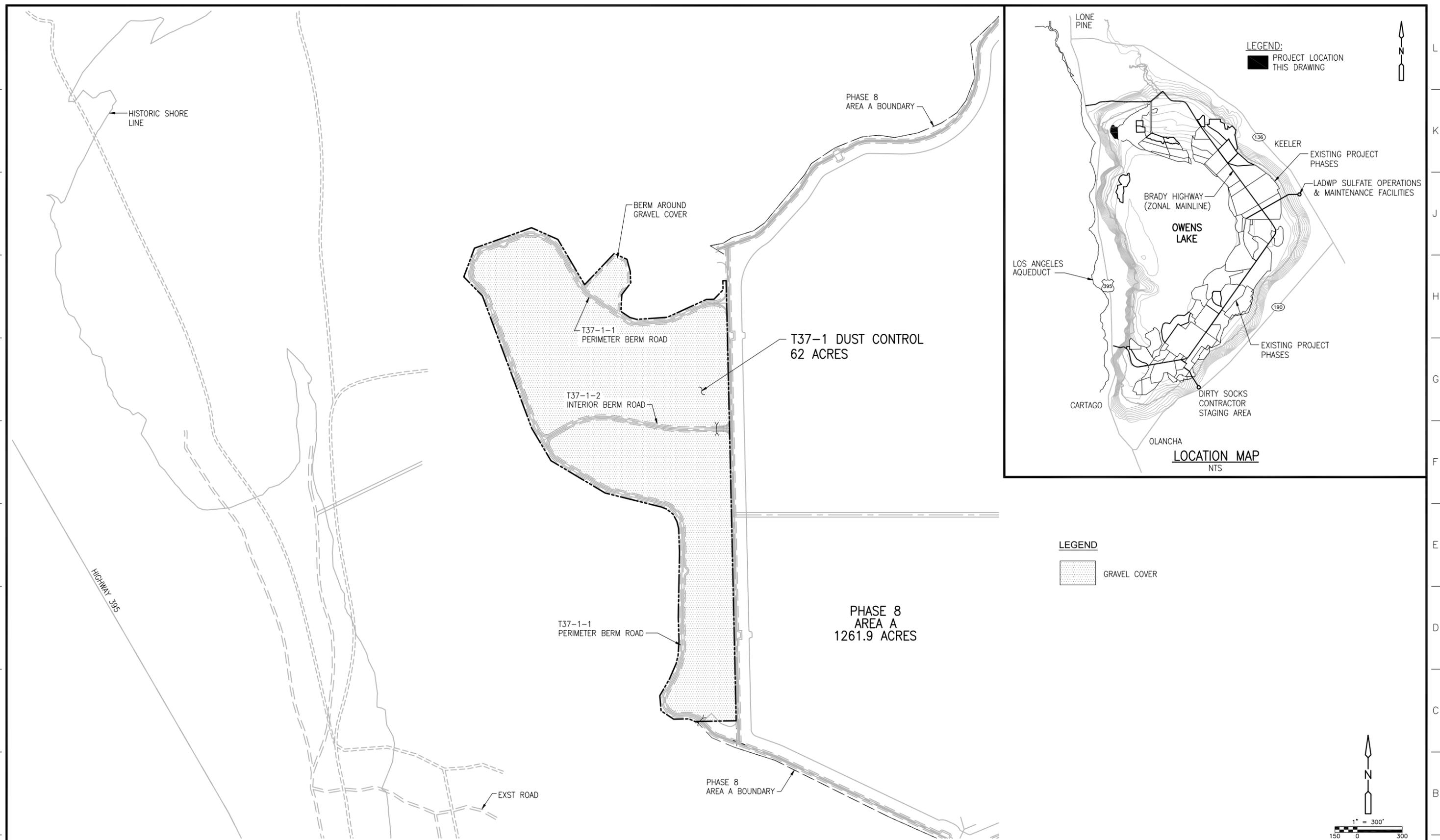
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DESIGNER	MARTIN L. ADAMS	5/13	5/13
ASSISTANT	MARTIN L. ADAMS	5/13	5/13
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RECOMMENDED	LOUIS G. RUBALCABA	5/13	
GENERAL MANAGER AND CHIEF ENGINEER	WILLIAM T. VANWAGONER	5/13	

**OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a**  
**OVERALL SITE PLAN T36-1b AREA-HYBRID**

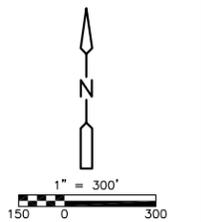
DEPARTMENT OF WATER AND POWER  
 WATER SERVICES ORGANIZATION CITY OF LOS ANGELES

DRAWING NUMBER  
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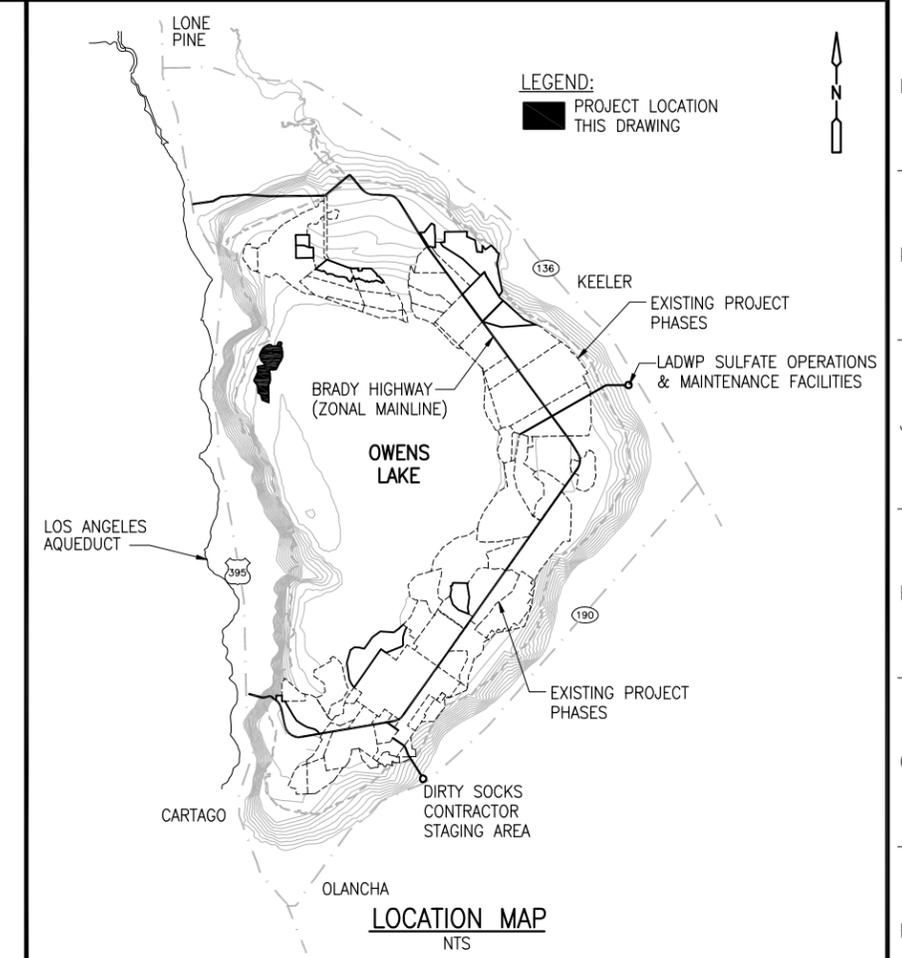
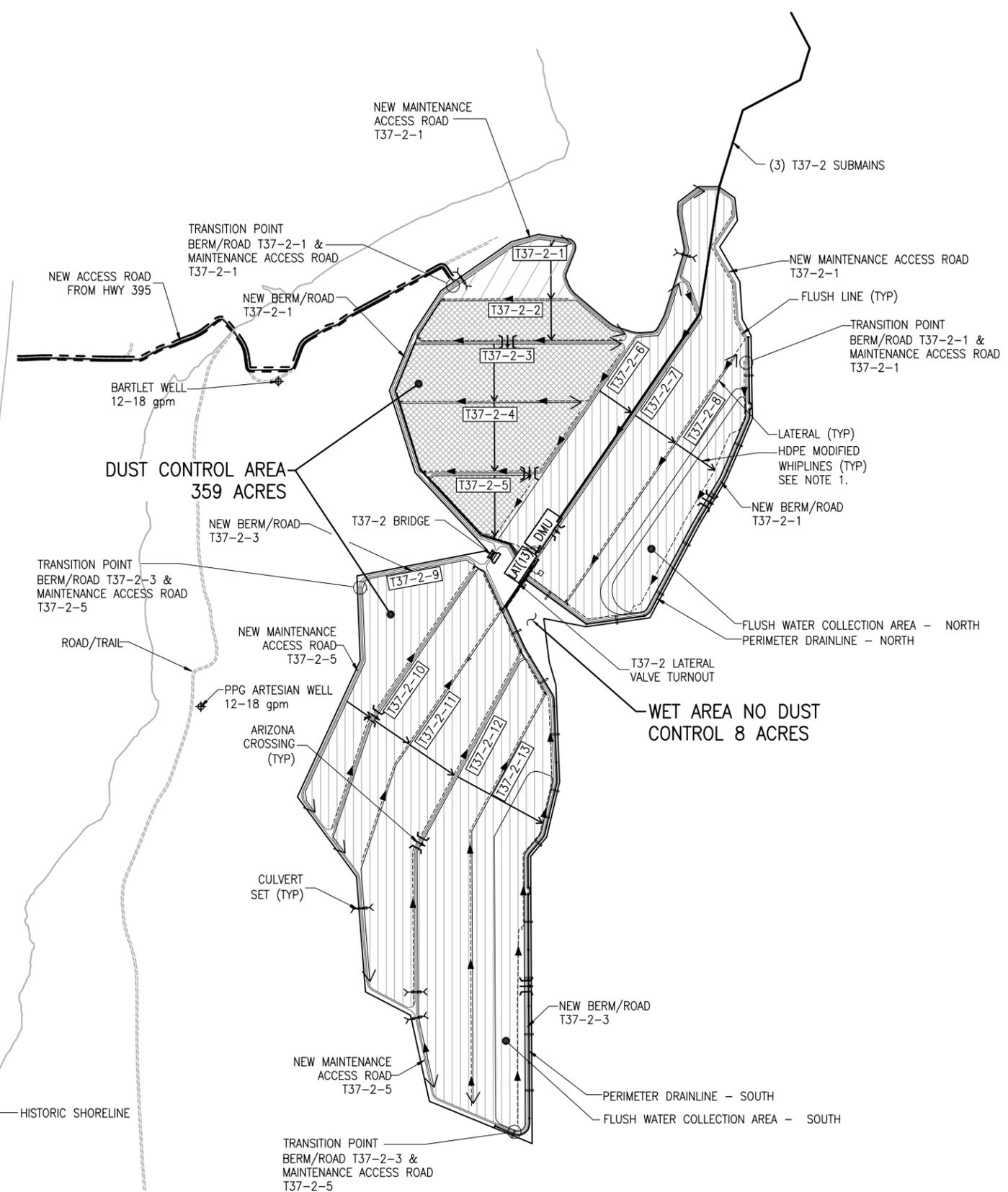
**LEGEND**  
 GRAVEL COVER



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HIGHWAY 395



DCM LEGEND		
SYMBOL	DCM TYPE	QTY. (ACRES)
[Hatched Pattern]	GRAVEL	0
[Vertical Line Pattern]	SF POND	0
[Horizontal Line Pattern]	SF SATURATED	260
[Cross-hatch Pattern]	MV/SF DRY ALKALINE	64
[Diagonal Line Pattern]	MV MIXED ALKALINE	0
[Dotted Pattern]	MV SHRUB/DRY MEADOW	10
[Stippled Pattern]	MITIGATION WETLANDS	0



REVISIONS				
NUMBER	DATE	INITIALS	LOCATION	DESCRIPTION

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SCALE	AS SHOWN	DATE	APPROVED	DATE
DESIGNER	C. FEIST	5/13	AS TO DESIGN	
ASSISTANT	V. HARDEN	5/13	MARTIN L. ADAMS	5/13
DRAWN BY	H. IGNACIO	5/13	AS TO OPERATIONS	
CHECKED BY	R. CHAUDHARY	5/13	MARTIN L. ADAMS	5/13
LAST UPDATE		5/13		
RECOMMENDED	LOUIS G. RUBALCABA	5/13	GENERAL MANAGER AND CHIEF ENGINEER	
	WILLIAM T. VANWAGONER	5/13		

**OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a**  
**OVERALL SITE PLAN T37-2 AREA**

DEPARTMENT OF WATER AND POWER  
 WATER SERVICES ORGANIZATION CITY OF LOS ANGELES

DRAWING NUMBER  
**D5887-Z-25P**

***Great Basin Unified Air Pollution Control District***

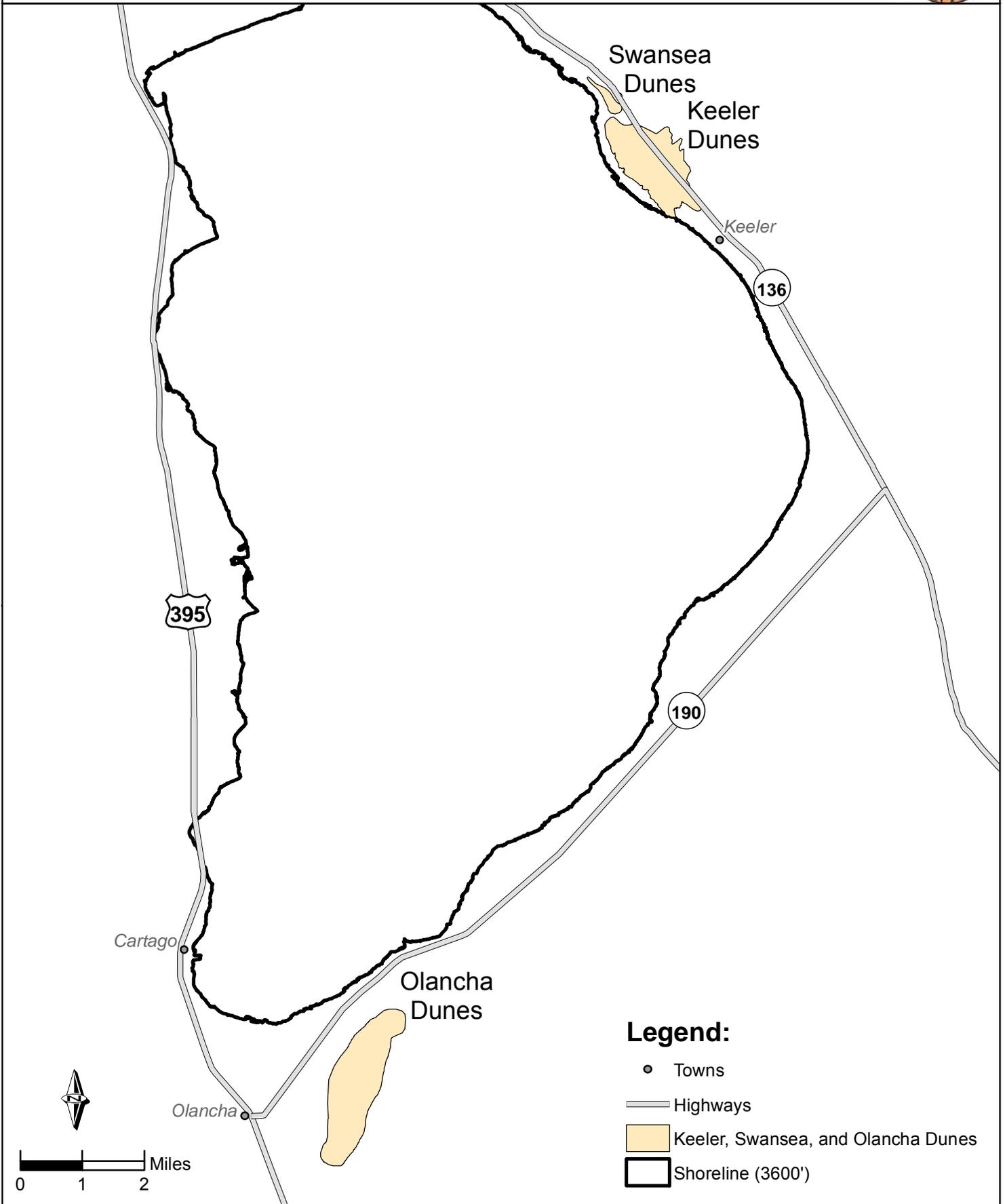
2013 Amendment to the Owens Valley PM<sub>10</sub> SIP

**Board Order 130916-01**

Exhibit 8: Map of Keeler and Other Dune Areas



# Keeler, Swansea, and Olancha Dunes



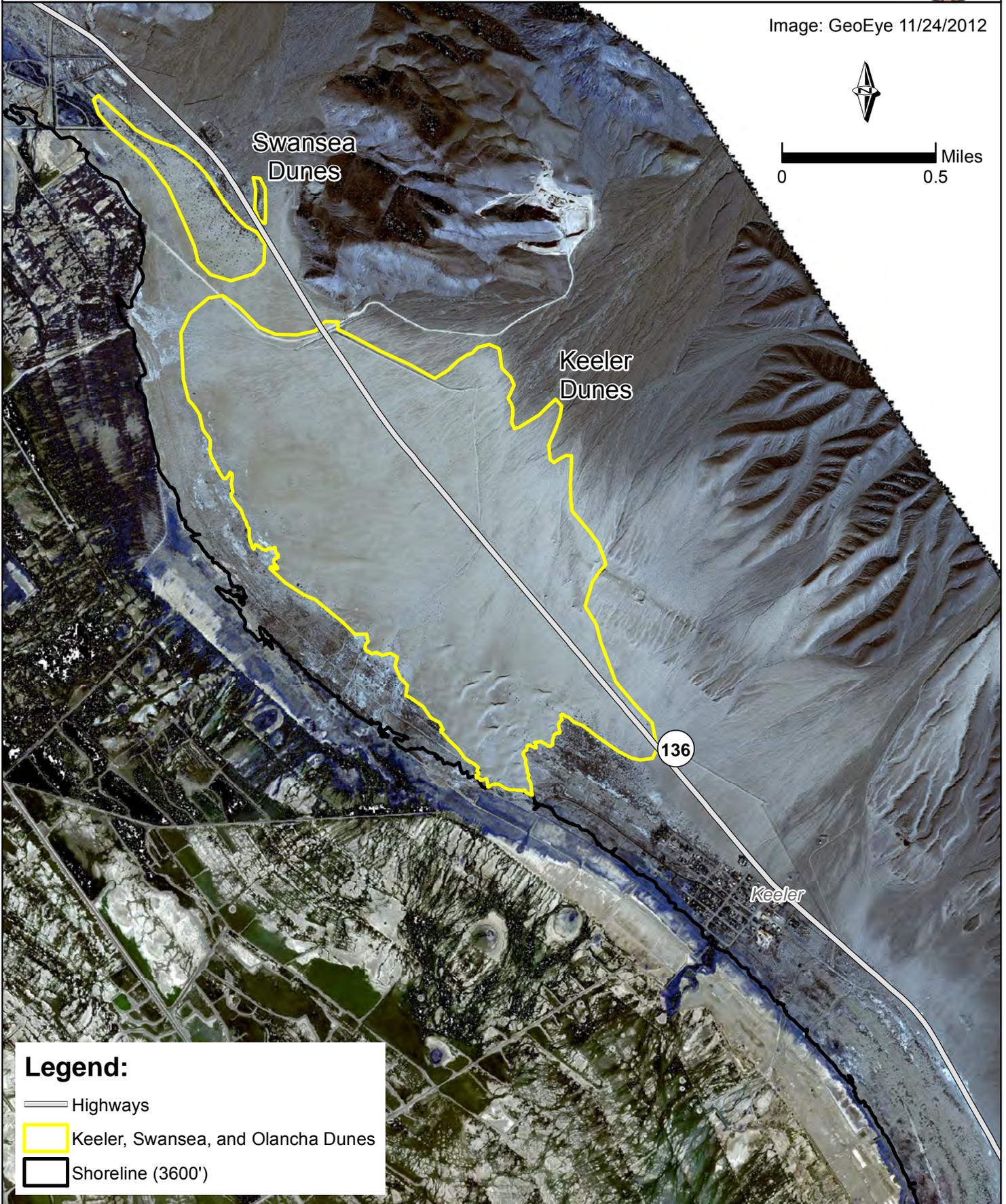


# Keeler and Swansea Dunes - Detail

Image: GeoEye 11/24/2012



0 0.5 Miles

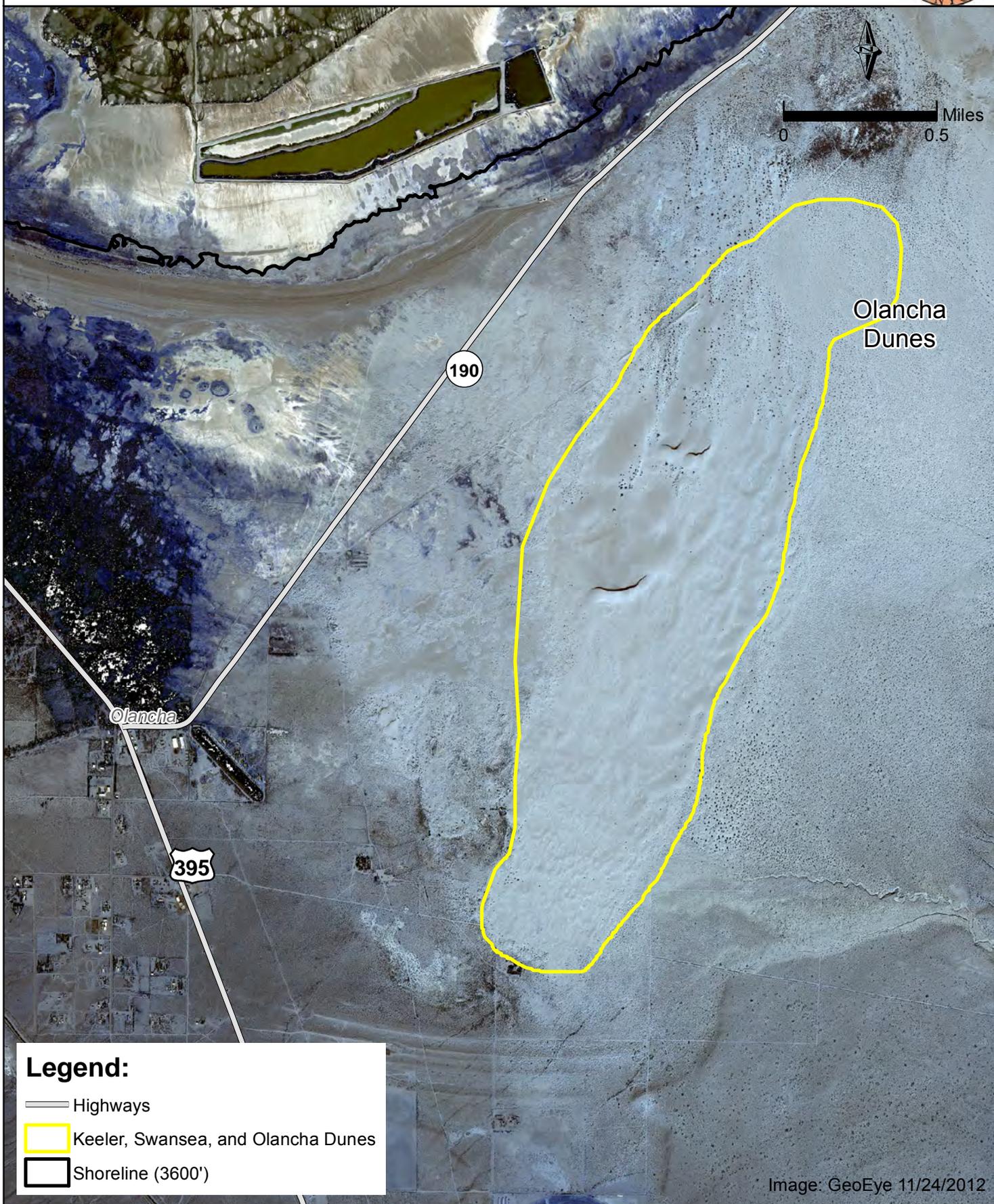


### Legend:

-  Highways
-  Keeler, Swansea, and Olancha Dunes
-  Shoreline (3600')



# Olancha Dunes - Detail



# Attachment 2

**Analysis of BO 080128-01 as Amended by BO 130916-01  
Under CH&SC § 40727.2 (a)**



**Analysis of Board Order 080128-01 as Amended by Board Order 130916-01 Under CH&SC § 40727.2 (a)**

(a) Analysis of existing requirements applicable to the same source or equipment.

Board Order 080128-01 applies to dust control requirements at Owens Lake, CA adopted pursuant to the 2008 Owens Valley PM10 State Implementation Plan and included as a maintenance measure in the 2010 Coso Junction PM10 Maintenance Plan. District rules and Board Orders that apply to dust control requirements at Owens Lake include the following:

**District Rules**

- 400 - 20% Opacity Limit
- 401 - Fugitive Dust Control
- 402 - Nuisance

District Rules 400, 401 and 402

These District rules apply to fugitive dust sources both on the Owens Lake bed and off the lake bed. However, through the 2008 Owens Valley SIP, dust control requirements that require the City of Los Angeles to control dust on the Owens Lake bed are ordered through board orders that specify which lake bed areas are to be controlled. Board Order 080128-01 as amended by Board Order 130916-01 addresses dust control measures on the lake bed. The District Rules can be found at <http://www.gbuapcd.org/rulesandregulations/index.htm>.

**District Board Orders**

- Hearing Board Order GB09-06: Findings and Order Granting Regular Variance from Requirements Set Forth in Governing Board Order 080128-01 (September 25, 2009) for Phase 7a Dust Control Area
- Board Order 110317-01: Findings and Decision of Governing Board Upon Hearing for Stipulated Order for Abatement (March 17, 2011)
- Board Order 130819-01: Findings and Decision of District Governing Board Upon Hearing for Stipulated Order for Abatement 110317 (August 19, 2013) for Phase 7a Dust Control Area

Hearing Board Order GB09-06 – Variance (September 25, 2009)

A variance was granted to the Los Angeles Department of Water and Power that extended the October 1, 2009 deadline for the completion of Moat & Row dust control measures on 3.5 square miles of the Owens Lake bed to October 1, 2010. The variance was needed because of the need to complete an environmental study and delays related to obtaining a lease from the State Lands Commission. The PM10 emissions that would have been emitting because of the one-year delay in implementing the Moat & Row dust control measures were offset by two variance conditions. 1) The variance conditions included implementing Best Available Control Measure (BACM) using gravel on two square miles of the lake bed outside the dust control boundaries required in the 2008 SIP, and 2) implementing temporary tilling on 3.5 square miles of the shallow flood BACM areas that were under construction and were to be flooding by October 2010. The 2.03

square mile gravel project was fully implemented by November 2012. Hearing Board Order GB09-06 is included in Board Order 130916-01 as Exhibit 2 (See Attachment 1).

#### Board Order 110317-01 – Stipulate Order for Abatement (March 17, 2011)

Due to the denial of a lease from the State Lands Commission to implement the Moat & Row dust control measure on 3.1 square miles of the Owens Lake bed, the District Governing Board issued a Stipulated Order for Abatement to install Best Available Control Measures on the 3.1 square mile area (known as the Phase 7a dust control area) by December 31, 2013, except for areas that will have managed vegetation BACM which will be fully implemented by December 31, 2015. The emissions from the Phase 7a area were offset by a \$6.5 million contribution to be used for Clean Air Projects within the District. These projects included paving roads and parking lots in the Owens Lake area, replacing over 450 non-EPA certified woodstoves with cleaner burning appliances, other assorted projects which provided air quality health benefits to people throughout the District. Information on projects that were funded can be found at <http://capp.gbuapcd.org/>. Governing Board Order 110317-01 is included in Board Order 130916-01 as Exhibit 3 (See Attachment 1).

#### Board Order 130819-01 – Modified Stipulated Order for Abatement (August 19, 2013)

Due to the discovery of cultural artifacts in the Phase 7a dust control areas, the City was delayed in its efforts to implement dust control measures. The District Governing Board issued a Modified Stipulated Order for Abatement that extended the deadline to implement BACM on the Phase 7a areas to December 31, 2015, except for areas that will have managed vegetation BACM which will be fully implemented by December 31, 2015. As part of this abatement order the City of Los Angeles will make a \$10 million public benefit contribution for the District to use to control PM10 emitted from the Keeler Dunes. Dust control measures are expected to be in place in the Keeler Dunes around the end of 2014. Governing Board Order 130819-01 is included in Board Order 130916-01 as Exhibit 6 (See Attachment 1).

### **Emissions and Air Quality Offset Analysis**

Delays in the implementation of dust control measures in the Phase 7a area resulted in emissions beyond those projected in the 2008 Owens Valley SIP of about 9,059 tons of PM10 per year. However, these excess emissions were offset by the implementation of gravel BACM on 2.03 square miles of the lake bed. The completion of the gravel BACM project in November 2012 resulted in the reduction of 11,509 tons of PM10 per year. The gravel BACM area encompassed the former Study Area 1 and is shown in Exhibit 1 of the amended Board Order. In addition, dust control measures in the Keeler Dunes will result in future reductions of about 1,617 tons of PM10 per year. Table 1 shows the annual PM10 emissions from the Keeler Dunes, and the Phase 7a and Phase 8 dust control areas for the period from July 2008 through June 2012. During this four-year period, all of these areas were monitored through the Owens Lake Dust Identification Program. Prior to that period the monitoring network in the Phase 8 area was incomplete.

<b>Period</b> (July-June)	<b>Keeler Dunes</b>	<b>Phase 7a</b>	<b>Phase 8</b>
2008-09	1,128	5,866	4,970
2009-10	867	18,689	28,413
2010-11	1,504	5,741	11,280
2011-12	2,968	5,938	1,374
Average	1,617	9,059	11,509

<b>Period</b> (July-June)	<b>Keeler Dunes</b>	<b>Phase 7a</b>	<b>Phase 8</b>
2008-09	55	20	16
2009-10	53	39	26
2010-11	84	12	29
2011-12	92	15	6
Average	71	22	19

Although implementation of control measures in the Phase 7a areas was originally scheduled to be completed by October 1, 2010 under the Owens Valley SIP schedule, the gravel BACM controls implemented in November 2012 are four years or more ahead of the schedule when they would have been ordinarily ordered for control under the supplemental control requirement determination.<sup>1</sup> Until BACM is installed in the Phase 7a areas, the early emission reductions in the Phase 8 area can be considered to offset the emissions from the Phase 7a area.

Through the use of the Owens Lake Dust ID model the effects of implementing dust control measures in these areas was also analyzed. Table 2 shows the number of modeled violations of the federal PM10 standard that can be expected from the Keeler Dunes and the Phase 7a and

<sup>1</sup> This determination was issued by the District in 2011, but because of a LADWP appeal of the determination to CARB, the 2011 SCRCD was not confirmed until November 2012 when CARB upheld the District's determination. LADWP appealed the CARB decision to the Sacramento County Superior Court and is scheduled for trial in 2014.

## Attachment 2

Phase 8 dust control areas. The table shows the number of days each area caused a modeled violation of the federal standard during the period from July 2008 through June 2012. This shows that the average number of violations caused by the Phase 7a and Phase 8 areas each year are about the same, while the number of violations caused by PM10 from the Keeler Dunes is much higher. Because the Keeler Dunes are adjacent to the community of Keeler, implementing dust controls in this area is a high priority since it will have substantial benefits for protecting public health.

Although the delay in implementing BACM in the Phase 7a areas caused a two-year shortfall in the expected emission reduction trends for reasonable further progress (RFP, see Owens Valley SIP, Section 7.11), the early implementation of gravel BACM in the Phase 8 area puts the current emission reductions trend below the RFP line. In addition the Los Angeles Department of Water and Power's contribution of \$6.5 million for the Clean Air Projects and \$10 million to control dust from the Keeler Dunes will have long term air quality benefits for the residents of the District, especially those who live in Keeler.

# Attachment 3

**Underline-strikeout Version of Revised Board Order 080128-01**



**BOARD ORDER # 080128-01 AS AMENDED PURSUANT TO  
BOARD ORDER 130916-01 and 110718-04  
REQUIRING THE  
CITY OF LOS ANGELES TO UNDERTAKE MEASURES TO  
CONTROL PM<sub>10</sub> EMISSIONS FROM THE DRIED BED OF OWENS LAKE**

With regard to the control of PM<sub>10</sub> emissions from the bed of Owens Lake, the Governing Board of the Great Basin Unified Air Pollution Control District (District) orders the City of Los Angeles (City) as follows:

**PREAMBLE**

- A. WHEREAS, the 1998 Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State Implementation Plan (1998 SIP), dated November 16, 1998 and the 2003 Revision to the Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State Implementation Plan (2003 SIP), dated November 13, 2003, require the City to implement a series of measures and actions to reduce particulate emissions from the Owens Lake bed such that the Owens Valley Planning Area (OVPA) will attain and maintain the federal 24-hour National Ambient Air Quality Standards (NAAQS) for particulate matter (PM<sub>10</sub>) by the statutory deadlines;
- B. WHEREAS, the District is required by law to maintain its discretion to protect the environment, public health and safety, and this Order is intended to fulfill those duties without improperly constraining that lawful exercise of discretion;
- C. WHEREAS, based on additional information collected subsequent to the information used to adopt the 1998 SIP and 2003 SIP, the District has determined that additional measures and actions will be required to continue to reduce particulate emissions in the OVPA such that the OVPA will attain and maintain the federal 24-hour NAAQS for PM<sub>10</sub> by the statutory deadlines;
- D. WHEREAS, in 2006 a dispute arose between the District and the City regarding the District's requirements for the City to control dust from additional areas at Owens Lake beyond those areas identified in the 2003 SIP;
- E. WHEREAS, on December 4, 2006 a Settlement Agreement was approved by both the District and the City. Under the provisions of this agreement, the City agreed to implement additional dust control measures by April 1, 2010 and the District agreed to revise the 2003 SIP before March 1, 2008 to incorporate the provisions of the Settlement Agreement;
- F. WHEREAS, on March 23, 2007, the U.S. Environmental Protection Agency (USEPA) published a finding that the Owens Valley Planning Area did not attain the 24-hour NAAQS for particulate matter of 10 microns or less (PM<sub>10</sub>) by December 31, 2006 as mandated by the U.S Clean Air Act Amendments of 1990;

- G. WHEREAS, as a result of the USEPA finding, the 2003 SIP must be revised to include a control strategy that will provide for attainment in the Owens Valley Planning Area as soon as practicable and that said revised SIP must be submitted to the USEPA by December 31, 2007;
- H. WHEREAS, in consideration of the District's continuing duties under federal and state law, including but not limited to the Clean Air Act, to control particulate emissions from the Owens Lake bed without interruption, the District intends, if this Order is stayed or disapproved, that Board Order #031113-01 (adopted on November 13, 2003) shall continue to be in effect, so that at all times there will be continuous control of these emissions;
- I. WHEREAS, the District thereby intends that if this Order is stayed due to a legal challenge, including but not limited to a challenge to this Order under California Health and Safety Code Section 42316, to the State Implementation Plan, or to the Environmental Impact Report for this SIP, or if this Order is disapproved by the California Air Resources Board (CARB), the District will revert to enforce the terms of Board Order #031113-01 which shall continue to be in effect and shall remain in full force for the duration of any stay or, in the case of disapproval, unless and until another Order is issued by this Board; and
- J. WHEREAS, to prevent the deterioration of air quality due to dismantling or "backsliding" on control measures that have already been implemented before any such stay or disapproval, the District intends that the City shall continue to operate and maintain all control measures already implemented at the time of any such stay or disapproval without interruption, unless and until a further Order of the District allows for such interruption, if the City has not appealed the control measures under Section 42316 within 30 days of the effective date of this Order, and if those control measures were not invalidated as a result of that appeal;
- K. WHEREAS, it is the District's intention that this 2008 revised SIP is consistent with the 2006 Settlement Agreement between the District and the City and that it is the District's intention to independently meet all its commitments and obligations under said Settlement Agreement.

**THEREFORE, IT IS HEREBY ORDERED AS FOLLOWS:**

**ORDER**

**IMPLEMENTATION OF OWENS LAKE BED PM<sub>10</sub> CONTROL MEASURES**

1. Existing PM<sub>10</sub> controls – From the date of adoption of this order, the City shall continue to operate and maintain the existing Best Available Control Measures (BACM) for PM<sub>10</sub>, as described in Paragraph 8 hereof, on 29.8 square miles of the Owens Lake bed within the 2003 Dust Control Area (DCA) delineated in Exhibit 1.

2. Additional Shallow Flood supplemental PM<sub>10</sub> controls – By April 1, 2010 the City shall implement a minimum of 9.2 square miles of additional Shallow Flooding BACM PM<sub>10</sub> controls within the 12.7 square-mile area known as the 2006 Supplemental Dust Control Area (SDCA) delineated in Exhibit 1. The areas within the SDCA designated for Shallow Flooding only are delineated in Exhibit 1. Shallow Flooding BACM is described in Paragraphs 8, 9 and 15 hereof.
3. Other additional supplemental PM<sub>10</sub> controls – On a maximum of 3.5 square miles within the 2006 SDCA delineated in Exhibit 1, the City shall implement BACM for PM<sub>10</sub>, as described in Paragraphs 8, 9 and 15 through 17 hereof, or the City may implement the alternative non-BACM PM<sub>10</sub> control measure known as “Moat & Row,” as described in Paragraph 18. If BACM are installed, the controls shall be operational by April 1, 2010. If Moat & Row is installed, it shall be operational by October 1, 2009. In accordance with Board Order 130916-01, the 3.1 square mile area remaining of the possible areas eligible for alternative non-BACM PM<sub>10</sub> control measures using Moat & Row, are now identified as the “Phase 7a areas.” The deadlines to implement BACM in the Phase 7a areas are provided as follows:
- A. With the exceptions noted below, the deadline for LADWP to construct all infrastructure and install fully-compliant BACM PM<sub>10</sub> controls (other than Managed Vegetation BACM) in those portions of the “2008 Dust Control Area” known as the “Phase 7a” areas, which total approximately 3.1 square miles, shall be December 31, 2015. All infrastructure and plant materials for Phase 7a areas controlled with Managed Vegetation BACM will be installed by December 31, 2015. The Phase 7a areas are a portion of the 2008 Dust Control Area previously referred to as “Moat & Row Dust Control Areas” and are shown and described in Exhibit 1.
- B. The deadline to achieve fully-compliant BACM vegetation cover for those Phase 7a areas controlled by the Managed Vegetation BACM shall be December 31, 2017.
- C. The extensions of the deadlines set forth in sections 3.A. and 3.B. shall be contingent upon all of the following:
- (1) LADWP timely receiving from California State Lands Commission (“CSLC”) and all other agencies all of the required permits, approvals, or leases necessary to allow LADWP to construct BACM controls within the deadlines set forth in sections 3.A. and 3.B.
- (2) The timely removal from the Phase 7a areas of all California Register of Historical Resources (“CRHR”)-eligible areas plus necessary buffer areas, referred to as the “Eligible Cultural Resource (“ECR”) areas.” The ECR areas initially consist of 277 acres of the Phase 7a areas (the “Initial Phase 7b Areas”). The Initial ECR areas and any newly discovered CRHR-eligible and necessary buffer areas shall comprise the “Phase 7b” areas. The Phase 7b Areas are not limited to the initial 277 acres.

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(3) Order 110317-01 being revised to state explicitly that any newly discovered potential ECRs in the Phase 7a areas are considered a condition of force majeure under paragraph 5(d) of that Order.

D. If any one of the above contingencies is not met, LADWP may seek further extensions of time under the provisions of paragraph 5 of Order 110317-01, as modified by Order 130819-01, and paragraphs 6 and 22 of Order 110317-01, which shall not be unreasonably denied by the District.

E. LADWP shall not be required to install dust controls in the Phase 7b areas (initially, 277 acres) under the provisions of the 2008 Owens Valley SIP, Board Order 080128-01 or Order 130819-01. If the District Governing Board subsequently decides to order LADWP to install dust controls in Initial Phase 7b Areas, the District Governing Board will do so by issuing a new Board order or orders. The new Board order or orders shall include deadlines for constructing dust controls that accommodate project circumstances. Any future order or orders issued by the District for Phase 7b will give due consideration to the shared goal of the District and LADWP to control air pollution and decrease the use of water as a dust control measure at Owens Lake. LADWP is not waiving its right to contest the new Board order or orders.

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3.4. Channel Area PM<sub>10</sub> controls – A 0.5 square-mile area of natural drainage channels on the south area of the Owens Lake bed is known as the “Channel Area” and is delineated in Exhibit 1. The City shall control PM<sub>10</sub> emissions from the Channel Area by implementing and operating BACM, modified-BACM or alternative non-BACM controls approved by the District’s Air Pollution Control Officer (APCO), that take into account the resource issues in the Channel Area, by April 1, 2010. Portions of the Channel Area that are determined by the APCO to be naturally non-emissive (for example, adequately vegetated areas) will not require controls. If BACM are implemented in the Channel Area, they shall be as described in paragraphs 8, 9 and 15 through 17 hereof. If the City seeks to implement modified-BACM or alternative non-BACM, the City will apply such modifications as are permissible to resource agencies in this channel, with the primary objective of controlling dust, and provide the District with a monitoring plan aimed at identifying source areas that could cause or contribute to shoreline violations. Should such areas be identified after facilities are fully operational (including vegetative development), the District and the City will work with resource agencies to develop site-specific and implementable dust control approaches. Regardless of the approach selected for Channel Area dust control, the City shall prepare and submit to the District a detailed plan demonstrating the need and effectiveness of the control measures and their projected impacts to the environment, and obtain the prior approval of the District and any other applicable regulatory agencies with jurisdiction over the Channel Area for use of the modified-BACM. The City shall be responsible for any additional environmental analyses that may be required and for all required permits.

4.5. Total PM<sub>10</sub> control area – The 29.8 square-mile 2003 Dust Control Area (DCA), the 12.7 square-mile 2006 Supplemental Dust Control Area (SDCA) and the 0.5 square-mile Channel Area together comprise the 43.0 square-mile area known as the 2008 Total Dust Control Area (TDCA). These PM<sub>10</sub> control areas are delineated in Exhibit 1.

## Attachment 3

5-6. Minor adjustments to PM<sub>10</sub> control area boundaries – Upon written request by the City to the District and written approval by the District’s APCO, minor adjustments may be made to the interior and exterior boundaries of the 2006 SDCA, for example to avoid impacts to existing resources or features, or for constructability reasons, which approval shall not be unreasonably withheld. In the event of such modification, the boundaries of the 2008 TDCA shall also be modified to reflect the modified 2006 SDCA boundaries.

7. Study Areas – The District has identified four additional “Study Areas” on the Owens Lake bed totaling up to 1.85 square miles that may require some level of control in order to attain the PM<sub>10</sub> NAAQS. The four Study Areas are delineated in Exhibit 1. The District will study emissions from the Study Areas occurring between July 1, 2006 and April 1, 2010 to determine whether they will cause or contribute to PM<sub>10</sub> NAAQS exceedances such that controls will be required. The District will use the data collected during this period to make a determination after May 1, 2010 as to the need for additional controls, as set forth in Paragraph 10, below. However, if the City is not in compliance with Paragraphs 1 and 3 of this Order, the determination as to the need for additional controls in the Study Areas may be made prior to May 1, 2010.

A. Phase 8 Gravel - As required by Order 110317-01, the City constructed and implemented an approximately 2 square mile BACM project that encompassed the location of Study Area 1. This BACM project is known as Phase 8 and is delineated in Exhibit 1.

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#### PM<sub>10</sub> CONTROL MEASURES

6-8. The City shall implement BACM PM<sub>10</sub> control measures as set forth in this Order, described below in Paragraphs 15 through 17. The City may implement the alternative non-BACM PM<sub>10</sub> control measure as set forth in this Order, described below in Paragraph 18. To complete implementation of a specified control measure by a date as required by this Order means that the control measure shall be constructed, installed, operated and maintained without interruption, so as to comply with the performance standards for the specified control measure not later than 5:00 p.m. on the required date.

7-9. All PM<sub>10</sub> control measures within the 2006 SDCA shall be designed, constructed, installed, operated and maintained by the City to achieve the initial target minimum dust control efficiencies (MDCEs) shown on the MDCE Map, attached as Exhibit 2. MDCEs are the actual dust control measure control efficiencies required to meet the PM<sub>10</sub> NAAQS, based on data collected during the four-year period between July 2002 and June 2006. Prior to April 1, 2010, upon request of the City and written approval of the APCO, which approval shall not be unreasonably withheld, the initial target MDCEs may be modified if the modified target MDCEs meet the criteria set forth in the MDCE Selection Process Spreadsheet, as set forth in the 2006 Settlement Agreement between the District and the City. This Settlement Agreement is attached as Attachment A.

CONTINGENCY MEASURES – SUPPLEMENTAL CONTROL DETERMINATIONS

8-10. At least once per calendar year after May 1, 2010, the District's APCO will make a written determination as to whether any areas, in addition to those described in Exhibit 1, require air pollution control measures in order to attain or maintain compliance with the NAAQS for PM<sub>10</sub>. The APCO's determination will also contain an analysis of the minimum dust control efficiency provided by the PM<sub>10</sub> controls in the 2008 TDCA to determine if a higher level of control efficiency is required in order to attain or maintain compliance with the NAAQS for PM<sub>10</sub>. In making these determinations, the APCO shall employ the methods described in Paragraph 11 of this Order. If the City is not in compliance with Paragraphs 1 and 3 of this Order, the determination as to the need for additional controls may be made prior to May 1, 2010.

- A. If the APCO determines under this Paragraph that additional areas require air pollution control measures or that existing PM<sub>10</sub> control measures require a higher level of control efficiency, the APCO shall issue a written determination to the City informing them that the provisions of Paragraph 11 of this Order require the City to implement, install, operate and maintain PM<sub>10</sub> BACM on additional areas of the Owens Lake bed or that the control efficiency on existing PM<sub>10</sub> controls must be increased. The determination will identify those areas of the lake bed that will require PM<sub>10</sub> BACM and the control efficiency necessary to attain the PM<sub>10</sub> NAAQS. The City shall secure all permits and leases necessary to implement BACM and conduct any additional analysis, if any, required to comply with the California Environmental Quality Act and any other applicable laws.
- B. The APCO's annual determinations will use data collected after April 1, 2010, except as provided in Paragraph 7, above, for the four Study Areas. The annual determinations for the Study Areas will use data collected after July 1, 2006.
- C. In the event the City appeals the supplemental control determination under Health & Safety Code Section 42316, and pending a decision of the CARB, the City is not required to comply with any measure imposed by the supplemental control determination. The District relies upon action by the CARB to issue its decision on the City's appeal within 90 days. If CARB does not affirm the District supplemental control determination, or otherwise require the City to immediately undertake alternative supplemental control measures within 90 days in such circumstances where automatic control measures are required under Sections 172(c)(1) or 182(c)(9) of the federal Clean Air Act, 42 U.S.C. Sections 7502(c)(9) and 7511a(c)(9), the District relies upon the CARB to take these federal requirements into account in its determination of the City's appeal and to issue such interim orders as necessary to implement automatic supplemental control measures so that this Order complies with the Clean Air Act and can be approved by the U.S. Environmental Protection Agency as a proper State Implementation Plan. The foregoing is not intended to provide the CARB with any authority other than its authority under state law.
- D. Paragraph 11 fixes the period of time within which the implementation of the additional control measures must be completed. Upon implementation, the City shall continuously

operate and maintain, without interruption, the control measures to comply with performance standards set forth for such measures in the control measure descriptions contained in this Order.

#### CRITERIA FOR DETERMINING THE NEED FOR ADDITIONAL PM<sub>10</sub> CONTROLS

~~9.11.~~ The criteria, methods and procedures for the APCO's determination of the need for additional PM<sub>10</sub> controls described in Paragraph 10 shall be those described in detail in the "2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure" document incorporated as Attachment B along with its referenced "2008 Owens Lake Dust Source Identification Program Protocol" incorporated as Attachment C.

#### NEW BACM, ADJUSTMENTS TO EXISTING BACM, AND BACM TRANSITIONS

~~12.~~ Upon written request by the City, the APCO may approve new BACM, a modification or adjustment to the existing BACMs described in Paragraphs 15, 16 and 17 of this Order, and/or the transition from one BACM to another provided that, at all times, the performance standards of one or the other BACM are continuously met during the transition to assure that the transition shall not prevent the OVPA from attaining or maintaining the NAAQS for PM<sub>10</sub>. The City's request shall contain a detailed description of the proposed alternative and a demonstration that the request satisfied all requirements of law and this Order. The APCO shall have full discretion to consider any such application for a change in BACM, and to accept, reject or condition its approval of such application. Non-compliance with any such condition shall be enforceable as noncompliance with a District Order. Without limiting the District's discretion as provided herein **and with the exception of the provisions made for Order 110317-01 for "Transition Areas"**, the procedures for transitions of implemented control measures or adjustments to BACM shall be those described in Attachment D, "2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area."

##### A. BACM Testing and Approval

The District shall work with LADWP on accelerated testing schedules and BACM approval, if warranted, for Engineered Roughness Elements and Tillage in soil type areas where these controls can be applied. The District Governing Board shall consider BACM approval of these candidate measures by September 28, 2014. If the accelerated testing does not result in approved BACM for the candidate measures, the District's and LADWP's respective Boards shall jointly assess why the accelerated testing did not result in the District Board's BACM approval. The District and LADWP shall also work on accelerated testing schedules and BACM approvals for other forms of BACM controls.

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#### ALTERNATIVE METHODS FOR IMPLEMENTING CONTINGENCY MEASURES AND SUPPLEMENTAL CONTROLS

~~10.13.~~ Notwithstanding any other provision of this Order, the District shall maintain its authority under Health and Safety Code Section 42316 to order the City to implement additional controls, to control additional emissive areas and/or to undertake additional reasonable measures necessary to mitigate the air pollution caused in the District by the City's water-

gathering activities in order to prevent the OVPA from failing to attain or maintain the NAAQS for PM<sub>10</sub>, if circumstances arise that are not specifically addressed in Paragraphs 10 or 12 of this Order.

RELATIONSHIP TO BOARD ORDER 031113-01

~~11~~14. The District hereby stays the force and effect of Board Order 031113-01 for all times that this Order is in full force and effect. In the event this Order, or any provision of this Order, is stayed due to a legal challenge, including but not limited to a challenge to this Order under Health & Safety Code Section 42316, or any other law, to the State Implementation Plan, or to the Environmental Impact Report for this Revised SIP, or in the event the Order is disapproved by the CARB, the following shall apply:

- A. If the stay or disapproval causes Paragraph 1 through 5 of this Order to cease its operative force and effect, Board Order #031113-01 shall immediately be in effect and shall remain in full force for the duration of any stay or, in the case of disapproval, until another Order is issued by this Board. In addition, the City shall continue to operate and maintain without interruption all control measures already implemented in any area if those control measures were not appealed under Health & Safety Code Section 42316 within 30 days of the date of this Order, and if those measures were not invalidated as a result of that appeal.
- B. If the stay or disapproval causes Paragraph 10 and/or 11 of this Order to cease its operative force and effect, but does not affect Paragraphs 1 through 5 of this Order, the City shall continue to operate and maintain all control measures already implemented without interruption.
- C. If the stay or disapproval does not affect Paragraphs 1 through 7, 10 or 11 of this Order, those Paragraphs and any other terms of this Order that are not stayed or disapproved shall be in effect, and shall remain in full force for the duration of any stay. In all cases, the City shall continue to operate and maintain, without interruption, all control measures already implemented.
- D. If a stay of this Order is imposed, then lifted so that this Order is in effect, the City shall, immediately, meet all requirements and deadlines set by this Order as if no stay had been imposed. The City shall not remove or decrease any control measures without the express written permission of the APCO, and the provisions of Board Order 031113-01 shall again be stayed. If the stay of this Order is only partially lifted such that any portion of this Order remains stayed, Board Order 031113-01 shall remain in effect as provided under Paragraphs 14.A., 14.B. and 14.C, above.

PM<sub>10</sub> CONTROL MEASURES

~~12~~15. BACM Shallow Flooding

The “Shallow Flooding” PM<sub>10</sub> control measure will apply water to the surface of those areas of the lake bed where Shallow Flooding is used as a PM<sub>10</sub> control measure. Water shall be applied in amounts and by means sufficient to achieve the following performance standards:

## Attachment 3

## A. For Shallow Flooding areas within the 29.8 square-mile 2003 DCA:

- i. Until April 1, 2010: At least 75 percent of each square mile of the designated areas shall continuously consist of standing water or surface-saturated soil, substantially evenly distributed for the period commencing on October 1 of each year, and ending on June 30 of the next year. If a contiguous Shallow Flood dust control area is less than one square mile, 75 percent of the entire contiguous area shall consist of substantially evenly distributed standing water or surface-saturated soil.
- ii. After April 1, 2010:
  - a. At least 75 percent of each square mile of the designated areas shall continuously consist of standing water or surface-saturated soil, substantially evenly distributed for the period commencing on October 16 of each year, and ending on May 15 of the next year. If a contiguous Shallow Flood dust control area is less than one square mile, 75 percent of the entire contiguous area shall consist of substantially evenly distributed standing water or surface-saturated soil.
  - b. Beginning May 16 and through May 31 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 70 percent.
  - c. Beginning June 1 and through June 15 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 65 percent.
  - d. Beginning June 16 and through June 30 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 60 percent.
  - e. If for any Shallow Flooding area, the percent of areal wetness cover in the periods specified in Paragraphs 15.A.ii,b, c, and d, above, is below the minimum percentages specified for each shallow flood area based on the air quality model for the analysis period from July 2002 through June 2006, and there were no monitored or modeled exceedances of the federal standard at the historic shoreline, that area will be deemed to be in compliance, if the City demonstrates in writing and the APCO reasonably determines in writing that maximum water delivery mainline flows were maintained throughout the applicable period.

## B. For Shallow Flooding areas within the 12.7 square-mile 2006 SDCA:

- i. The percentage of each area that must have substantially evenly distributed standing water or surface-saturated soil shall be based on the Shallow Flood Control Efficiency Curve (SFCE Curve) attached as Exhibit 3 to achieve the control efficiency levels in the MDCE Map (Exhibit 2).
- ii. For Shallow Flooding areas with control efficiencies of 99 percent or more:
  - a. Beginning May 16 and through May 31 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 70 percent.
  - b. Beginning June 1 and through June 15 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 65 percent.

- c. Beginning June 16 and through June 30 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 60 percent.
  - d. If for any Shallow Flooding area, the percent of areal wetness cover in the periods specified in Paragraph 15.B.ii.a,b, and c, above, is below the minimum percentages specified for each shallow flood area based on the air quality model for the analysis period from July 2002 through June 2006, and there were no monitored or modeled exceedances of the federal standard at the historic shoreline, that area will be deemed to be in compliance if the City demonstrates in writing and the APCO reasonably determines in writing that maximum water delivery mainline flows were maintained throughout the applicable period.
- C. Beginning on April 1, 2010, if modeled or monitoring data shows an exceedance or exceedances of the PM<sub>10</sub> NAAQS at the historic shoreline as a result of excessive dry areas within Shallow Flooding control areas during the dust control periods for each year between October 1 and June 30 of the next year, the provisions of Paragraph 10 shall apply.
- D. From July 1 through September 30 of each year, the City is not required by the 2008 SIP to apply water to Shallow Flooding areas for dust control purposes, but is required to maintain minimum areal wetness cover as required by applicable environmental documents, permits, leases and approvals.
- E. Aerial photography, satellite imagery or other methods approved at the sole discretion of the APCO shall be used to confirm wetness coverage.
- F. The following portions of the areas designated for control with Shallow Flooding are exempted from the requirement of dust control by means of a saturated surface:
- i. Raised berms, roadways and their shoulders necessary to access, operate and maintain the control measure which are otherwise controlled and maintained to render them substantially non-emissive and
  - ii. Raised pads containing vaults, pumping equipment or control equipment necessary for the operation of Shallow Flooding infrastructure which are otherwise controlled and maintained to render them substantially non-emissive.
- G. "Substantially non-emissive" shall be defined to mean that the surface is protected with gravel, durable pavement or other APCO-approved surface protections sufficient to meet the requirements of District Rules 400 and 401 (visible emissions and fugitive dust).
- H. Excess surface waters and shallow groundwaters above the annual average water table that existed before site construction that reach the lower boundary of the dust control areas will be contained, collected and recirculated for reapplication to dust control areas or otherwise lawfully discharged. The dust control measure areas shall have lateral boundary edge berms and/or drains as necessary to contain excess waters in the control areas and to isolate the dust control measure areas from each other and from areas not

controlled. If drains are used, they shall be designed and constructed so that they may be regulated such that groundwater levels, surface water extent and wetlands in adjacent uncontrolled areas are not impacted. These requirements do not apply to Shallow Flood area T36-4, due to its adjacency to the Lower Owens River Project (LORP) and the City's intention to integrate the design and operation of T36-4 into the LORP.

- I. The City shall remove all exotic pest plants, including salt cedar (*Tamarix ramosissima*), that invade any of the areas designated for control by Shallow Flooding.
- J. As necessary to protect human health, the City shall prevent, avoid and/or abate mosquito, other pest vector and biting nuisance insect breeding and swarming within and in the vicinity of the control areas, including within communities less than three miles from a PM<sub>10</sub> control area, by effective means that minimize adverse effects upon adjacent wildlife.

~~J.K.~~ Brine Shallow Flooding BACM. The Governing Board approves "Brine Shallow Flooding BACM" as a subcategory of Shallow Flooding BACM. Brine Shallow Flooding is defined per the "Shallow Flooding BACM" in the 2008 Owens Valley SIP except that the water used for dust control may contain elevated levels of dissolved salts. The Air Pollution Control Officer will develop a Brine Shallow Flood BACM compliance methodology with input from the LADWP. The District and LADWP acknowledge and agree that the District's approval of Brine Shallow Flooding BACM shall not make LADWP liable for maintenance of the existing natural Brine Pool on Owens Lake. The existing "natural Brine Pool" is defined as those areas at Owens Lake below elevation 3,553.55 feet.

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~~13-16.~~ BACM Managed Vegetation (This section amended on 7/18/2011, BO 110718-04)

- A. ~~Existing Managed Vegetation areas~~ The "Managed Vegetation" PM<sub>10</sub> control measure will consist of establishing and maintaining locally adapted native plants at specified cover requirements on those areas of the lake bed where Managed Vegetation is used as a PM<sub>10</sub> control measure. Any Managed Vegetation area will be considered compliant when the vegetative cover requirements are maintained on the area by the City as specified in Order 110718-04.  
~~For areas controlled with the Managed Vegetation PM<sub>10</sub> control measure prior to January 1, 2007, the areas shall be operated and maintained in accordance with a Managed Vegetation Operation and Management Plan to be approved in writing by the APCO, which approval shall not be unreasonably withheld. The requirements of the Plan may be revised upon written request by the City and written approval of the APCO, which approval shall not be unreasonable withheld. The City's request shall contain a specific description of the modification requested and provide a demonstration regarding the effect of the modification on the environment and PM<sub>10</sub> control effectiveness.~~

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~~B.~~ New Managed Vegetation areas

~~In PM<sub>10</sub> control areas constructed after January 1, 2007 where Managed Vegetation is used as a PM<sub>10</sub> control measure, the following performance standard shall be achieved commencing on October 1 of each year, and ending on June 30 of the next year:~~

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~~substantially evenly distributed live or dead vegetation coverage of at least 50 percent on each acre designated for Managed Vegetation.~~

~~C.B.~~ All Managed Vegetation areas

i. The vegetation planted for dust control shall consist only of locally-adapted native species approved by the APCO or other species approved by both the APCO and the California State Lands Commission (CSLC). ~~To date, the only approved locally-adapted native species is saltgrass (*Distichlis spicata*). However, other appropriate species may be approved upon written request of the City and written approval of both the APCO and CSLC.~~

ii. ~~Vegetation coverage shall be measured by~~ Vegetative cover compliance is to be determined on a fall satellite image of the area calibrated and validated by reference to measurements made by the point-frame method, by ground-truthed remote sensing or by other methods approved at the sole discretion of the APCO.

- iii. The following portions of the areas designated for control with Managed Vegetation are exempted from the requirements set forth in Paragraphs 16.A. and 16.B., above:
- a. Portions consistently inundated with water, such as reservoirs, ponds and canals,
  - b. Roadways and equipment pads necessary to access, operate and maintain the control measure which are otherwise controlled and maintained to render them substantially non-emissive, and
  - c. Portions used as floodwater diversion channels or desiltation/retention basins.
- iv. "Substantially non-emissive" shall be defined to mean that the surface is protected with gravel, durable pavement or other APCO-approved surface protections sufficient to meet the requirements of District Rules 400 and 401 (visible emissions and fugitive dust).
- v. Excess surface waters and shallow groundwaters above the root zone depths that reach the lower boundary of the dust control areas shall be collected and recirculated for reapplication to dust control areas or otherwise lawfully discharged. The dust control measure areas shall have lateral boundary edge berms and/or drains as necessary to contain excess waters in the control areas and to isolate the dust control measure areas from each other and from areas not controlled. Drains shall be designed and constructed so that they may be regulated such that groundwater levels, surface water extent and wetlands in adjacent uncontrolled areas are not impacted.
- vi. To protect the Managed Vegetation control measure from flood damage and alluvial deposition, the City shall incorporate stormwater and siltation control facilities into and around Managed Vegetation areas adequate to maintain the dust mitigation function of Managed Vegetation. The Managed Vegetation protection facilities shall be designed to dissipate flood waters and capture the alluvial material carried by flood waters, so as to avoid greater than normal water flows and deposition of alluvial material into the Owens Lake brine pool.

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- vii. The City shall remove all exotic pest plants, including salt cedar (*Tamarix* spp.), that invade any of the areas designated for control by Managed Vegetation.
- viii. As necessary to protect human health, the City shall prevent, avoid and/or abate mosquito, other pest vector and biting nuisance insect breeding and swarming within and in the vicinity of the dust control areas, including within communities less than three miles from a PM<sub>10</sub> control area, by effective means that minimize adverse effects upon adjacent wildlife.

#### 14-17. BACM Gravel Blanket

- A. In areas where Gravel Blanket is used as a PM<sub>10</sub> control measure, the City shall meet the following performance standard: one hundred percent of the control area shall be covered with a layer of gravel at least four inches thick. All gravel material placed must be screened to a size greater than one-half inch (½ inch) in diameter. Where it is necessary to support the gravel blanket, it shall be placed over a permanent permeable geotextile fabric. The gravel shall have resistance to leaching and erosion. It shall be no more toxic than the gravel from the Keeler fan site analyzed by the District in the Final Environmental Report prepared for the 1997 SIP. To minimize visual impacts, all gravel used shall be comparable in coloration to the existing lake bed soils.
- B. To protect the Gravel Blanket control measure from flooding, the City shall incorporate drains and channels into and around the control measure areas adequate to maintain the dust mitigation function of the Gravel Blanket, and outlet flood waters into the Owens Lake brine pool, Shallow Flooding areas, or reservoirs. The drains and channels shall be designed to incorporate features such as desiltation or retention basins that are adequate to capture the alluvial material carried by the flood waters and to avoid greater than normal deposition of this material into the Owens Lake brine pool.
- C. The gravel placement design and implementation shall adequately protect the graveled areas from the deposition of wind- and water-borne soil or infiltration of sediments from below. All graveled areas will be visually monitored to ensure that the Gravel Blanket is not filled with sand, dust or salt and that it has not been inundated or washed out from flooding. If any of these conditions are observed over areas larger than one acre, additional gravel will be transported to the playa and applied to the playa surface such that the original performance standard is maintained. The City shall apply best available control measures (BACM) and New Source Performance Standard (NSPS) emission limits to its gravel mining and transportation activities occurring within the District's geographic boundaries as required by the District in the City's District-issued Authority to Construct and Permit to Operate.

D. **Reduced Thickness Gravel. As an alternative to the use of a gravel blanket at least four inches thick in 17.A., the Governing Board approves "Reduced Thickness Gravel" as an approved type of Gravel Blanket BACM. For Reduced Thickness Gravel the gravel thickness is reduced from a minimum of four inches (4") to two inches (2") and all reduced thickness gravel areas shall be underlain with geotextile fabric. One**

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hundred percent of the control area shall be covered with a layer of gravel and all gravel material placed must be screened to a size greater than one-half inch (½ inch) in diameter. All geotextile fabric shall be Class I woven or nonwoven geotextile fabric meeting the minimum specifications set forth in the National Standard Materials Specification “Material Specification 592—Geotextile” (National Engineering Handbook, Chapter 3, Part 642), or equivalent as approved by the Air Pollution Control Officer. The gravel shall have resistance to leaching and erosion. It shall be no more toxic than the gravel from the Keeler fan site analyzed by the District in the Final Environmental Report prepared for the 1997 SIP. To minimize visual impacts, all gravel used shall be comparable in coloration to the existing lake bed soils.

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15-18. Alternative Non-BACM Moat & Row Control Measure

- A. The Moat & Row PM<sub>10</sub> control measure is not a currently-approved BACM. The preliminary form of Moat & Row is described in Exhibit 4 of the 2006 Settlement Agreement between the District and the City (Attachment A). The final form of the Moat & Row PM<sub>10</sub> control measure will be determined from the results of a demonstration project and testing to be conducted by the City on the lake bed. All Moat & Row controls will be designed, constructed and operated to achieve the MDCEs described in Paragraph 9.
- B. The PM<sub>10</sub> control effectiveness of Moat & Row may be enhanced by combining it with other dust control methods such as vegetation, water, gravel, or the addition of other features that enhance sand capture and sheltering or directly protect the lake bed surface from wind erosion. The effectiveness of the array can also be increased by adding additional moats and rows to the array.
- C. Final design for the Moat & Row control measure will be determined solely by the City after consultation with and written notification to the District. The City shall consider the following elements in its final design:
  - i. Test results demonstrating that the required MDCE for each Moat & Row area can be met,
  - ii. Completion of all required environmental documentation, approvals, permits and leases, and
  - iii. Inclusion of monitoring in the infrastructure design to continuously monitor compliance with the target MDCE for each area.
- D. Upon written request of the City, the APCO shall determine in writing if any given Moat & Row design constitutes BACM or MDCE-BACM in accordance with Attachment D, “2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area.”
- E. Areas of Moat & Row that do not function as designed or that cause or contribute to an exceedance of the federal 24-hour PM<sub>10</sub> NAAQS will be remediated as specifically

## Attachment 3

provided in Attachment B, the “2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure.”

#### PM<sub>10</sub> CONTROL MEASURE COMPLIANCE AND ENFORCEMENT

- ~~16-19.~~ The District and City will work collaboratively to develop improved wetness and vegetative cover measurement techniques, control efficiency relationships, and compliance specifications for all PM<sub>10</sub> control measures. Final acceptance and implementation of all compliance measurement techniques and PM<sub>10</sub> control measure compliance specifications with regulatory impact will be at the sole discretion of the APCO.

#### STORMWATER MANAGEMENT

- ~~17-20.~~ The City shall design, install, continually operate and maintain flood and siltation control facilities to protect the all PM<sub>10</sub> control measures installed on the lake bed at all times, and in a manner that groundwater levels, surface water extent, and wetlands in adjacent uncontrolled areas are not impacted by induced drainage. Flood and siltation control facilities shall be integrated into the design and operation of the PM<sub>10</sub> control measures. All flood and siltation control facilities and PM<sub>10</sub> control measures damaged by stormwater runoff or flooding shall be promptly repaired and restored to their designed level of protection and effectiveness. All flood and siltation control facilities shall be designed and operated in a manner to prevent any greater threat of alluvial material contamination to the existing trona mineral deposit lease area (State Lands Commission leases PRC 5464.1, PRC 3511 and PRC 2969.1) than would have occurred under natural conditions prior to the installation of PM<sub>10</sub> control measures.

#### SCHEDULE

- ~~18-21.~~ The Control Measures shall be implemented on the areas set forth in Paragraphs 1 through 4 by the dates set forth in those Paragraphs. Supplemental Control Requirements shall be met on the schedule provided for in Attachment B.

#### PERFORMANCE MONITORING PLAN

- ~~19-22.~~ The City, in consultation with the District, shall annually develop and provide to the District in writing a Performance Monitoring Plan (PMP) to aid in its operation of the Owens Lake dust mitigation program on the Owens Lake bed.
- A. The PMP shall describe the measurements and methods used to verify the performance of the constructed DCMs. The PMP shall also describe the measurements and methods used to maximize information on dust emissions from any areas of special interest.
  - B. The City shall implement the PMP, and will use the results as a guide for making operational decisions about the type, location, timing, and level of dust control measures needed to prevent exceedances of the federal standard at the shoreline.
  - C. The District may use information from the PMP to assist in determining the likely sources of dust emissions causing or contributing to exceedances (if any) of the federal standard at the shoreline.

- D. The PMP for each calendar year shall be submitted to the APCO by March 31 of the following calendar year.

#### ADDITIONAL REQUIREMENTS

- ~~20-23.~~ The District Board orders the City of Los Angeles to satisfy the following requirements related to the implementation of the Shallow Flooding, Managed Vegetation, Gravel Blanket and Moat & Row control measures:
- A. The City's construction, operation and maintenance activities shall comply with all Mitigation Measures set forth in Final Environmental Impact Reports, EIR Addendums and Mitigated Negative Declarations associated with the areas on which dust controls are placed, and all subsequent environmental documents adopted by the District for implementation of the requirements of this SIP.
  - B. The City shall comply with any and all applicable requirements of the Mitigation Monitoring and Reporting Programs adopted by the District and associated with the Final Environmental Impact Reports and Final Environmental Impact Report Addendums for this project, and with all subsequent environmental documents adopted by the District for implementation of the requirements of this SIP. All mitigation measures required in certified environmental documents associated with the implementation, operation and maintenance of PM<sub>10</sub> control measures required by this order are hereby incorporated as requirements of this order and may be enforced as such.
  - C. The City shall apply best available control measures (BACM) to control air emissions from its construction/implementation activities occurring in the District's geographic boundaries.

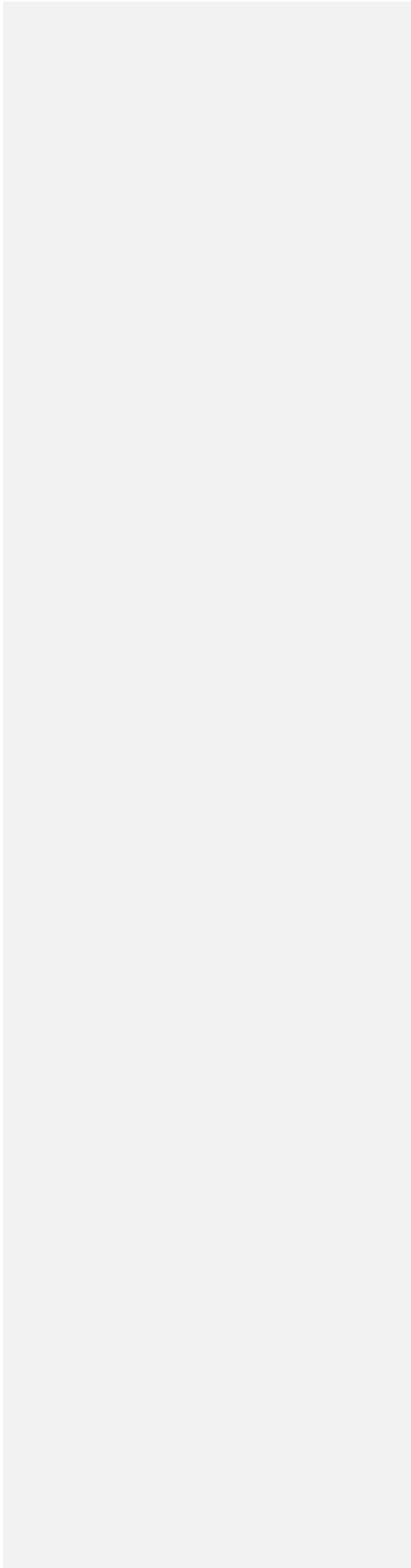
#### Exhibits

- Exhibit 1 Map and Coordinates of PM<sub>10</sub> Control Areas
- Exhibit 2 Minimum Dust Control Efficiency Map
- Exhibit 3 Shallow Flood Control Efficiency Curve

#### Attachments

- Attachment A 2006 Settlement Agreement between the Great Basin Unified Air Pollution Control District and the City of Los Angeles
- Attachment B 2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure
- Attachment C 2008 Owens Lake Dust Source Identification Program Protocol

Attachment D 2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area



# Attachment 4

Clean Version of Revised Board Order 080128-01



**BOARD ORDER # 080128-01 AS AMENDED PURSUANT TO  
BOARD ORDER 130916-01 and 110718-04 REQUIRING THE  
CITY OF LOS ANGELES TO UNDERTAKE MEASURES TO  
CONTROL PM<sub>10</sub> EMISSIONS FROM THE DRIED BED OF OWENS LAKE**

With regard to the control of PM<sub>10</sub> emissions from the bed of Owens Lake, the Governing Board of the Great Basin Unified Air Pollution Control District (District) orders the City of Los Angeles (City) as follows:

**PREAMBLE**

- A. WHEREAS, the 1998 Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State Implementation Plan (1998 SIP), dated November 16, 1998 and the 2003 Revision to the Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State Implementation Plan (2003 SIP), dated November 13, 2003, require the City to implement a series of measures and actions to reduce particulate emissions from the Owens Lake bed such that the Owens Valley Planning Area (OVPA) will attain and maintain the federal 24-hour National Ambient Air Quality Standards (NAAQS) for particulate matter (PM<sub>10</sub>) by the statutory deadlines;
- B. WHEREAS, the District is required by law to maintain its discretion to protect the environment, public health and safety, and this Order is intended to fulfill those duties without improperly constraining that lawful exercise of discretion;
- C. WHEREAS, based on additional information collected subsequent to the information used to adopt the 1998 SIP and 2003 SIP, the District has determined that additional measures and actions will be required to continue to reduce particulate emissions in the OVPA such that the OVPA will attain and maintain the federal 24-hour NAAQS for PM<sub>10</sub> by the statutory deadlines;
- D. WHEREAS, in 2006 a dispute arose between the District and the City regarding the District's requirements for the City to control dust from additional areas at Owens Lake beyond those areas identified in the 2003 SIP;
- E. WHEREAS, on December 4, 2006 a Settlement Agreement was approved by both the District and the City. Under the provisions of this agreement, the City agreed to implement additional dust control measures by April 1, 2010 and the District agreed to revise the 2003 SIP before March 1, 2008 to incorporate the provisions of the Settlement Agreement;
- F. WHEREAS, on March 23, 2007, the U.S. Environmental Protection Agency (USEPA) published a finding that the Owens Valley Planning Area did not attain the 24-hour NAAQS for particulate matter of 10 microns or less (PM<sub>10</sub>) by December 31, 2006 as mandated by the U.S Clean Air Act Amendments of 1990;

- G. WHEREAS, as a result of the USEPA finding, the 2003 SIP must be revised to include a control strategy that will provide for attainment in the Owens Valley Planning Area as soon as practicable and that said revised SIP must be submitted to the USEPA by December 31, 2007;
- H. WHEREAS, in consideration of the District's continuing duties under federal and state law, including but not limited to the Clean Air Act, to control particulate emissions from the Owens Lake bed without interruption, the District intends, if this Order is stayed or disapproved, that Board Order #031113-01 (adopted on November 13, 2003) shall continue to be in effect, so that at all times there will be continuous control of these emissions;
- I. WHEREAS, the District thereby intends that if this Order is stayed due to a legal challenge, including but not limited to a challenge to this Order under California Health and Safety Code Section 42316, to the State Implementation Plan, or to the Environmental Impact Report for this SIP, or if this Order is disapproved by the California Air Resources Board (CARB), the District will revert to enforce the terms of Board Order #031113-01 which shall continue to be in effect and shall remain in full force for the duration of any stay or, in the case of disapproval, unless and until another Order is issued by this Board; and
- J. WHEREAS, to prevent the deterioration of air quality due to dismantling or "backsliding" on control measures that have already been implemented before any such stay or disapproval, the District intends that the City shall continue to operate and maintain all control measures already implemented at the time of any such stay or disapproval without interruption, unless and until a further Order of the District allows for such interruption, if the City has not appealed the control measures under Section 42316 within 30 days of the effective date of this Order, and if those control measures were not invalidated as a result of that appeal;
- K. WHEREAS, it is the District's intention that this 2008 revised SIP is consistent with the 2006 Settlement Agreement between the District and the City and that it is the District's intention to independently meet all its commitments and obligations under said Settlement Agreement.

**THEREFORE, IT IS HEREBY ORDERED AS FOLLOWS:**

**ORDER**

**IMPLEMENTATION OF OWENS LAKE BED PM<sub>10</sub> CONTROL MEASURES**

1. Existing PM<sub>10</sub> controls – From the date of adoption of this order, the City shall continue to operate and maintain the existing Best Available Control Measures (BACM) for PM<sub>10</sub>, as described in Paragraph 8 hereof, on 29.8 square miles of the Owens Lake bed within the 2003 Dust Control Area (DCA) delineated in Exhibit 1.

2. Additional Shallow Flood supplemental PM<sub>10</sub> controls – By April 1, 2010 the City shall implement a minimum of 9.2 square miles of additional Shallow Flooding BACM PM<sub>10</sub> controls within the 12.7 square-mile area known as the 2006 Supplemental Dust Control Area (SDCA) delineated in Exhibit 1. The areas within the SDCA designated for Shallow Flooding only are delineated in Exhibit 1. Shallow Flooding BACM is described in Paragraphs 8, 9 and 15 hereof.
3. Other additional supplemental PM<sub>10</sub> controls – On a maximum of 3.5 square miles within the 2006 SDCA delineated in Exhibit 1, the City shall implement BACM for PM<sub>10</sub>, as described in Paragraphs 8, 9 and 15 through 17 hereof, or the City may implement the alternative non-BACM PM<sub>10</sub> control measure known as “Moat & Row,” as described in Paragraph 18. If BACM are installed, the controls shall be operational by April 1, 2010. If Moat & Row is installed, it shall be operational by October 1, 2009. In accordance with Board Order 130916-01, the 3.1 square mile area remaining of the possible areas eligible for alternative non-BACM PM<sub>10</sub> control measures using Moat & Row, are now identified as the “Phase 7a areas.” The deadlines to implement BACM in the Phase 7a areas are provided as follows:
  - A. With the exceptions noted below, the deadline for LADWP to construct all infrastructure and install fully-compliant BACM PM<sub>10</sub> controls (other than Managed Vegetation BACM) in those portions of the “2008 Dust Control Area” known as the “Phase 7a” areas, which total approximately 3.1 square miles, shall be December 31, 2015. All infrastructure and plant materials for Phase 7a areas controlled with Managed Vegetation BACM will be installed by December 31, 2015. The Phase 7a areas are a portion of the 2008 Dust Control Area previously referred to as “Moat & Row Dust Control Areas” and are shown and described in Exhibit 1.
  - B. The deadline to achieve fully-compliant BACM vegetation cover for those Phase 7a areas controlled by the Managed Vegetation BACM shall be December 31, 2017.
  - C. The extensions of the deadlines set forth in sections 3.A. and 3.B. shall be contingent upon all of the following:
    - (1) LADWP timely receiving from California State Lands Commission (“CSLC”) and all other agencies all of the required permits, approvals, or leases necessary to allow LADWP to construct BACM controls within the deadlines set forth in sections 3.A. and 3.B.
    - (2) The timely removal from the Phase 7a areas of all California Register of Historical Resources (“CRHR”)-eligible areas plus necessary buffer areas, referred to as the “Eligible Cultural Resource (“ECR”) areas.” The ECR areas initially consist of 277 acres of the Phase 7a areas (the “Initial Phase 7b Areas”). The Initial ECR areas and any newly discovered CRHR-eligible and necessary buffer areas shall comprise the “Phase 7b” areas. The Phase 7b Areas are not limited to the initial 277 acres.

- (3) Order 110317-01 being revised to state explicitly that any newly discovered potential ECRs in the Phase 7a areas are considered a condition of force majeure under paragraph 5(d) of that Order.
- D. If any one of the above contingencies is not met, LADWP may seek further extensions of time under the provisions of paragraph 5 of Order 110317-01, as modified by Order 130819-01, and paragraphs 6 and 22 of Order 110317-01, which shall not be unreasonably denied by the District.
- E. LADWP shall not be required to install dust controls in the Phase 7b areas (initially, 277 acres) under the provisions of the 2008 Owens Valley SIP, Board Order 080128-01 or Order 130819-01. If the District Governing Board subsequently decides to order LADWP to install dust controls in Initial Phase 7b Areas, the District Governing Board will do so by issuing a new Board order or orders. The new Board order or orders shall include deadlines for constructing dust controls that accommodate project circumstances. Any future order or orders issued by the District for Phase 7b will give due consideration to the shared goal of the District and LADWP to control air pollution and decrease the use of water as a dust control measure at Owens Lake. LADWP is not waiving its right to contest the new Board order or orders.
4. Channel Area PM<sub>10</sub> controls – A 0.5 square-mile area of natural drainage channels on the south area of the Owens Lake bed is known as the “Channel Area” and is delineated in Exhibit 1. The City shall control PM<sub>10</sub> emissions from the Channel Area by implementing and operating BACM, modified-BACM or alternative non-BACM controls approved by the District’s Air Pollution Control Officer (APCO), that take into account the resource issues in the Channel Area, by April 1, 2010. Portions of the Channel Area that are determined by the APCO to be naturally non-emissive (for example, adequately vegetated areas) will not require controls. If BACM are implemented in the Channel Area, they shall be as described in paragraphs 8, 9 and 15 through 17 hereof. If the City seeks to implement modified-BACM or alternative non-BACM, the City will apply such modifications as are permissible to resource agencies in this channel, with the primary objective of controlling dust, and provide the District with a monitoring plan aimed at identifying source areas that could cause or contribute to shoreline violations. Should such areas be identified after facilities are fully operational (including vegetative development), the District and the City will work with resource agencies to develop site-specific and implementable dust control approaches. Regardless of the approach selected for Channel Area dust control, the City shall prepare and submit to the District a detailed plan demonstrating the need and effectiveness of the control measures and their projected impacts to the environment, and obtain the prior approval of the District and any other applicable regulatory agencies with jurisdiction over the Channel Area for use of the modified-BACM. The City shall be responsible for any additional environmental analyses that may be required and for all required permits.
5. Total PM<sub>10</sub> control area – The 29.8 square-mile 2003 Dust Control Area (DCA), the 12.7 square-mile 2006 Supplemental Dust Control Area (SDCA) and the 0.5 square-mile Channel Area together comprise the 43.0 square-mile area known as the 2008 Total Dust Control Area (TDCA). These PM<sub>10</sub> control areas are delineated in Exhibit 1.

6. Minor adjustments to PM<sub>10</sub> control area boundaries – Upon written request by the City to the District and written approval by the District’s APCO, minor adjustments may be made to the interior and exterior boundaries of the 2006 SDCA, for example to avoid impacts to existing resources or features, or for constructability reasons, which approval shall not be unreasonably withheld. In the event of such modification, the boundaries of the 2008 TDCA shall also be modified to reflect the modified 2006 SDCA boundaries.
  
7. Study Areas – The District has identified four additional “Study Areas” on the Owens Lake bed totaling up to 1.85 square miles that may require some level of control in order to attain the PM<sub>10</sub> NAAQS. The four Study Areas are delineated in Exhibit 1. The District will study emissions from the Study Areas occurring between July 1, 2006 and April 1, 2010 to determine whether they will cause or contribute to PM<sub>10</sub> NAAQS exceedances such that controls will be required. The District will use the data collected during this period to make a determination after May 1, 2010 as to the need for additional controls, as set forth in Paragraph 10, below. However, if the City is not in compliance with Paragraphs 1 and 3 of this Order, the determination as to the need for additional controls in the Study Areas may be made prior to May 1, 2010.
  - A. Phase 8 Gravel - As required by Order 110317-01, the City constructed and implemented an approximately 2 square mile BACM project that encompassed the location of Study Area 1. This BACM project is known as Phase 8 and is delineated in Exhibit 1.

#### PM<sub>10</sub> CONTROL MEASURES

8. The City shall implement BACM PM<sub>10</sub> control measures as set forth in this Order, described below in Paragraphs 15 through 17. The City may implement the alternative non-BACM PM<sub>10</sub> control measure as set forth in this Order, described below in Paragraph 18. To complete implementation of a specified control measure by a date as required by this Order means that the control measure shall be constructed, installed, operated and maintained without interruption, so as to comply with the performance standards for the specified control measure not later than 5:00 p.m. on the required date.
  
9. All PM<sub>10</sub> control measures within the 2006 SDCA shall be designed, constructed, installed, operated and maintained by the City to achieve the initial target minimum dust control efficiencies (MDCEs) shown on the MDCE Map, attached as Exhibit 2. MDCEs are the actual dust control measure control efficiencies required to meet the PM<sub>10</sub> NAAQS, based on data collected during the four-year period between July 2002 and June 2006. Prior to April 1, 2010, upon request of the City and written approval of the APCO, which approval shall not be unreasonably withheld, the initial target MDCEs may be modified if the modified target MDCEs meet the criteria set forth in the MDCE Selection Process Spreadsheet, as set forth in the 2006 Settlement Agreement between the District and the City. This Settlement Agreement is attached as Attachment A.

CONTINGENCY MEASURES – SUPPLEMENTAL CONTROL DETERMINATIONS

10. At least once per calendar year after May 1, 2010, the District's APCO will make a written determination as to whether any areas, in addition to those described in Exhibit 1, require air pollution control measures in order to attain or maintain compliance with the NAAQS for PM<sub>10</sub>. The APCO's determination will also contain an analysis of the minimum dust control efficiency provided by the PM<sub>10</sub> controls in the 2008 TDCA to determine if a higher level of control efficiency is required in order to attain or maintain compliance with the NAAQS for PM<sub>10</sub>. In making these determinations, the APCO shall employ the methods described in Paragraph 11 of this Order. If the City is not in compliance with Paragraphs 1 and 3 of this Order, the determination as to the need for additional controls may be made prior to May 1, 2010.
- A. If the APCO determines under this Paragraph that additional areas require air pollution control measures or that existing PM<sub>10</sub> control measures require a higher level of control efficiency, the APCO shall issue a written determination to the City informing them that the provisions of Paragraph 11 of this Order require the City to implement, install, operate and maintain PM<sub>10</sub> BACM on additional areas of the Owens Lake bed or that the control efficiency on existing PM<sub>10</sub> controls must be increased. The determination will identify those areas of the lake bed that will require PM<sub>10</sub> BACM and the control efficiency necessary to attain the PM<sub>10</sub> NAAQS. The City shall secure all permits and leases necessary to implement BACM and conduct any additional analysis, if any, required to comply with the California Environmental Quality Act and any other applicable laws.
- B. The APCO's annual determinations will use data collected after April 1, 2010, except as provided in Paragraph 7, above, for the four Study Areas. The annual determinations for the Study Areas will use data collected after July 1, 2006.
- C. In the event the City appeals the supplemental control determination under Health & Safety Code Section 42316, and pending a decision of the CARB, the City is not required to comply with any measure imposed by the supplemental control determination. The District relies upon action by the CARB to issue its decision on the City's appeal within 90 days. If CARB does not affirm the District supplemental control determination, or otherwise require the City to immediately undertake alternative supplemental control measures within 90 days in such circumstances where automatic control measures are required under Sections 172(c)(1) or 182(c)(9) of the federal Clean Air Act, 42 U.S.C. Sections 7502(c)(9) and 7511a(c)(9), the District relies upon the CARB to take these federal requirements into account in its determination of the City's appeal and to issue such interim orders as necessary to implement automatic supplemental control measures so that this Order complies with the Clean Air Act and can be approved by the U.S. Environmental Protection Agency as a proper State Implementation Plan. The foregoing is not intended to provide the CARB with any authority other than its authority under state law.
- D. Paragraph 11 fixes the period of time within which the implementation of the additional control measures must be completed. Upon implementation, the City shall continuously

operate and maintain, without interruption, the control measures to comply with performance standards set forth for such measures in the control measure descriptions contained in this Order.

#### CRITERIA FOR DETERMINING THE NEED FOR ADDITIONAL PM<sub>10</sub> CONTROLS

11. The criteria, methods and procedures for the APCO's determination of the need for additional PM<sub>10</sub> controls described in Paragraph 10 shall be those described in detail in the "2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure" document incorporated as Attachment B along with its referenced "2008 Owens Lake Dust Source Identification Program Protocol" incorporated as Attachment C.

#### NEW BACM, ADJUSTMENTS TO EXISTING BACM, AND BACM TRANSITIONS

12. Upon written request by the City, the APCO may approve new BACM, a modification or adjustment to the existing BACMs described in Paragraphs 15, 16 and 17 of this Order, and/or the transition from one BACM to another provided that, at all times, the performance standards of one or the other BACM are continuously met during the transition to assure that the transition shall not prevent the OVPA from attaining or maintaining the NAAQS for PM<sub>10</sub>. The City's request shall contain a detailed description of the proposed alternative and a demonstration that the request satisfied all requirements of law and this Order. The APCO shall have full discretion to consider any such application for a change in BACM, and to accept, reject or condition its approval of such application. Non-compliance with any such condition shall be enforceable as noncompliance with a District Order. Without limiting the District's discretion as provided herein and with the exception of the provisions made for Order 110317-01 for "Transition Areas", the procedures for transitions of implemented control measures or adjustments to BACM shall be those described in Attachment D, "2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area."

##### A. BACM Testing and Approval

The District shall work with LADWP on accelerated testing schedules and BACM approval, if warranted, for Engineered Roughness Elements and Tillage in soil type areas where these controls can be applied. The District Governing Board shall consider BACM approval of these candidate measures by September 28, 2014. If the accelerated testing does not result in approved BACM for the candidate measures, the District's and LADWP's respective Boards shall jointly assess why the accelerated testing did not result in the District Board's BACM approval. The District and LADWP shall also work on accelerated testing schedules and BACM approvals for other forms of BACM controls.

#### ALTERNATIVE METHODS FOR IMPLEMENTING CONTINGENCY MEASURES AND SUPPLEMENTAL CONTROLS

13. Notwithstanding any other provision of this Order, the District shall maintain its authority under Health and Safety Code Section 42316 to order the City to implement additional controls, to control additional emissive areas and/or to undertake additional reasonable measures necessary to mitigate the air pollution caused in the District by the City's water-gathering activities in order to prevent the OVPA from failing to attain or maintain the

NAAQS for PM<sub>10</sub>, if circumstances arise that are not specifically addressed in Paragraphs 10 or 12 of this Order.

#### RELATIONSHIP TO BOARD ORDER 031113-01

14. The District hereby stays the force and effect of Board Order 031113-01 for all times that this Order is in full force and effect. In the event this Order, or any provision of this Order, is stayed due to a legal challenge, including but not limited to a challenge to this Order under Health & Safety Code Section 42316, or any other law, to the State Implementation Plan, or to the Environmental Impact Report for this Revised SIP, or in the event the Order is disapproved by the CARB, the following shall apply:
- A. If the stay or disapproval causes Paragraph 1 through 5 of this Order to cease its operative force and effect, Board Order #031113-01 shall immediately be in effect and shall remain in full force for the duration of any stay or, in the case of disapproval, until another Order is issued by this Board. In addition, the City shall continue to operate and maintain without interruption all control measures already implemented in any area if those control measures were not appealed under Health & Safety Code Section 42316 within 30 days of the date of this Order, and if those measures were not invalidated as a result of that appeal.
  - B. If the stay or disapproval causes Paragraph 10 and/or 11 of this Order to cease its operative force and effect, but does not affect Paragraphs 1 through 5 of this Order, the City shall continue to operate and maintain all control measures already implemented without interruption.
  - C. If the stay or disapproval does not affect Paragraphs 1 through 7, 10 or 11 of this Order, those Paragraphs and any other terms of this Order that are not stayed or disapproved shall be in effect, and shall remain in full force for the duration of any stay. In all cases, the City shall continue to operate and maintain, without interruption, all control measures already implemented.
  - D. If a stay of this Order is imposed, then lifted so that this Order is in effect, the City shall, immediately, meet all requirements and deadlines set by this Order as if no stay had been imposed. The City shall not remove or decrease any control measures without the express written permission of the APCO, and the provisions of Board Order 031113-01 shall again be stayed. If the stay of this Order is only partially lifted such that any portion of this Order remains stayed, Board Order 031113-01 shall remain in effect as provided under Paragraphs 14.A., 14.B. and 14.C, above.

#### PM<sub>10</sub> CONTROL MEASURES

##### 15. BACM Shallow Flooding

The “Shallow Flooding” PM<sub>10</sub> control measure will apply water to the surface of those areas of the lake bed where Shallow Flooding is used as a PM<sub>10</sub> control measure. Water shall be applied in amounts and by means sufficient to achieve the following performance standards:

A. For Shallow Flooding areas within the 29.8 square-mile 2003 DCA:

- i. Until April 1, 2010: At least 75 percent of each square mile of the designated areas shall continuously consist of standing water or surface-saturated soil, substantially evenly distributed for the period commencing on October 1 of each year, and ending on June 30 of the next year. If a contiguous Shallow Flood dust control area is less than one square mile, 75 percent of the entire contiguous area shall consist of substantially evenly distributed standing water or surface-saturated soil.
- ii. After April 1, 2010:
  - a. At least 75 percent of each square mile of the designated areas shall continuously consist of standing water or surface-saturated soil, substantially evenly distributed for the period commencing on October 16 of each year, and ending on May 15 of the next year. If a contiguous Shallow Flood dust control area is less than one square mile, 75 percent of the entire contiguous area shall consist of substantially evenly distributed standing water or surface-saturated soil.
  - b. Beginning May 16 and through May 31 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 70 percent.
  - c. Beginning June 1 and through June 15 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 65 percent.
  - d. Beginning June 16 and through June 30 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 60 percent.
  - e. If for any Shallow Flooding area, the percent of areal wetness cover in the periods specified in Paragraphs 15.A.ii,b, c, and d, above, is below the minimum percentages specified for each shallow flood area based on the air quality model for the analysis period from July 2002 through June 2006, and there were no monitored or modeled exceedances of the federal standard at the historic shoreline, that area will be deemed to be in compliance, if the City demonstrates in writing and the APCO reasonably determines in writing that maximum water delivery mainline flows were maintained throughout the applicable period.

B. For Shallow Flooding areas within the 12.7 square-mile 2006 SDCA:

- i. The percentage of each area that must have substantially evenly distributed standing water or surface-saturated soil shall be based on the Shallow Flood Control Efficiency Curve (SFCE Curve) attached as Exhibit 3 to achieve the control efficiency levels in the MDCE Map (Exhibit 2).
- ii. For Shallow Flooding areas with control efficiencies of 99 percent or more:
  - a. Beginning May 16 and through May 31 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 70 percent.
  - b. Beginning June 1 and through June 15 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 65 percent.

- c. Beginning June 16 and through June 30 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 60 percent.
  - d. If for any Shallow Flooding area, the percent of areal wetness cover in the periods specified in Paragraph 15.B.ii.a,b, and c, above, is below the minimum percentages specified for each shallow flood area based on the air quality model for the analysis period from July 2002 through June 2006, and there were no monitored or modeled exceedances of the federal standard at the historic shoreline, that area will be deemed to be in compliance if the City demonstrates in writing and the APCO reasonably determines in writing that maximum water delivery mainline flows were maintained throughout the applicable period.
- C. Beginning on April 1, 2010, if modeled or monitoring data shows an exceedance or exceedances of the PM<sub>10</sub> NAAQS at the historic shoreline as a result of excessive dry areas within Shallow Flooding control areas during the dust control periods for each year between October 1 and June 30 of the next year, the provisions of Paragraph 10 shall apply.
- D. From July 1 through September 30 of each year, the City is not required by the 2008 SIP to apply water to Shallow Flooding areas for dust control purposes, but is required to maintain minimum areal wetness cover as required by applicable environmental documents, permits, leases and approvals.
- E. Aerial photography, satellite imagery or other methods approved at the sole discretion of the APCO shall be used to confirm wetness coverage.
- F. The following portions of the areas designated for control with Shallow Flooding are exempted from the requirement of dust control by means of a saturated surface:
- i. Raised berms, roadways and their shoulders necessary to access, operate and maintain the control measure which are otherwise controlled and maintained to render them substantially non-emissive and
  - ii. Raised pads containing vaults, pumping equipment or control equipment necessary for the operation of Shallow Flooding infrastructure which are otherwise controlled and maintained to render them substantially non-emissive.
- G. "Substantially non-emissive" shall be defined to mean that the surface is protected with gravel, durable pavement or other APCO-approved surface protections sufficient to meet the requirements of District Rules 400 and 401 (visible emissions and fugitive dust).
- H. Excess surface waters and shallow groundwaters above the annual average water table that existed before site construction that reach the lower boundary of the dust control areas will be contained, collected and recirculated for reapplication to dust control areas or otherwise lawfully discharged. The dust control measure areas shall have lateral boundary edge berms and/or drains as necessary to contain excess waters in the control areas and to isolate the dust control measure areas from each other and from areas not

controlled. If drains are used, they shall be designed and constructed so that they may be regulated such that groundwater levels, surface water extent and wetlands in adjacent uncontrolled areas are not impacted. These requirements do not apply to Shallow Flood area T36-4, due to its adjacency to the Lower Owens River Project (LORP) and the City's intention to integrate the design and operation of T36-4 into the LORP.

- I. The City shall remove all exotic pest plants, including salt cedar (*Tamarix ramosissima*), that invade any of the areas designated for control by Shallow Flooding.
- J. As necessary to protect human health, the City shall prevent, avoid and/or abate mosquito, other pest vector and biting nuisance insect breeding and swarming within and in the vicinity of the control areas, including within communities less than three miles from a PM<sub>10</sub> control area, by effective means that minimize adverse effects upon adjacent wildlife.
- K. Brine Shallow Flooding BACM. The Governing Board approves "Brine Shallow Flooding BACM" as a subcategory of Shallow Flooding BACM. Brine Shallow Flooding is defined per the "Shallow Flooding BACM" in the 2008 Owens Valley SIP except that the water used for dust control may contain elevated levels of dissolved salts. The Air Pollution Control Officer will develop a Brine Shallow Flood BACM compliance methodology with input from the LADWP. The District and LADWP acknowledge and agree that the District's approval of Brine Shallow Flooding BACM shall not make LADWP liable for maintenance of the existing natural Brine Pool on Owens Lake. The existing "natural Brine Pool" is defined as those areas at Owens Lake below elevation 3,553.55 feet.

16. BACM Managed Vegetation (This section amended on 7/18/2011, BO 110718-04)

- A. The "Managed Vegetation" PM<sub>10</sub> control measure will consist of establishing and maintaining locally adapted native plants at specified cover requirements on those areas of the lake bed where Managed Vegetation is used as a PM<sub>10</sub> control measure. Any Managed Vegetation area will be considered compliant when the vegetative cover requirements are maintained on the area by the City as specified in Order 110718-04.
- B. All Managed Vegetation areas
  - i. The vegetation planted for dust control shall consist only of locally-adapted native species approved by the APCO or other species approved by both the APCO and the California State Lands Commission (CSLC).
  - ii. Vegetative cover compliance is to be determined on a fall satellite image of the area calibrated and validated by reference to measurements made by the point-frame method, by ground-truthed remote sensing or by other methods approved at the sole discretion of the APCO.
  - iii. The following portions of the areas designated for control with Managed Vegetation are exempted from the requirements set forth in Paragraphs 16.A. and 16.B., above:
    - a. Portions consistently inundated with water, such as reservoirs, ponds and canals,

- b. Roadways and equipment pads necessary to access, operate and maintain the control measure which are otherwise controlled and maintained to render them substantially non-emissive, and
  - c. Portions used as floodwater diversion channels or desiltation/retention basins.
- iv. “Substantially non-emissive” shall be defined to mean that the surface is protected with gravel, durable pavement or other APCO-approved surface protections sufficient to meet the requirements of District Rules 400 and 401 (visible emissions and fugitive dust).
- v. Excess surface waters and shallow groundwaters above the root zone depths that reach the lower boundary of the dust control areas shall be collected and recirculated for reapplication to dust control areas or otherwise lawfully discharged. The dust control measure areas shall have lateral boundary edge berms and/or drains as necessary to contain excess waters in the control areas and to isolate the dust control measure areas from each other and from areas not controlled. Drains shall be designed and constructed so that they may be regulated such that groundwater levels, surface water extent and wetlands in adjacent uncontrolled areas are not impacted.
- vi. To protect the Managed Vegetation control measure from flood damage and alluvial deposition, the City shall incorporate stormwater and siltation control facilities into and around Managed Vegetation areas adequate to maintain the dust mitigation function of Managed Vegetation. The Managed Vegetation protection facilities shall be designed to dissipate flood waters and capture the alluvial material carried by flood waters, so as to avoid greater than normal water flows and deposition of alluvial material into the Owens Lake brine pool.
- vii. The City shall remove all exotic pest plants, including salt cedar (*Tamarix* spp.), that invade any of the areas designated for control by Managed Vegetation.
- viii. As necessary to protect human health, the City shall prevent, avoid and/or abate mosquito, other pest vector and biting nuisance insect breeding and swarming within and in the vicinity of the dust control areas, including within communities less than three miles from a PM<sub>10</sub> control area, by effective means that minimize adverse effects upon adjacent wildlife.

#### 17. BACM Gravel Blanket

- A. In areas where Gravel Blanket is used as a PM<sub>10</sub> control measure, the City shall meet the following performance standard: one hundred percent of the control area shall be covered with a layer of gravel at least four inches thick. All gravel material placed must be screened to a size greater than one-half inch (½ inch) in diameter. Where it is necessary to support the gravel blanket, it shall be placed over a permanent permeable geotextile fabric. The gravel shall have resistance to leaching and erosion. It shall be no more toxic than the gravel from the Keeler fan site analyzed by the District in the Final

Environmental Report prepared for the 1997 SIP. To minimize visual impacts, all gravel used shall be comparable in coloration to the existing lake bed soils.

- B. To protect the Gravel Blanket control measure from flooding, the City shall incorporate drains and channels into and around the control measure areas adequate to maintain the dust mitigation function of the Gravel Blanket, and outlet flood waters into the Owens Lake brine pool, Shallow Flooding areas, or reservoirs. The drains and channels shall be designed to incorporate features such as desiltation or retention basins that are adequate to capture the alluvial material carried by the flood waters and to avoid greater than normal deposition of this material into the Owens Lake brine pool.
- C. The gravel placement design and implementation shall adequately protect the graveled areas from the deposition of wind- and water-borne soil or infiltration of sediments from below. All graveled areas will be visually monitored to ensure that the Gravel Blanket is not filled with sand, dust or salt and that it has not been inundated or washed out from flooding. If any of these conditions are observed over areas larger than one acre, additional gravel will be transported to the playa and applied to the playa surface such that the original performance standard is maintained. The City shall apply best available control measures (BACM) and New Source Performance Standard (NSPS) emission limits to its gravel mining and transportation activities occurring within the District's geographic boundaries as required by the District in the City's District-issued Authority to Construct and Permit to Operate.
- D. Reduced Thickness Gravel. As an alternative to the use of a gravel blanket at least four inches thick in 17.A., the Governing Board approves "Reduced Thickness Gravel" as an approved type of Gravel Blanket BACM. For Reduced Thickness Gravel the gravel thickness is reduced from a minimum of four inches (4") to two inches (2") and all reduced thickness gravel areas shall be underlain with geotextile fabric. One hundred percent of the control area shall be covered with a layer of gravel and all gravel material placed must be screened to a size greater than one-half inch (½ inch) in diameter. All geotextile fabric shall be Class I woven or nonwoven geotextile fabric meeting the minimum specifications set forth in the National Standard Materials Specification "Material Specification 592—Geotextile" (National Engineering Handbook, Chapter 3, Part 642), or equivalent as approved by the Air Pollution Control Officer. The gravel shall have resistance to leaching and erosion. It shall be no more toxic than the gravel from the Keeler fan site analyzed by the District in the Final Environmental Report prepared for the 1997 SIP. To minimize visual impacts, all gravel used shall be comparable in coloration to the existing lake bed soils.

#### 18. Alternative Non-BACM Moat & Row Control Measure

- A. The Moat & Row PM<sub>10</sub> control measure is not a currently-approved BACM. The preliminary form of Moat & Row is described in Exhibit 4 of the 2006 Settlement Agreement between the District and the City (Attachment A). The final form of the Moat & Row PM<sub>10</sub> control measure will be determined from the results of a demonstration project and testing to be conducted by the City on the lake bed. All Moat

& Row controls will be designed, constructed and operated to achieve the MDCEs described in Paragraph 9.

- B. The PM<sub>10</sub> control effectiveness of Moat & Row may be enhanced by combining it with other dust control methods such as vegetation, water, gravel, or the addition of other features that enhance sand capture and sheltering or directly protect the lake bed surface from wind erosion. The effectiveness of the array can also be increased by adding additional moats and rows to the array.
- C. Final design for the Moat & Row control measure will be determined solely by the City after consultation with and written notification to the District. The City shall consider the following elements in its final design:
  - i. Test results demonstrating that the required MDCE for each Moat & Row area can be met,
  - ii. Completion of all required environmental documentation, approvals, permits and leases, and
  - iii. Inclusion of monitoring in the infrastructure design to continuously monitor compliance with the target MDCE for each area.
- D. Upon written request of the City, the APCO shall determine in writing if any given Moat & Row design constitutes BACM or MDCE-BACM in accordance with Attachment D, “2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area.”
- E. Areas of Moat & Row that do not function as designed or that cause or contribute to an exceedance of the federal 24-hour PM<sub>10</sub> NAAQS will be remediated as specifically provided in Attachment B, the “2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure.”

#### PM<sub>10</sub> CONTROL MEASURE COMPLIANCE AND ENFORCEMENT

19. The District and City will work collaboratively to develop improved wetness and vegetative cover measurement techniques, control efficiency relationships, and compliance specifications for all PM<sub>10</sub> control measures. Final acceptance and implementation of all compliance measurement techniques and PM<sub>10</sub> control measure compliance specifications with regulatory impact will be at the sole discretion of the APCO.

#### STORMWATER MANAGEMENT

20. The City shall design, install, continually operate and maintain flood and siltation control facilities to protect the all PM<sub>10</sub> control measures installed on the lake bed at all times, and in a manner that groundwater levels, surface water extent, and wetlands in adjacent uncontrolled areas are not impacted by induced drainage. Flood and siltation control facilities shall be integrated into the design and operation of the PM<sub>10</sub> control measures. All flood and siltation control facilities and PM<sub>10</sub> control measures damaged by stormwater runoff or

flooding shall be promptly repaired and restored to their designed level of protection and effectiveness. All flood and siltation control facilities shall be designed and operated in a manner to prevent any greater threat of alluvial material contamination to the existing trona mineral deposit lease area (State Lands Commission leases PRC 5464.1, PRC 3511 and PRC 2969.1) than would have occurred under natural conditions prior to the installation of PM<sub>10</sub> control measures.

#### SCHEDULE

21. The Control Measures shall be implemented on the areas set forth in Paragraphs 1 through 4 by the dates set forth in those Paragraphs. Supplemental Control Requirements shall be met on the schedule provided for in Attachment B.

#### PERFORMANCE MONITORING PLAN

22. The City, in consultation with the District, shall annually develop and provide to the District in writing a Performance Monitoring Plan (PMP) to aid in its operation of the Owens Lake dust mitigation program on the Owens Lake bed.
  - A. The PMP shall describe the measurements and methods used to verify the performance of the constructed DCMs. The PMP shall also describe the measurements and methods used to maximize information on dust emissions from any areas of special interest.
  - B. The City shall implement the PMP, and will use the results as a guide for making operational decisions about the type, location, timing, and level of dust control measures needed to prevent exceedances of the federal standard at the shoreline.
  - C. The District may use information from the PMP to assist in determining the likely sources of dust emissions causing or contributing to exceedances (if any) of the federal standard at the shoreline.
  - D. The PMP for each calendar year shall be submitted to the APCO by March 31 of the following calendar year.

#### ADDITIONAL REQUIREMENTS

23. The District Board orders the City of Los Angeles to satisfy the following requirements related to the implementation of the Shallow Flooding, Managed Vegetation, Gravel Blanket and Moat & Row control measures:
  - A. The City's construction, operation and maintenance activities shall comply with all Mitigation Measures set forth in Final Environmental Impact Reports, EIR Addendums and Mitigated Negative Declarations associated with the areas on which dust controls are placed, and all subsequent environmental documents adopted by the District for implementation of the requirements of this SIP.
  - B. The City shall comply with any and all applicable requirements of the Mitigation Monitoring and Reporting Programs adopted by the District and associated with the Final

Environmental Impact Reports and Final Environmental Impact Report Addendums for this project, and with all subsequent environmental documents adopted by the District for implementation of the requirements of this SIP. All mitigation measures required in certified environmental documents associated with the implementation, operation and maintenance of PM<sub>10</sub> control measures required by this order are hereby incorporated as requirements of this order and may be enforced as such.

- C. The City shall apply best available control measures (BACM) to control air emissions from its construction/implementation activities occurring in the District's geographic boundaries.

### **Exhibits**

Exhibit 1 Map and Coordinates of PM<sub>10</sub> Control Areas

Exhibit 2 Minimum Dust Control Efficiency Map

Exhibit 3 Shallow Flood Control Efficiency Curve

### **Attachments**

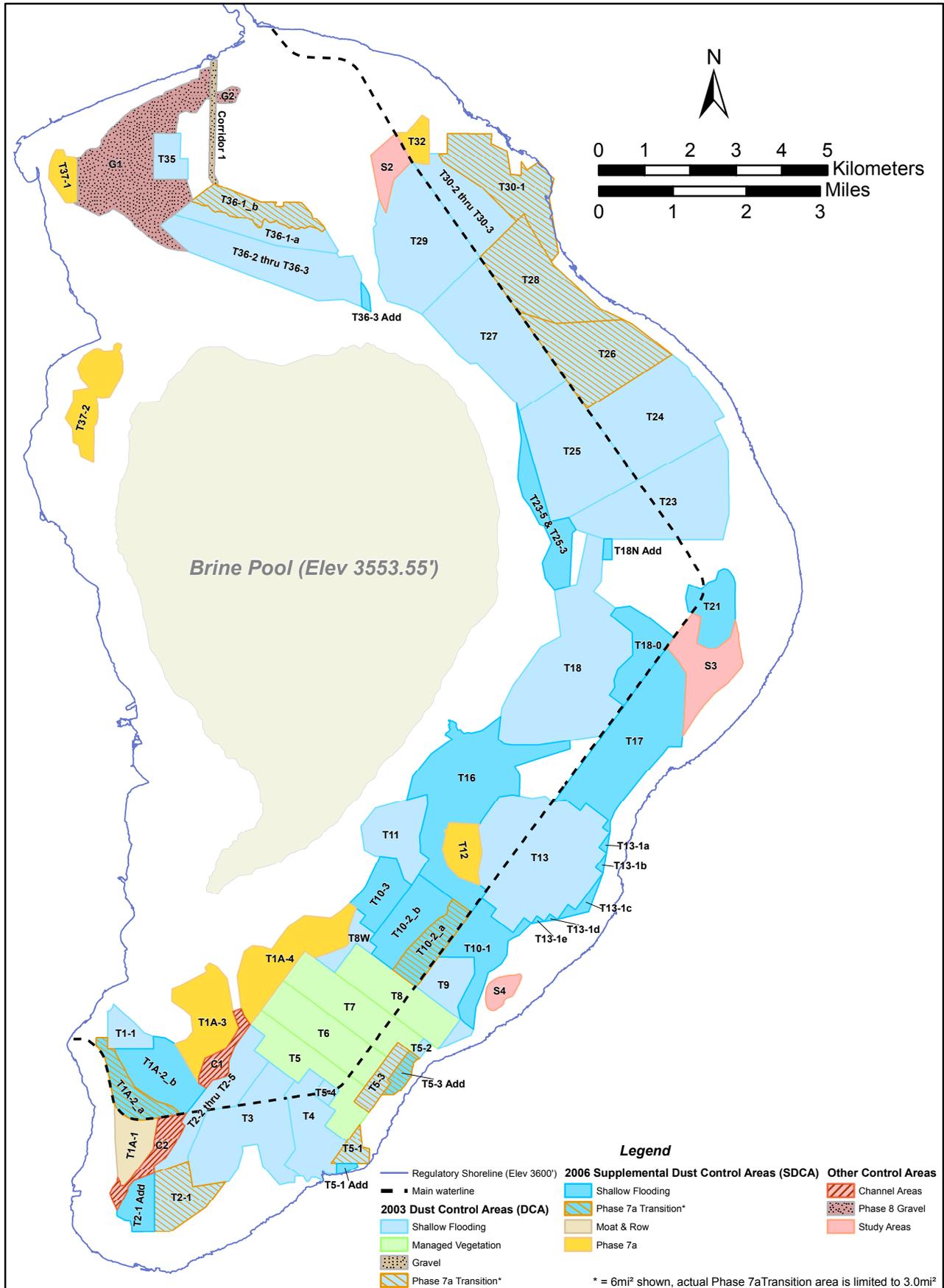
Attachment A 2006 Settlement Agreement between the Great Basin Unified Air Pollution Control District and the City of Los Angeles

Attachment B 2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure

Attachment C 2008 Owens Lake Dust Source Identification Program Protocol

Attachment D 2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area

# Exhibit 1 - Map and Coordinates of PM10 Control Areas



# Exhibit 1 - Coordinates of PM10 Control Areas

## Area Summary

### PM10 Control Areas

2003 DCA	Sq Miles	2006 SDCA	Sq Miles	Other Controls	Sq Miles
Corridor 1	0.1370	T1A-1	0.3883	C1 (Channel)	0.2075
T1-1	0.2421	T1A-2_a	0.3989	C2 (Channel)	0.2972
T2-1	0.5206	T1A-2_b	0.6929	G1 (Gravel)	1.9565
T2-2 thru T2-5	0.7123	T1A-3	0.7850	G2 (Gravel)	0.0581
T3	1.4534	T1A-4	0.9618	S2 (Study)	0.2790
T4	0.7416	T2-1 Add	0.2916	S3 (Study)	0.7210
T5	0.8429	T5-1 Add	0.0310	S4 (Study)	0.1488
T5-1	0.1351	T5-3 Add	0.1225		
T5-2	0.0310	T10-1	0.6993		
T5-3	0.2209	T10-2_a	0.4419		
T5-4	0.0625	T10-2_b	0.6442		
T6	0.8745	T10-3	0.4386		
T7	0.9370	T12	0.3428		
T8	0.8742	T13-1a	0.0153		
T8W	0.2084	T13-1b	0.0155		
T9	0.4575	T13-1c	0.0784		
T11	0.6747	T13-1d	0.0078		
T13	2.4578	T13-1e	0.0076		
T18	2.6728	T16	1.9875		
T23	1.8524	T17	1.7604		
T24	1.7643	T18-0	0.5290		
T25	1.6857	T18N Add	0.0333		
T26	1.3301	T21	0.4944		
T27	1.7861	T23-5 & T25-3	0.5717		
T28	1.1774	T32	0.1755		
T29	1.7510	T36-3 Add	0.0325		
T30-1	1.0815	T37-1	0.2146		
T30-2 thru T30-3	0.7634	T37-2	0.5903		
T35	0.2559				
T36-1-a	0.5256				
T36-1_b	0.4831				
T36-2 thru T36-3	1.3981				

**2003 DCA**

**Total** 30.11104 miles<sup>2</sup>

**2006 SDCA**

**Total** 12.75245 miles<sup>2</sup>

**Channel Areas**

**Total** 0.50469 miles<sup>2</sup>

**Phase 8 Gravel**

**Total** 2.01458 miles<sup>2</sup>

**Study Areas**

**Total** 1.14875 miles<sup>2</sup>

**Exhibit 1 - Coordinates of PM10 Control Areas**

Area / ID 2003 DCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)		Area / ID 2003 DCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)			
		X-coordinates	Y_coordinates			X-coordinates	Y_coordinates		
Corridor 1	0.1370	411,404.1637	4,041,882.1942	T3	1.4534	413,074.9993	4,020,946.8083		
		411,328.7980	4,041,911.0091			413,096.9447	4,020,800.0171		
		411,307.5628	4,041,894.7186			412,857.9724	4,020,476.5179		
		411,206.9290	4,042,044.9075			412,906.4567	4,020,440.6744		
		411,237.3205	4,043,740.6607			413,034.4897	4,020,346.0780		
		411,250.0279	4,044,449.6939			413,216.5995	4,020,220.4048		
		411,252.3971	4,044,581.8872			413,090.0414	4,020,217.8291		
		411,297.8028	4,044,632.7570			413,082.4137	4,020,077.9380		
		411,393.9218	4,044,623.3657			412,973.9179	4,020,085.6761		
		411,326.8256	4,042,108.9708			412,756.6975	4,020,031.3975		
		411,411.9449	4,041,944.4412			412,608.0432	4,020,197.5292		
		411,404.1637	4,041,882.1942			412,389.2662	4,020,442.0285		
						412,281.9783	4,020,866.6437		
						412,270.9733	4,020,910.1986		
T1-1	0.2421	410,001.3479	4,023,280.2990			411,937.4110	4,020,860.1271		
		410,002.3580	4,023,206.9595			411,952.8142	4,020,757.8941		
		410,005.2363	4,022,997.9711			411,890.5687	4,020,548.9971		
		409,150.1396	4,022,999.8884			411,835.6901	4,020,364.6351		
		408,999.6293	4,023,000.2258			411,644.0866	4,020,105.5040		
		409,002.0721	4,023,249.9209			411,579.3994	4,020,095.6486		
		409,002.6986	4,023,313.7804			411,246.3282	4,020,045.5553		
		409,007.7806	4,023,833.1024			410,856.3054	4,019,986.9089		
		409,051.0269	4,023,839.2045			410,764.8535	4,020,543.1808		
		409,110.9082	4,023,908.2518			410,750.1808	4,020,640.9787		
		409,130.6312	4,023,981.8092			410,911.0799	4,021,031.0051		
		409,555.1195	4,023,595.2654			411,171.1912	4,021,661.1653		
		409,806.6814	4,023,351.0115			411,449.4651	4,021,702.9848		
		410,001.3479	4,023,280.2990			411,604.4684	4,021,726.2842		
				411,753.6515	4,021,748.6529				
T2-1	0.5206	411,579.3994	4,020,095.6486			411,802.8532	4,021,756.0717		
		411,149.7636	4,019,542.1549			411,848.2994	4,021,817.5154		
		410,360.7181	4,019,008.5005			412,041.9403	4,022,079.6437		
		410,025.1591	4,019,002.0354			412,090.5723	4,022,145.4802		
		410,021.5195	4,020,289.5251			412,280.9151	4,022,403.1215		
		410,764.8535	4,020,543.1808			412,520.0138	4,022,726.6285		
		410,856.3054	4,019,986.9089			412,843.4972	4,022,487.5883		
		411,246.3282	4,020,045.5553			413,088.6035	4,022,306.4585		
		411,579.3994	4,020,095.6486			412,849.6316	4,021,982.9620		
						412,928.1826	4,021,923.8598		
						413,012.4600	4,021,362.4642		
						413,055.0876	4,021,078.5086		
						413,074.9993	4,020,946.8083		
T2-2 thru T2-5	0.7123	410,764.8535	4,020,543.1808	T4	0.7416				
		410,021.5195	4,020,289.5251					413,729.5137	4,022,333.1287
		410,015.7153	4,020,454.4270					413,490.4317	4,022,009.5808
		410,264.9378	4,020,620.1863					413,652.2147	4,021,890.0650
		410,488.7112	4,020,946.6551					413,814.0009	4,021,770.5574
		410,592.4067	4,021,145.4323					413,975.7851	4,021,651.0243
		410,686.3969	4,021,329.2488					413,741.0231	4,021,324.3436
		410,604.9139	4,021,412.4751					413,898.4688	4,021,208.0224
		410,723.1430	4,021,595.2150					414,222.0726	4,020,969.0150
		410,772.2220	4,021,661.6656					414,160.6092	4,020,885.8261
		410,794.5608	4,021,690.3325					413,982.9758	4,020,645.4436
		411,069.6619	4,022,043.1456					413,893.6355	4,020,524.5934
		411,151.2016	4,022,147.9844					413,877.7052	4,020,502.9468
		411,290.0657	4,022,321.4651					414,001.4695	4,020,502.4758
		411,421.1708	4,022,347.8283					414,001.2533	4,020,257.4915
		411,641.2736	4,022,435.1011					413,893.7745	4,020,264.7699
		411,645.2720	4,022,735.1098					413,767.6592	4,020,273.3310
		411,702.1375	4,022,877.2132					413,695.4389	4,020,332.7395
		411,780.3515	4,023,076.2456					413,677.0551	4,020,225.3030
		411,853.5786	4,023,178.4492					413,700.3399	4,020,128.3549
		411,898.3534	4,023,239.0517					413,627.7543	4,020,158.1265
		412,114.1288	4,023,531.1972					413,549.0822	4,020,190.3946
		412,159.2499	4,023,493.2116					413,490.8659	4,020,190.3962
		412,237.2383	4,023,435.6152					413,444.3883	4,020,190.3975
		412,435.5486	4,023,289.1826					413,424.8082	4,020,157.2395
		412,327.9694	4,023,143.6398					413,385.0218	4,020,104.3834
		412,269.0657	4,023,063.9330					413,343.6338	4,020,101.2053
		412,196.4642	4,022,965.6545					413,266.1224	4,020,221.4128
		412,264.8371	4,022,915.1168					413,216.5995	4,020,220.4048
		412,292.7693	4,022,894.4741					413,034.4897	4,020,346.0780
		412,520.0138	4,022,726.6285					412,906.4567	4,020,440.6744
		412,280.9151	4,022,403.1215					412,857.9724	4,020,476.5179
		412,090.5723	4,022,145.4802					413,096.9447	4,020,800.0171
		412,041.9403	4,022,079.6437					413,074.9993	4,020,946.8083
		411,848.2994	4,021,817.5154					413,055.0876	4,021,078.5086
		411,802.8532	4,021,756.0717					413,012.4600	4,021,362.4642
		411,753.6515	4,021,748.6529					412,928.1826	4,021,923.8598
		411,604.4684	4,021,726.2842					412,849.6316	4,021,982.9620
		411,449.4651	4,021,702.9848					413,088.6035	4,022,306.4585
		411,171.1912	4,021,661.1653					413,166.9434	4,022,248.5872
410,911.0799	4,021,031.0051			413,406.0618	4,022,572.1831				
410,750.1808	4,020,640.9787			413,729.5137	4,022,333.1287				
410,764.8535	4,020,543.1808								

**Exhibit 1 - Coordinates of PM10 Control Areas**

Area / ID 2003 DCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)		Area / ID 2003 DCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)	
		X-coordinates	Y_coordinates			X-coordinates	Y_coordinates
T5	0.8429	414,615.6262	4,022,178.5720	T5-4	0.0625	413,814.0009	4,021,770.5574
		414,426.4783	4,021,922.6108			413,652.2147	4,021,890.0650
		414,376.5555	4,021,855.0570			413,490.4317	4,022,009.5808
		414,700.1075	4,021,616.0524			413,729.5137	4,022,333.1287
		414,505.9987	4,021,353.3100			414,053.0895	4,022,094.0927
		414,461.0480	4,021,292.4897			413,931.8875	4,021,930.0605
		414,222.0726	4,020,969.0150			413,865.8579	4,021,840.7154
		413,898.4688	4,021,208.0224			413,814.0009	4,021,770.5574
		413,741.0231	4,021,324.3436				
		413,975.7851	4,021,651.0243				
		413,814.0009	4,021,770.5574				
		413,865.8579	4,021,840.7154				
		413,931.8875	4,021,930.0605				
		414,053.0895	4,022,094.0927				
		413,729.5137	4,022,333.1287				
		413,406.0618	4,022,572.1831				
		413,166.9434	4,022,248.5872				
		413,088.6035	4,022,306.4585				
		412,843.4972	4,022,487.5883				
		412,520.0138	4,022,726.6285				
		412,292.7693	4,022,894.4741				
		412,264.8371	4,022,915.1168				
		412,196.4642	4,022,965.6545				
		412,269.0657	4,023,063.9330				
		412,327.9694	4,023,143.6398				
		412,435.5486	4,023,289.1826				
		412,237.2383	4,023,435.6152				
		412,159.2499	4,023,493.2116				
		412,114.1288	4,023,531.1972				
		412,316.2796	4,023,804.5494				
		412,351.0895	4,023,851.6783				
		412,674.5366	4,023,612.7141				
		412,997.9834	4,023,373.7502				
		413,321.5800	4,023,134.6691				
413,645.0264	4,022,895.7058						
413,968.6226	4,022,656.6253						
414,292.0677	4,022,417.6245						
414,615.6262	4,022,178.5720						
T5-1	0.1351	414,429.2165	4,020,500.8382	T6	0.8745	415,093.6715	4,022,825.5607
		414,232.1268	4,020,501.5982			414,854.5912	4,022,502.0156
		414,001.4695	4,020,502.4758			414,615.6262	4,022,178.5720
		413,877.7052	4,020,502.9468			414,292.0677	4,022,417.6245
		413,893.6355	4,020,524.5934			413,968.6226	4,022,656.6253
		413,982.9758	4,020,645.4436			413,645.0264	4,022,895.7058
		414,160.6092	4,020,885.8261			413,321.5800	4,023,134.6691
		414,222.0726	4,020,969.0150			412,997.9834	4,023,373.7502
		414,461.0480	4,021,292.4897			412,674.5366	4,023,612.7141
		414,505.9987	4,021,353.3100			412,351.0895	4,023,851.6783
		414,557.3614	4,020,853.0235			412,292.7693	4,023,908.6402
		414,632.3454	4,020,832.6501			412,590.0541	4,024,175.1253
		414,717.5371	4,020,809.5032			412,716.3209	4,024,345.9798
		414,704.8599	4,020,499.7994			412,829.1735	4,024,498.6832
		414,429.2165	4,020,500.8382			413,152.4691	4,024,259.7978
						413,475.9145	4,024,020.7953
						413,799.5105	4,023,781.7139
						414,122.9555	4,023,542.7119
		414,446.5511	4,023,303.6311				
		414,770.1473	4,023,064.5885				
		415,093.6715	4,022,825.5607				
T5-2	0.0310	416,056.8587	4,023,113.9676	T7	0.9370	413,520.9060	4,024,987.7652
		415,815.3044	4,022,792.4623			413,630.5473	4,024,906.7558
		415,704.1714	4,022,874.5914			413,705.0932	4,024,851.6720
		415,656.1628	4,022,910.0892			413,813.9702	4,024,771.2201
		415,895.2471	4,023,233.5923			413,954.0157	4,024,667.7535
		416,056.8587	4,023,113.9676			414,277.5935	4,024,428.7162
T5-3	0.2209					414,601.0379	4,024,189.7139
		415,580.7123	4,022,964.7690	414,924.6337	4,023,950.6707		
		415,520.5385	4,022,883.3346	415,248.2293	4,023,711.6277		
		415,380.8866	4,022,694.3156	415,571.8247	4,023,472.5851		
		415,192.7623	4,022,439.6891	415,895.2471	4,023,233.5923		
		415,127.4250	4,022,351.2549	415,656.1628	4,022,910.0892		
		415,106.6479	4,022,323.0048	415,622.4090	4,022,934.9994		
		415,148.1754	4,022,285.3898	415,580.7123	4,022,964.7690		
		415,178.1077	4,022,263.0525	415,453.5288	4,023,059.7725		
		415,146.6854	4,022,220.5223	415,332.6768	4,023,149.0322		
		414,989.6965	4,022,007.9919	415,093.6715	4,022,825.5607		
		414,750.3341	4,021,684.0582	414,770.1473	4,023,064.5885		
		414,446.5511	4,023,303.6311				
		414,122.9555	4,023,542.7119				
		413,799.5105	4,023,781.7139				
		413,475.9145	4,024,020.7953				
		413,152.4691	4,024,259.7978				
		412,829.1735	4,024,498.6832				
		413,005.9543	4,024,737.9616				
		413,068.1384	4,024,822.1295				
		413,307.2567	4,025,145.6105				
		413,520.9060	4,024,987.7652				
T8	0.8742					414,755.6684	4,025,075.7084
						414,987.6679	4,024,904.2813
						415,079.1212	4,024,836.7146
						415,225.2485	4,024,728.7512
						415,402.7156	4,024,597.6328
						415,721.8772	4,024,363.7439
						416,049.7522	4,024,119.5115
						416,373.1960	4,023,880.5480
						416,696.6388	4,023,641.5466
						416,457.6759	4,023,318.1030
						416,213.7556	4,022,998.2673
						416,081.2099	4,023,096.2253
						416,056.8587	4,023,113.9676
						415,895.2471	4,023,233.5923
						415,571.8247	4,023,472.5851
						415,248.2293	4,023,711.6277
						414,924.6337	4,023,950.6707
						414,601.0379	4,024,189.7139
				414,277.5935	4,024,428.7162		
				413,954.0157	4,024,667.7535		
				414,117.8568	4,024,889.3542		
				414,193.0965	4,024,991.1381		

## Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID 2003 DCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)		Area / ID 2003 DCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)	
		X-coordinates	Y_coordinates			X-coordinates	Y_coordinates
T8 <i>continued</i>	0.8742	414,365.0268	4,025,223.8960	T11 <i>continued</i>	0.6747	415,815.0825	4,027,594.0878
		414,432.1019	4,025,314.6897			415,819.5445	4,027,506.2313
		414,755.6684	4,025,075.7084			415,821.2552	4,027,472.5544
T8W	0.2084	414,714.1101	4,025,356.9862	T13	2.4578	415,829.9319	4,027,301.7159
		414,875.1490	4,025,237.4744			415,955.5124	4,027,208.8937
		414,828.4698	4,025,174.2710			416,016.5518	4,027,163.7735
		414,755.6684	4,025,075.7084			417,985.8356	4,028,530.6268
		414,432.1019	4,025,314.6897			418,270.9212	4,028,479.7746
		414,365.0268	4,025,223.8960			418,552.1861	4,028,522.0171
		414,348.6477	4,025,201.7221			418,641.0131	4,028,456.3877
		414,193.0965	4,024,991.1381			418,725.6089	4,028,396.0970
		414,117.8568	4,024,889.3542			418,940.0949	4,028,435.3170
		413,954.0157	4,024,667.7535			418,994.5143	4,028,445.2593
		413,813.9702	4,024,771.2201			419,318.0047	4,028,206.2594
		413,705.0932	4,024,851.6720			419,437.6778	4,028,367.7751
		413,630.5473	4,024,906.7558			419,922.7917	4,028,009.4868
		413,520.9060	4,024,987.7652			419,803.4484	4,027,847.6038
		414,210.4545	4,025,245.9289			419,853.4559	4,027,810.6655
		414,234.5783	4,025,278.7465			419,964.9561	4,027,727.9417
		414,237.4033	4,025,282.6518			419,815.0913	4,027,525.2967
		414,265.6270	4,025,321.6698			419,726.2673	4,027,404.5246
		414,260.7145	4,025,375.7116			419,887.7273	4,027,284.9795
		414,249.7773	4,025,496.0299			419,648.9217	4,026,961.5818
		414,253.5442	4,025,523.3931			419,810.2777	4,026,841.6888
		414,275.2628	4,025,680.9863			419,748.5558	4,026,757.6663
		414,383.8825	4,025,998.0971			419,525.0923	4,026,455.4515
414,433.1201	4,026,063.8621	419,499.4993	4,026,420.9158				
414,628.9092	4,025,919.5013	419,206.2888	4,026,038.3123				
414,592.2070	4,025,869.8256	419,051.1767	4,026,152.9153				
414,509.4040	4,025,757.7501	418,944.5404	4,026,008.5914				
414,573.9046	4,025,710.0958	418,812.4327	4,025,829.9087				
414,832.3590	4,025,517.9893	418,650.4050	4,025,948.9162				
414,714.1101	4,025,356.9862	418,530.6017	4,025,787.6073				
T9	0.4575	416,987.0241	4,023,427.0505	418,369.1355	4,025,906.6762		
		416,933.0673	4,023,305.0811	418,250.0503	4,025,745.2361		
		416,213.7556	4,022,998.2673	418,087.8706	4,025,864.4329		
		416,457.6759	4,023,318.1030	417,965.0399	4,025,698.1844		
		416,696.6388	4,023,641.5466	417,848.8505	4,025,540.9244		
		416,373.1960	4,023,880.5480	417,363.5983	4,025,899.4766		
		416,049.7522	4,024,119.5115	417,483.0867	4,026,061.2172		
		415,721.8772	4,024,363.7439	417,366.8592	4,026,147.0905		
		415,752.1670	4,024,382.2273	417,170.2116	4,026,293.6483		
		415,795.7936	4,024,428.4142	417,289.1233	4,026,454.5769		
		416,222.2418	4,025,004.5422	417,122.8974	4,026,577.3922		
		416,423.1407	4,025,002.1395	417,084.2094	4,026,850.3179		
		416,999.8010	4,024,996.4655	417,168.0579	4,027,307.0306		
		417,001.1420	4,024,947.4364	417,084.6434	4,027,863.9835		
		417,009.4547	4,024,643.4367	417,123.5860	4,027,916.7887		
		416,773.5777	4,024,179.3379	417,149.3087	4,027,977.2199		
		416,740.4644	4,024,114.1911	417,545.6899	4,028,513.6273		
		416,644.2056	4,023,924.8115	417,827.9025	4,028,557.0432		
		416,681.7283	4,023,739.4429	417,876.9859	4,028,548.4822		
		416,700.3078	4,023,672.4212	417,985.8356	4,028,530.6268		
		416,724.9459	4,023,638.9524	418,383.2186	4,029,647.0736		
		416,791.8080	4,023,571.3270	418,130.4116	4,029,646.0180		
		416,987.0241	4,023,427.0505	417,852.8347	4,029,647.5471		
T11	0.6747	416,016.5518	4,027,163.7735	417,771.7107	4,029,657.7122		
		415,892.7261	4,026,970.7408	417,699.9538	4,029,667.9768		
		415,850.0994	4,026,904.2900	417,653.3789	4,029,674.6593		
		415,790.4216	4,026,811.2579	417,521.5049	4,029,776.4691		
		415,677.0319	4,026,634.4934	417,581.9086	4,030,267.7438		
		415,640.1630	4,026,578.7438	417,605.6678	4,030,460.9564		
		415,466.7219	4,026,708.6624	417,838.7772	4,030,929.0825		
		415,340.1072	4,027,066.6946	418,459.9718	4,031,788.9629		
		415,303.7796	4,027,171.2685	418,889.1261	4,032,024.0241		
		415,233.1529	4,027,179.3891	418,754.0253	4,033,026.4824		
		415,156.5509	4,027,188.1773	419,084.1419	4,033,110.8123		
		414,946.8125	4,027,212.2390	419,239.5306	4,033,150.5146		
		414,829.7448	4,027,225.6694	419,365.9142	4,033,768.8440		
		414,704.5839	4,027,293.5349	419,466.7915	4,034,261.8713		
		414,603.3991	4,027,348.4000	419,496.3620	4,034,252.3887		
		414,525.4449	4,027,872.6930	419,832.6228	4,034,141.1372		
		414,845.5480	4,028,265.1622	419,802.4606	4,033,687.7767		
		415,530.3795	4,028,446.4469	419,771.8711	4,033,218.0199		
		415,969.6875	4,028,562.7110	419,606.1581	4,032,994.4388		
		415,987.3754	4,028,348.7866	419,929.6631	4,032,755.4136		
		415,812.0017	4,027,654.7769	420,091.3942	4,032,635.9359		
				419,976.1285	4,032,480.3898		
				420,133.8016	4,032,354.8284		

## Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID 2003 DCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)		Area / ID 2003 DCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)	
		X-coordinates	Y_coordinates			X-coordinates	Y_coordinates
T18 <i>continued</i>	2.6728	420,425.7541	4,032,122.7085	T27 <i>continued</i>	1.7861	417,255.4209	4,040,111.6752
		420,448.8685	4,032,104.3398			417,959.0480	4,039,116.3619
		420,460.8875	4,031,607.1656				
		420,174.1314	4,031,339.0630	T28	1.1774		
		420,132.5084	4,031,300.4919			420,260.2740	4,038,939.6141
		420,102.1497	4,031,215.3678			418,789.3715	4,038,860.6801
		420,051.6551	4,031,073.7611			417,959.0480	4,039,116.3619
		420,067.1527	4,030,907.7868			417,255.4209	4,040,111.6752
		419,953.0593	4,030,737.6865			417,121.6189	4,040,304.5343
		420,100.9126	4,030,629.4127			417,473.8189	4,040,647.9564
		420,270.2682	4,030,504.5926			417,921.3802	4,041,084.8832
		420,257.4813	4,030,470.7618			418,093.9730	4,041,254.0466
		419,822.9960	4,029,884.0794			418,155.9146	4,041,076.4185
		419,798.7906	4,029,851.3951			418,687.1386	4,040,203.3590
		419,084.5984	4,029,747.7702			418,733.7251	4,040,126.7522
		418,383.2186	4,029,647.0736			418,872.7825	4,039,997.9387
						419,760.8752	4,039,175.2704
						420,260.2740	4,038,939.6141
T23	1.8524	422,559.8892	4,034,701.7965	T29	7.7510		
		422,429.2563	4,034,127.0388			416,435.5451	4,041,276.9560
		421,482.5827	4,034,132.2129			417,121.6189	4,040,304.5343
		420,004.5740	4,034,139.6849			416,658.3540	4,039,852.3712
		419,832.6228	4,034,141.1372			416,323.1348	4,039,525.0305
		419,496.3620	4,034,252.3887			415,933.4067	4,039,143.8996
		419,466.7915	4,034,261.8713			415,865.4763	4,039,054.8651
		419,223.1494	4,034,342.8214			415,536.0232	4,039,224.5107
		419,188.9454	4,034,400.9790			415,102.2160	4,039,351.9435
		419,064.9605	4,034,610.8361			414,905.7226	4,039,737.5501
		420,562.6228	4,035,433.5165			414,921.1090	4,039,918.0500
		422,377.3155	4,036,418.9679			414,927.2536	4,039,990.1326
		422,544.4991	4,036,065.0490			414,931.2068	4,040,036.5085
		422,546.3765	4,035,898.7421			414,921.7343	4,040,096.5239
		422,559.8892	4,034,701.7965			414,906.2118	4,040,194.8691
						414,894.9833	4,040,266.0091
T24	1.7643	421,672.5269	4,037,910.9745			414,848.0568	4,040,379.0156
		421,775.5115	4,037,695.3944			414,814.5852	4,040,750.8719
		421,815.4472	4,037,708.0811			414,797.1740	4,040,944.3347
		422,114.0386	4,037,354.1188			414,835.3793	4,040,983.9777
		422,305.0531	4,037,054.4244			414,873.5845	4,041,023.6206
		422,453.6130	4,036,821.3405			414,850.9250	4,041,058.2850
		422,237.3513	4,036,716.5520			414,828.2654	4,041,092.9493
		422,377.3155	4,036,418.9679			414,928.6584	4,041,572.8182
		420,562.6228	4,035,433.5165			415,073.9313	4,041,276.5424
		419,459.5560	4,036,993.8362			415,237.3285	4,041,985.5193
		421,317.9300	4,038,183.2674			415,630.5647	4,042,376.1020
		421,672.5269	4,037,910.9745			415,655.6659	4,042,384.0795
						416,435.5451	4,041,276.9560
T25	1.6857	419,064.9605	4,034,610.8361	T30-1	1.0815		
		418,665.8457	4,034,527.9245			418,687.1386	4,040,203.3590
		418,192.9713	4,036,174.1094			418,155.9146	4,041,076.4185
		417,974.8683	4,036,933.5367			418,093.9730	4,041,254.0466
		419,017.0594	4,037,619.7626			417,921.3802	4,041,084.8832
		419,459.5560	4,036,993.8362			417,171.9137	4,041,828.3044
		420,562.6228	4,035,433.5165			416,322.8671	4,042,382.8026
		419,064.9605	4,034,610.8361			416,237.8729	4,042,517.5607
						416,238.8166	4,042,563.7458
						416,413.8960	4,042,560.2618
T26	1.3301	420,260.2740	4,038,939.6141			416,415.9268	4,043,001.9282
		420,448.8516	4,038,850.6281			417,384.3152	4,042,993.4517
		421,317.9300	4,038,183.2674			417,370.6762	4,042,778.5344
		419,459.5560	4,036,993.8362			417,719.8507	4,042,619.4658
		419,017.0594	4,037,619.7626			417,792.5767	4,042,117.6796
		417,959.0480	4,039,116.3619			418,026.3192	4,042,090.2555
		418,789.3715	4,038,860.6801			418,032.4649	4,042,385.2584
		420,260.2740	4,038,939.6141			418,154.9595	4,042,206.3723
						418,410.5623	4,042,382.5975
						418,608.9968	4,042,170.9490
						418,642.6771	4,042,098.0531
						418,743.9293	4,042,022.1567
						418,637.1570	4,041,594.2678
						418,746.9274	4,040,943.5424
						418,839.1598	4,040,396.7884
						418,687.1386	4,040,203.3590
T27	1.7861	417,959.0480	4,039,116.3619				
		419,017.0594	4,037,619.7626				
		417,974.8683	4,036,933.5367				
		417,924.4340	4,037,108.4563				
		417,056.7418	4,037,995.5171				
		416,908.7138	4,037,982.5250				
		416,631.9746	4,038,195.4231				
		416,422.7260	4,038,451.3374				
		416,046.9016	4,038,858.3728				
		415,865.4763	4,039,054.8651				
		415,933.4067	4,039,143.8996				
		416,323.1348	4,039,525.0305				
		416,658.3540	4,039,852.3712				
		417,121.6189	4,040,304.5343				

## Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID 2003 DCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)		Area / ID 2003 DCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)	
		X-coordinates	Y_coordinates			X-coordinates	Y_coordinates
T30-2 thru T30-3	0.7634	416,322.8671	4,042,382.8026	T36-1-b	0.4831	411,404.1637	4,041,882.1942
		417,171.9137	4,041,828.3044			412,344.1688	4,041,513.1631
		417,921.3802	4,041,084.8832			412,682.1021	4,041,508.1389
		417,473.8189	4,040,647.9564			412,652.1923	4,041,436.0645
		417,121.6189	4,040,304.5343			412,690.1314	4,041,406.0416
		416,435.5451	4,041,276.9560			412,833.6710	4,041,412.9149
		415,655.6659	4,042,384.0795			412,841.4082	4,041,505.7657
		415,692.3612	4,042,371.6124			413,191.4978	4,041,500.2871
		415,869.3630	4,042,338.0433			413,241.1227	4,041,488.5169
		416,015.9120	4,042,330.2460			413,443.2128	4,041,269.5238
		416,020.8582	4,042,568.1991			413,478.6456	4,041,158.2255
		416,238.8166	4,042,563.7458			413,561.2523	4,041,141.5984
		416,237.8729	4,042,517.5607			413,723.0869	4,040,965.9151
		416,322.8671	4,042,382.8026			413,750.7680	4,040,919.5075
T35	0.2559					413,728.4917	4,040,901.9263
		410,756.1353	4,042,245.4528			413,680.6972	4,040,859.3622
		410,754.6508	4,042,002.5380			413,584.8942	4,040,925.0172
		410,723.8358	4,042,002.5739			413,418.4792	4,040,978.7387
		410,000.0033	4,042,003.4174			413,361.1248	4,040,959.8278
		410,001.6954	4,042,464.1381			413,303.6310	4,040,934.2185
		410,003.7039	4,043,010.8326			413,233.7158	4,040,955.7766
		410,268.6279	4,043,005.6231			413,182.8508	4,040,926.6789
		410,493.9516	4,043,001.1922			413,108.8898	4,040,914.8146
		410,599.0285	4,042,999.1260			413,026.3440	4,040,973.4927
		410,587.3545	4,042,696.5372			413,008.9013	4,040,940.3492
		410,577.9311	4,042,452.2776			412,965.2921	4,040,937.9055
		410,757.3767	4,042,448.5842			412,892.5848	4,040,986.3270
		410,756.1353	4,042,245.4528			412,809.5514	4,041,021.5608
T36-1-a	0.5256					412,733.0771	4,041,049.9567
		413,750.7680	4,040,919.5075			412,683.9537	4,041,104.5889
		414,039.1683	4,040,436.0033			412,649.6953	4,041,068.4443
		414,010.8260	4,040,412.9166			412,592.6194	4,041,062.9304
		413,965.4168	4,040,383.7884			412,538.8232	4,041,053.9974
		412,673.7969	4,040,565.9749			412,482.7924	4,041,098.7215
		410,453.6629	4,041,239.6583			412,446.7174	4,041,136.3291
		410,825.3880	4,041,524.8233			412,399.2015	4,041,107.1616
		410,846.2711	4,041,514.7386			412,370.0391	4,040,993.8458
		410,992.7310	4,041,468.1333			412,352.3875	4,040,950.6544
		411,055.8087	4,041,440.0159			412,288.6829	4,040,948.6289
		411,135.8416	4,041,421.5977			412,245.9095	4,040,986.3758
		411,183.1486	4,041,440.7177			412,184.0859	4,041,074.7789
		411,235.6910	4,041,389.3648			412,161.7561	4,041,128.8540
		411,274.9063	4,041,341.6397			412,118.0073	4,041,119.7120
		411,347.5440	4,041,289.8688			412,071.8847	4,041,157.5286
		411,408.1782	4,041,305.3608			411,974.8273	4,041,162.8983
		411,518.4236	4,041,289.6650			411,804.2266	4,041,176.4989
		411,591.6884	4,041,268.0371			411,710.8667	4,041,198.5448
		411,660.8374	4,041,209.6374			411,660.8374	4,041,209.6374
		411,710.8667	4,041,198.5448			411,591.6884	4,041,268.0371
		411,804.2266	4,041,176.4989			411,518.4236	4,041,289.6650
		411,974.8273	4,041,162.8983			411,408.1782	4,041,305.3608
		412,071.8847	4,041,157.5286			411,408.1782	4,041,305.3608
		412,118.0073	4,041,119.7120			411,347.5440	4,041,289.8688
		412,161.7561	4,041,128.8540			411,274.9063	4,041,341.6397
		412,184.0859	4,041,074.7789			411,235.6910	4,041,389.3648
		412,245.9095	4,040,986.3758			411,183.1486	4,041,440.7177
		412,288.6829	4,040,948.6289			411,135.8416	4,041,421.5977
		412,352.3875	4,040,950.6544			411,055.8087	4,041,440.0159
		412,370.0391	4,040,993.8458			410,992.7310	4,041,468.1333
		412,399.2015	4,041,107.1616			410,926.2711	4,041,514.7386
		412,446.7174	4,041,136.3291			410,825.3880	4,041,524.8233
		412,482.7924	4,041,098.7215			410,857.4942	4,041,549.4532
		412,538.8232	4,041,053.9974			411,307.5628	4,041,894.7186
		412,592.6194	4,041,062.9304			411,328.7980	4,041,911.0091
		412,649.6953	4,041,068.4443	T36-2 thru T36-3	1.3981	411,404.1637	4,041,882.1942
		412,683.9537	4,041,104.5889			412,673.7969	4,040,565.9749
		412,733.0771	4,041,049.9567			413,965.4168	4,040,383.7884
		412,809.5514	4,041,021.5608			414,010.8260	4,040,412.9166
		412,892.5848	4,040,986.3270			414,002.9668	4,040,378.3377
		412,965.2921	4,040,937.9055			414,050.7092	4,040,298.5802
		413,008.9013	4,040,940.3492			414,211.1526	4,040,321.9816
		413,026.3440	4,040,973.4927			414,280.2236	4,040,319.3575
		413,108.8898	4,040,914.8146			414,347.5813	4,040,337.7609
		413,182.8508	4,040,926.6789			414,544.1961	4,039,918.4944
		413,233.7158	4,040,955.7766			414,532.4404	4,039,758.0190
		413,303.6310	4,040,934.2185			414,528.0492	4,039,697.5872
		413,361.1248	4,040,959.8278			414,537.5701	4,039,498.0063
		413,418.4792	4,040,978.7387			414,548.2365	4,039,274.9161
		413,584.8942	4,040,925.0172			414,550.5526	4,039,224.6348
		413,680.6972	4,040,859.3622			414,146.0294	4,039,386.3858
		413,728.4917	4,040,901.9263			413,592.7832	4,039,353.6958
		413,750.7680	4,040,919.5075			412,804.1591	4,039,650.8708
						412,039.2079	4,039,939.1253
						411,230.3923	4,040,243.9095

**Exhibit 1 - Coordinates of PM10 Control Areas**

Area / ID 2003 DCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)		Area / ID 2003 DCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)	
		X-coordinates	Y_coordinates			X-coordinates	Y_coordinates
T36-2 thru T36-3 <i>continued</i>	1.3981	410,766.2080	4,040,418.8272				
		410,754.5323	4,040,429.4164				
		410,132.6677	4,040,993.4098				
		410,453.6629	4,041,239.6583				
		412,673.7969	4,040,565.9749				



Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID 2006 SDCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)		Area / ID 2006 SDCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)	
		X-coordinates	Y_coordinates			X-coordinates	Y_coordinates
T1A-4	0.9618	414,433.1201	4,026,063.8621	T5-3 Add <i>continued</i>	0.1225	415,361.8634	4,022,096.6739
		414,383.8825	4,025,998.0971			415,302.8811	4,022,046.5389
		414,275.2628	4,025,680.9863			415,242.8901	4,022,005.1797
		414,253.5442	4,025,523.3931			414,989.6965	4,022,007.9919
		414,249.7773	4,025,496.0299			415,146.6854	4,022,220.5223
		414,260.7145	4,025,375.7116			415,178.1077	4,022,263.0525
		414,265.6270	4,025,321.6698			415,148.1754	4,022,285.3898
		414,234.5783	4,025,278.7465			415,106.6479	4,022,323.0048
		414,210.4545	4,025,245.9289			415,127.4250	4,022,351.2549
		413,520.9060	4,024,987.7652			415,192.7623	4,022,439.6891
		413,307.2567	4,025,145.6105			415,380.8866	4,022,694.3156
		413,068.1384	4,024,822.1295			415,520.5385	4,022,883.3346
		413,005.9543	4,024,737.9616			415,580.7123	4,022,964.7690
		412,829.1735	4,024,498.6832			415,622.4090	4,022,934.9994
		412,716.3209	4,024,345.9798			415,656.1628	4,022,910.0892
		412,590.0541	4,024,175.1253				
		412,393.1732	4,023,908.6402				
		412,351.0895	4,023,851.6783				
		412,316.2796	4,023,804.5494				
		412,114.1288	4,023,531.1972				
		411,987.3569	4,023,709.3450				
		411,915.0878	4,023,883.7727				
		411,828.1298	4,024,594.2291				
		411,987.9741	4,025,141.2709				
		412,161.8337	4,025,254.5966				
		412,387.4889	4,025,234.3186				
		412,577.2692	4,025,175.8075				
		412,752.8915	4,025,413.6926				
		412,942.5931	4,025,667.2112				
		413,140.6925	4,025,804.2789				
		413,273.7478	4,025,896.3417				
		413,298.0623	4,025,913.1653				
		413,700.6748	4,025,878.0963				
413,843.4527	4,025,859.0182						
413,892.4598	4,025,869.0491						
414,103.3906	4,026,021.7264						
414,280.6829	4,026,176.7292						
414,433.1201	4,026,063.8621						
T2-1 Add	0.2916	410,025.1591	4,019,002.0354	T10-1	0.6993	417,483.0867	4,026,061.2172
		409,535.8384	4,018,994.6572			417,363.5983	4,025,899.4766
		409,534.8572	4,019,112.7819			417,848.8505	4,025,540.9244
		409,493.9270	4,019,250.0862			417,965.0399	4,025,698.1844
		409,428.6436	4,019,253.2063			418,087.8706	4,025,864.4329
		409,374.7338	4,019,259.9508			418,250.0503	4,025,745.2361
		409,302.2554	4,019,299.7624			417,981.0900	4,025,483.1796
		409,272.1768	4,019,316.2843			417,862.3542	4,025,432.8305
		409,240.1576	4,019,333.8721			417,742.6529	4,025,357.7897
		409,207.4586	4,019,355.6851			417,731.0963	4,025,299.8718
		409,208.2558	4,019,473.1115			417,711.4790	4,025,042.9035
		409,435.8230	4,019,902.2959			417,596.8590	4,024,857.0344
		409,445.4661	4,019,983.4003			417,427.9719	4,024,735.2047
		409,576.6128	4,020,126.1299			417,308.1869	4,024,673.9089
		409,630.4774	4,020,144.7287			417,192.2023	4,024,288.3952
409,689.8168	4,020,165.2179	417,038.6920	4,023,907.3688				
410,021.5195	4,020,289.5251	416,987.0241	4,023,427.0505				
410,025.1591	4,019,002.0354	416,791.8080	4,023,571.3270				
T5-1 Add	0.0310	414,429.2165	4,020,500.8382	T10-2-a	0.4419	416,940.2572	4,025,981.7598
		414,464.0586	4,020,432.0182			416,222.2418	4,025,004.5422
		414,293.7162	4,020,338.7319			415,795.7936	4,024,428.4142
		414,135.9213	4,020,279.6763			415,752.1670	4,024,382.2273
		414,001.2533	4,020,257.4915			415,721.8772	4,024,363.7439
		414,001.4695	4,020,502.4758			415,402.7156	4,024,597.6328
		414,232.1268	4,020,501.5982			415,225.2485	4,024,728.7512
		414,429.2165	4,020,500.8382			415,320.9627	4,024,860.0799
						415,528.3940	4,025,157.8442
T5-3 Add	0.1225	415,656.1628	4,022,910.0892	T10-2-b	0.6442	416,940.2572	4,025,981.7598
		415,704.1714	4,022,874.5914			416,536.3813	4,026,273.1182
		415,815.3044	4,022,792.4623			416,536.3813	4,026,273.1182
		415,748.1977	4,022,764.6488			416,428.3778	4,026,108.0129
		415,699.5372	4,022,723.3612			416,428.3779	4,026,108.0129
		415,670.0461	4,022,679.1244			416,428.3779	4,026,037.7539
		415,672.9952	4,022,639.3114			416,428.3778	4,026,108.0129
		415,650.8768	4,022,577.3799			416,428.3779	4,026,037.7539
		415,643.2259	4,022,531.0919			416,408.3038	4,025,957.4580
		415,621.3856	4,022,398.9584			416,344.7363	4,025,907.2731
		415,574.1998	4,022,322.2813			416,257.7489	4,025,873.8164
		415,529.9630	4,022,266.2481			416,180.7986	4,025,810.2488
415,496.0482	4,022,202.8421	415,976.7131	4,025,619.5459				
415,434.1167	4,022,145.3343	415,715.7513	4,025,348.5469				
415,404.6256	4,022,093.7248	415,528.3940	4,025,157.8442				

## Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID 2006 SDCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)		Area / ID 2006 SDCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)	
		X-coordinates	Y_coordinates			X-coordinates	Y_coordinates
T10-2-b <i>continued</i>	0.6442	415,320.9627	4,024,860.0799	T13-1-d	0.0078	418,812.4327	4,025,829.9087
		415,225.2485	4,024,728.7512			418,720.4393	4,025,816.9724
		415,079.1212	4,024,836.7146			418,530.6017	4,025,787.6073
		414,987.6679	4,024,904.2813			418,650.4050	4,025,948.9162
		414,755.6684	4,025,075.7084			418,812.4327	4,025,829.9087
		414,828.4698	4,025,174.2710				
		414,875.1490	4,025,237.4744				
		414,714.1101	4,025,356.9862				
		414,832.3590	4,025,517.9893				
		415,640.1630	4,026,578.7438				
		415,677.0319	4,026,634.4934				
		415,790.4216	4,026,811.2579				
		416,536.3813	4,026,273.1182				
T10-3	0.4386	415,640.1630	4,026,578.7438	T16	1.9875	417,581.9086	4,030,267.7438
		414,832.3590	4,025,517.9893			417,521.5049	4,029,776.4691
		414,573.9046	4,025,710.0958			417,653.3789	4,029,674.6593
		414,509.4040	4,025,757.7501			417,699.9538	4,029,667.9768
		414,592.2070	4,025,869.8256			417,771.7107	4,029,657.7122
		414,628.9092	4,025,919.5013			417,852.8347	4,029,647.5471
		414,510.4174	4,026,006.8686			418,130.4116	4,029,646.0180
		414,433.1201	4,026,063.8621			418,383.2186	4,029,647.0736
		414,280.6829	4,026,176.7292			419,084.5984	4,029,747.7702
		414,294.0026	4,026,188.3743			419,093.6209	4,029,564.0366
		414,474.4641	4,026,371.4413			418,540.1609	4,029,396.3602
		414,574.5451	4,026,473.5791			418,492.0331	4,029,381.7793
		414,628.2736	4,026,552.7589			417,887.8942	4,029,186.5402
		414,946.8125	4,027,212.2390			418,000.2288	4,028,968.8521
		415,156.5509	4,027,188.1773			417,985.8356	4,028,530.6268
		415,233.1529	4,027,179.3891			417,876.9859	4,028,548.4822
		415,303.7796	4,027,171.2685			417,827.9025	4,028,557.0432
		415,340.0472	4,027,066.8674			417,545.6899	4,028,513.6273
		415,340.1072	4,027,066.6946			417,149.3087	4,027,977.2199
		415,466.7219	4,026,708.6624			417,123.5860	4,027,916.7887
		415,640.1630	4,026,578.7438			416,445.8246	4,027,952.8636
		416,412.4399	4,027,812.1367				
		416,356.7395	4,027,801.5013				
		416,380.4537	4,027,677.3045				
		416,307.8668	4,027,358.6501				
		416,425.8276	4,027,677.3045				
		416,674.9793	4,027,801.5013				
		417,122.8974	4,027,812.1367				
		417,122.8974	4,027,952.8636				
		417,289.1233	4,027,916.7887				
		417,170.2116	4,027,301.7159				
		416,940.2572	4,027,472.5544				
		416,536.3813	4,027,506.2313				
		415,790.4216	4,027,594.0878				
		415,850.0994	4,027,654.7769				
		415,892.7261	4,028,348.7866				
		416,016.5518	4,028,562.7110				
		415,955.5124	4,028,446.4469				
		415,829.9319	4,028,955.4660				
		415,821.2552	4,029,458.0553				
		415,819.5445	4,029,650.8434				
		415,815.0825	4,029,700.9180				
		415,812.0017	4,029,742.9928				
		415,987.3754	4,029,756.5417				
		415,969.6875	4,029,773.4766				
		415,530.3795	4,029,773.4985				
		415,660.2354	4,029,786.2637				
		416,062.8635	4,029,794.9004				
		416,338.7305	4,029,834.6543				
		416,414.3687	4,029,843.4570				
		416,477.5638	4,029,849.4766				
		416,497.9138	4,029,856.1563				
		416,520.7968	4,029,860.3105				
		416,520.8264	4,029,870.0703				
		416,501.9688	4,029,880.6270				
		416,489.6563	4,029,895.7617				
		416,430.1250	4,029,910.9023				
		416,415.3750	4,029,918.6621				
		416,400.7188	4,029,922.9727				
		416,387.3125	4,029,929.8086				
		416,372.5938	4,029,936.6543				
		416,368.5313	4,029,947.3340				
		416,375.7813					
		416,384.4688					
		416,385.5313					
		416,395.3125					
		416,406.0625					
		416,419.9063					
		416,435.1563					
		416,449.2500					

## Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID 2006 SDCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)		Area / ID 2006 SDCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)	
		X-coordinates	Y_coordinates			X-coordinates	Y_coordinates
T16 <i>continued</i>	1.9875	416,459.1250	4,029,961.2246	T17 <i>continued</i>	1.7604	419,922.7917	4,028,009.4868
		416,462.9688	4,029,976.8418			419,437.6778	4,028,367.7751
		416,471.5625	4,029,988.3965			419,318.0047	4,028,206.2594
		416,481.0000	4,029,994.3359			418,994.5143	4,028,445.2593
		416,483.2500	4,030,000.4590			418,940.0949	4,028,435.3170
		416,476.4688	4,030,004.0684			418,725.6089	4,028,396.0970
		416,464.6250	4,030,013.5332			418,756.9252	4,028,433.4718
		416,452.1250	4,030,020.7266			419,406.8125	4,029,323.4179
		416,447.3125	4,030,031.0762			419,775.3475	4,029,819.8899
		416,454.8750	4,030,042.8809			419,798.7906	4,029,851.3951
		416,467.7500	4,030,052.9766			419,822.9960	4,029,884.0794
		416,466.0625	4,030,067.6035			420,257.4813	4,030,470.7618
		416,454.5313	4,030,077.5586			420,270.2682	4,030,504.5926
		416,440.6250	4,030,076.0938			420,395.6316	4,030,679.8608
		416,437.6250	4,030,084.6914			420,485.2029	4,030,805.0886
		416,445.8125	4,030,098.3496			420,995.8461	4,031,495.0314
		416,459.0313	4,030,110.6875			421,054.3411	4,031,574.3940
		416,465.9063	4,030,126.0488			421,209.7312	4,031,769.2300
		416,467.1563	4,030,142.7871			421,298.8678	4,031,663.9944
		416,461.5313	4,030,157.1523			421,331.5889	4,031,625.3209
		416,450.1563	4,030,168.0938			421,366.6346	4,031,583.9002
		416,439.0938	4,030,177.2402			421,439.1082	4,031,498.2427
		416,443.8750	4,030,188.7227			421,548.5165	4,031,333.2213
		416,458.4375	4,030,192.3809			421,631.0272	4,031,208.7695
		416,470.3125	4,030,190.8789			421,622.9727	4,031,054.6596
		416,479.0313	4,030,177.9727			421,571.8926	4,030,077.3204
		416,493.8125	4,030,171.2637			421,549.0082	4,029,833.7401
		416,510.6250	4,030,166.2656				
		416,527.2188	4,030,165.8828	T18-0	0.5290		
		416,541.7813	4,030,161.9238			421,209.7312	4,031,769.2300
		416,568.0625	4,030,143.3945			421,054.3411	4,031,574.3940
		416,585.0000	4,030,137.3281			420,995.8461	4,031,495.0314
		416,601.6250	4,030,130.7734			420,485.2029	4,030,805.0886
		416,608.7188	4,030,112.7188			420,395.6316	4,030,679.8608
		416,614.8750	4,030,093.7324			420,270.2682	4,030,504.5926
		416,614.1563	4,030,081.1367			420,100.9126	4,030,629.4127
		416,606.9688	4,030,057.0176			419,953.0593	4,030,737.6865
		416,610.2813	4,030,041.6328			420,067.1527	4,030,907.7868
		416,621.0313	4,030,029.7910			420,051.6551	4,031,073.7611
		416,626.8438	4,030,016.4492			420,102.1497	4,031,215.3678
		416,634.6563	4,030,003.4863			420,132.5084	4,031,300.4919
		416,639.6563	4,029,988.0273			420,174.1314	4,031,339.0630
		416,642.2500	4,029,973.2676			420,460.8875	4,031,607.1656
		416,656.7188	4,029,972.4727			420,448.8685	4,032,104.3398
		416,688.3750	4,029,977.5293			420,425.7541	4,032,122.7085
		416,704.9375	4,029,976.5762			420,133.8016	4,032,354.8284
		416,715.9688	4,029,964.5742			419,976.1285	4,032,480.3898
		416,723.1250	4,029,949.7949			420,091.3942	4,032,635.9359
		416,734.4688	4,029,937.7109			420,399.6558	4,032,679.1114
		416,747.7188	4,029,929.2070			420,847.2185	4,032,406.3000
		416,759.0313	4,029,916.4004			421,363.7119	4,031,994.1301
		416,768.4688	4,029,902.2207			421,209.7312	4,031,769.2300
		416,781.8125	4,029,898.3633				
		416,790.3750	4,029,900.3945	T18N Add	0.0333		
		416,827.0938	4,029,907.2129			420,004.5740	4,034,139.6849
		416,838.2500	4,029,915.7813			420,012.6570	4,033,690.4716
		416,845.7500	4,029,917.9492			419,802.4606	4,033,687.7767
		416,852.5938	4,029,916.0938			419,832.6228	4,034,141.1372
		416,867.9688	4,029,916.1543			420,004.5740	4,034,139.6849
		416,880.3438	4,029,917.7637				
		416,895.6875	4,029,914.7402				
		416,933.2774	4,029,903.9416				
		416,933.3437	4,029,903.9482			422,698.7244	4,033,173.2549
		416,960.6093	4,029,911.0537			422,688.1222	4,032,830.0374
		417,119.3092	4,029,946.7131			422,701.7643	4,032,367.5270
		417,187.5882	4,029,971.9062			422,592.2681	4,031,994.7888
		417,307.5528	4,030,061.9091			422,299.6378	4,031,762.4906
		417,404.8087	4,030,134.8752			422,105.2825	4,031,749.0183
		417,581.9086	4,030,267.7438			421,855.0233	4,031,871.3901
						421,952.1081	4,032,442.4394
						421,827.2288	4,032,498.3566
						421,672.6950	4,032,568.0642
						421,615.4529	4,032,859.4383
						421,680.5833	4,033,146.5036
						421,959.4881	4,033,044.5656
						422,031.2822	4,033,112.9606
						422,103.3088	4,033,191.3140
						422,274.9333	4,033,248.8166
						422,331.3994	4,033,437.2447
						422,451.8434	4,033,492.2605
						422,530.2048	4,033,470.0379
						422,579.0949	4,033,430.6750
						422,659.7524	4,033,313.9588
						422,698.7244	4,033,173.2549
T17	1.7604	421,549.0082	4,029,833.7401				
		421,523.2951	4,029,607.1388				
		421,241.1573	4,029,607.9067				
		421,115.9541	4,029,457.7723				
		420,796.0648	4,029,098.4398				
		420,776.0445	4,029,075.9509				
		420,233.8289	4,028,421.8006				
		420,070.9764	4,028,193.2976				
		419,973.2496	4,027,978.3517				
		419,964.9561	4,027,727.9417				
		419,853.4559	4,027,810.6655				
		419,803.4484	4,027,847.6038				

## Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID 2006 SDCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)		Area / ID 2006 SDCA	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)		
		X-coordinates	Y_coordinates			X-coordinates	Y_coordinates	
T23-5 & T25-3	0.5717	418,192.9713	4,036,174.1094	T37-2 <i>continued</i>	0.5903	408,694.4951	4,035,836.9988	
		418,665.8457	4,034,527.9245			408,417.2066	4,035,957.7318	
		419,064.9605	4,034,610.8361			408,370.5660	4,036,191.9354	
		419,188.9454	4,034,400.9790			408,249.5600	4,036,258.3226	
		419,223.1494	4,034,342.8214			408,231.7489	4,036,571.0454	
		419,141.4448	4,034,271.8118			408,075.5676	4,036,791.1801	
		419,084.1419	4,033,110.8123			408,254.3940	4,037,157.2867	
		418,754.0253	4,033,026.4824			408,249.8202	4,037,387.3633	
		418,552.8969	4,033,287.6994			408,606.5674	4,037,448.5389	
		418,483.9471	4,033,621.1100			408,414.0682	4,037,664.3519	
		418,689.0409	4,034,066.4152			408,348.7912	4,037,888.7233	
		418,529.1039	4,034,424.5053			408,415.8298	4,038,042.2505	
		418,434.8263	4,034,452.0750			408,493.9799	4,038,156.1081	
		418,325.1939	4,034,653.5406			408,687.9040	4,038,284.6646	
		418,224.8453	4,034,845.3287			408,762.6862	4,038,303.7721	
		418,067.8080	4,035,047.7803			408,853.1404	4,038,290.2585	
		417,953.2284	4,035,467.5065			408,911.3347	4,038,246.1919	
		417,980.4697	4,035,865.3136			409,028.9283	4,038,251.5605	
		418,027.8561	4,036,319.6127			409,126.1477	4,038,258.7530	
		417,976.7952	4,036,709.7435			409,134.0177	4,038,309.6731	
		417,940.1967	4,036,989.3746			409,144.5362	4,038,382.5555	
		417,924.4340	4,037,108.4563			409,201.1026	4,038,424.0681	
		417,974.8683	4,036,933.5367			409,267.1731	4,038,414.5390	
418,192.9713	4,036,174.1094	409,299.1846	4,038,391.3782					
		409,304.7188	4,038,329.9625					
		409,254.9333	4,038,259.1717					
T32	0.1755	416,020.8582	4,042,568.1991					
		416,015.9120	4,042,330.2460					
		415,869.3630	4,042,338.0433					
		415,692.3612	4,042,371.6124					
		415,316.6838	4,043,015.0880					
		415,532.3824	4,043,014.2631					
		415,863.2633	4,043,403.6167					
		416,009.4278	4,043,312.8570					
		416,019.1461	4,042,804.9417					
		416,021.7492	4,042,611.0661					
		416,020.8582	4,042,568.1991					
T36-3 Add	0.0325	414,550.5526	4,039,224.6348					
		414,548.2365	4,039,274.9161					
		414,537.5701	4,039,498.0063					
		414,528.0492	4,039,697.5872					
		414,532.4404	4,039,758.0190					
		414,583.4212	4,039,699.2761					
		414,643.2559	4,039,605.6218					
		414,700.4892	4,039,498.9600					
		414,718.6997	4,039,441.7268					
		414,729.1056	4,039,314.2529					
		414,747.2438	4,039,109.5495					
		414,550.5526	4,039,224.6348					
T37-1	0.2146	408,316.4774	4,042,459.9838					
		408,346.9908	4,042,440.3199					
		408,348.9029	4,041,492.4725					
		408,085.5117	4,041,493.3164					
		407,718.8959	4,042,027.7602					
		407,731.4988	4,042,299.4041					
		407,804.9242	4,042,524.2075					
		407,873.2855	4,042,654.1035					
		408,032.2792	4,042,647.7062					
		408,067.3807	4,042,558.3666					
		408,078.1553	4,042,530.9437					
		408,089.5014	4,042,502.0659					
		408,267.7178	4,042,491.4062					
		408,316.4774	4,042,459.9838					
T37-2	0.5903	409,254.9333	4,038,259.1717					
		409,308.0584	4,038,163.0196					
		409,312.7645	4,038,061.7760					
		409,335.6731	4,038,017.0272					
		409,334.4056	4,037,792.2852					
		409,260.6274	4,037,628.4629					
		409,184.9769	4,037,508.1215					
		409,044.0149	4,037,256.8354					
		408,869.9095	4,037,236.6162					
		408,755.7934	4,037,260.8691					
		408,768.3315	4,037,143.0313					
		408,784.9129	4,037,079.6832					
		408,787.0526	4,036,961.8229					
		408,789.6756	4,036,817.3542					
		408,751.3271	4,036,667.7207					
		408,706.6520	4,036,616.2502					



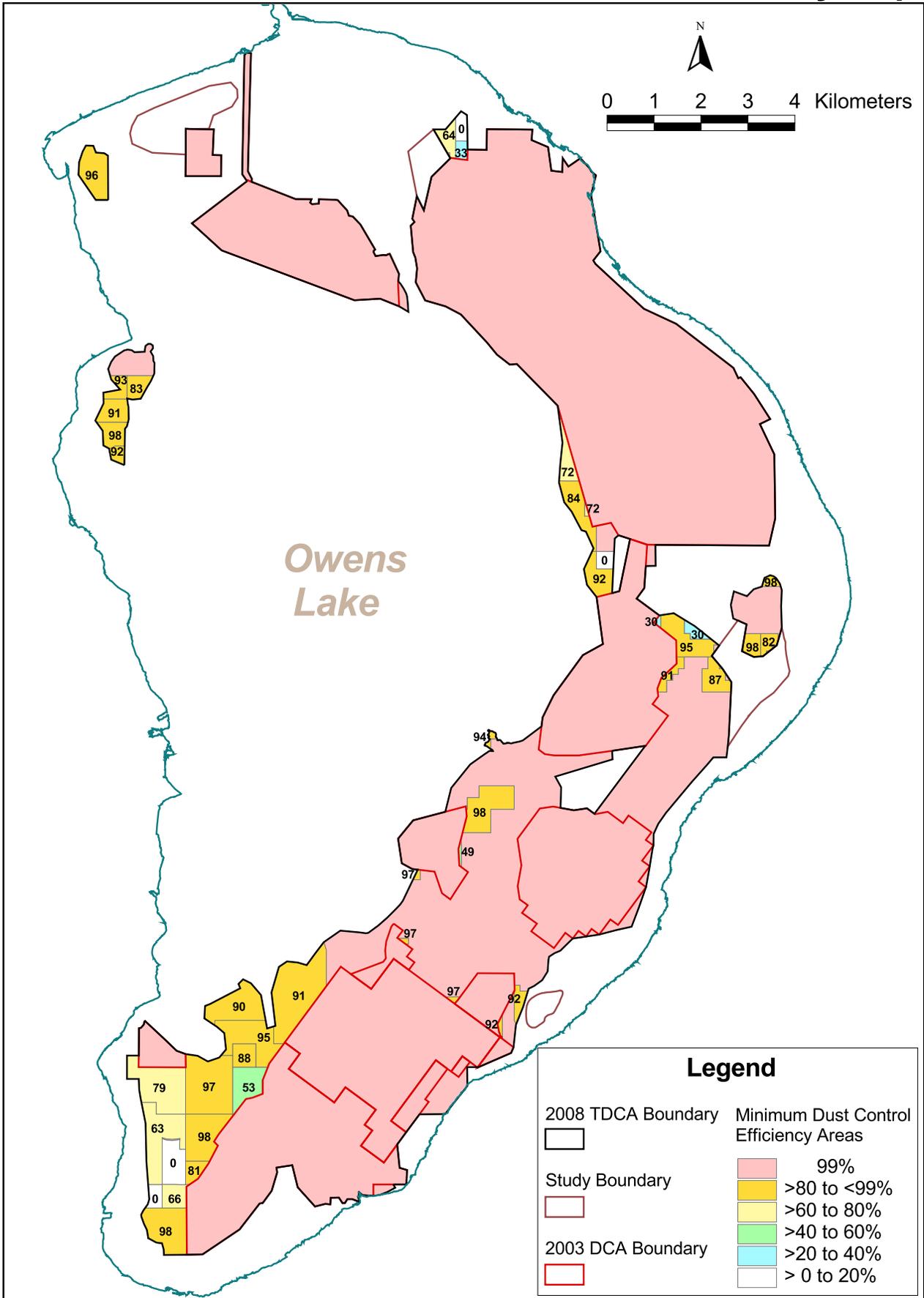
## Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID Other Control Areas	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)		Area / ID Other Control Areas	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)	
		X-coordinates	Y_coordinates			X-coordinates	Y_coordinates
G1 <i>continued</i>	1.9565	410,976.4794	4,044,211.0969	S4 <i>continued</i>	0.1488	417,286.2813	4,023,921.5137
		410,994.0806	4,044,226.5327			417,281.1250	4,023,930.3848
		411,004.4350	4,044,247.5293			417,276.9063	4,023,939.6543
		411,020.9354	4,044,383.2291			417,273.1563	4,023,949.9414
		411,194.2518	4,044,437.7691			417,269.7188	4,023,961.3281
		411,250.0279	4,044,449.6939			417,266.5000	4,023,975.5664
		411,237.3205	4,043,740.6607			417,263.6563	4,023,992.3125
G2	0.0581	411,602.8327	4,043,660.0595	417,257.5625	4,024,036.4043		
		411,456.7364	4,043,657.0894	417,255.7813	4,024,053.0898		
		411,368.8821	4,043,685.0145	417,254.3438	4,024,071.4844		
		411,375.0392	4,043,915.7480	417,253.3438	4,024,112.0410		
		411,516.4385	4,043,938.4040	417,253.6875	4,024,135.3887		
		411,620.8424	4,044,005.2321	417,256.4688	4,024,211.2207		
		411,709.8854	4,044,038.2482	417,258.9375	4,024,248.6602		
		411,758.3361	4,044,037.2052	417,260.8125	4,024,266.7930		
		411,828.9394	4,044,025.2421	417,266.0625	4,024,299.1426		
		411,888.9563	4,043,991.2337	417,269.5625	4,024,313.8516		
		411,896.9565	4,043,946.2341	417,274.6563	4,024,330.5859		
		411,863.9022	4,043,894.9825	417,281.5938	4,024,349.5684		
		411,828.8353	4,043,806.6428	417,289.7813	4,024,368.9414		
		411,788.9031	4,043,686.1008	417,298.0625	4,024,386.4863		
		411,697.8689	4,043,662.0922	417,306.2813	4,024,401.4785		
411,602.8327	4,043,660.0595	417,314.9688	4,024,415.0508				
S2	0.2790	415,283.2813	4,043,000.1953	417,324.0625	4,024,427.2441		
		415,639.7813	4,042,385.2695	417,333.2500	4,024,437.8730		
		415,237.3125	4,041,985.5195	417,341.8125	4,024,446.3809		
		415,075.1250	4,041,273.9336	417,362.2813	4,024,463.6328		
		414,928.6563	4,041,572.7617	417,374.6875	4,024,472.7871		
		414,740.2500	4,042,529.6992	417,391.6875	4,024,484.4727		
		415,283.2813	4,043,000.1953	417,422.5938	4,024,504.8984		
				417,438.9375	4,024,515.1504		
				417,454.8438	4,024,524.5742		
				417,469.5000	4,024,532.6895		
S3	0.7210			417,483.8125	4,024,540.1250		
				417,497.9688	4,024,546.9180		
				417,525.0313	4,024,558.3184		
		421,369.5313	4,031,989.5391	417,537.3125	4,024,562.7500		
		421,766.0313	4,032,526.5938	417,550.9688	4,024,567.0371		
		421,778.4375	4,032,522.0762	417,565.6875	4,024,571.1504		
		421,827.1563	4,032,498.3555	417,595.7188	4,024,578.3379		
		421,952.1875	4,032,442.4199	417,644.3750	4,024,588.4512		
		421,854.9688	4,031,871.4102	417,671.1563	4,024,593.2676		
		422,105.2500	4,031,749.0176	417,699.5625	4,024,597.4395		
		422,299.6563	4,031,762.5020	417,729.9688	4,024,601.0371		
		422,592.2188	4,031,994.7988	417,763.4063	4,024,604.2285		
		422,701.7500	4,032,367.5195	417,801.4375	4,024,607.2109		
		422,732.5625	4,032,243.8984	417,876.5000	4,024,612.3184		
		422,746.8125	4,032,159.0254	417,885.9688	4,024,613.4160		
		422,779.7500	4,032,064.7734	417,906.1875	4,024,617.6074		
		422,779.7188	4,031,946.8984	417,954.9063	4,024,630.4629		
		422,793.9063	4,031,814.8984	417,966.3750	4,024,632.8535		
		422,817.5313	4,031,682.9316	417,976.4688	4,024,634.2813		
		422,840.9688	4,031,565.0645	417,984.4063	4,024,634.8398		
		422,869.3125	4,031,447.2109	417,991.7188	4,024,634.7266		
		422,836.2813	4,031,338.7852	417,998.0938	4,024,633.9082		
		422,713.7500	4,031,206.8086	418,004.0313	4,024,632.4531		
		422,529.9375	4,030,985.2422	418,009.1563	4,024,630.2891		
		422,250.5938	4,030,779.7578	418,013.8125	4,024,627.4102		
		422,000.0313	4,030,499.9922	418,017.8750	4,024,623.8594		
		422,006.2813	4,030,500.0156	418,021.4375	4,024,619.5566		
		421,836.9375	4,030,271.0234	418,027.1563	4,024,609.7598		
		421,548.9688	4,029,833.7383	418,032.4063	4,024,597.6895		
		421,571.8750	4,030,077.3184	418,034.6563	4,024,589.4512		
421,631.0313	4,031,208.7773	418,035.8750	4,024,580.7773				
421,439.0938	4,031,498.2363	418,035.6563	4,024,570.7617				
421,216.1563	4,031,761.8594	418,034.0625	4,024,559.9766				
421,208.0625	4,031,771.3574	418,031.0625	4,024,548.3418				
421,210.0938	4,031,774.1426	418,026.3750	4,024,535.4473				
421,369.5313	4,031,989.5391	418,020.4688	4,024,521.3984				
		418,000.5313	4,024,478.6465				
		417,984.5625	4,024,435.9668				
		417,970.9063	4,024,402.7227				
		417,957.8125	4,024,373.8125				
		417,943.3125	4,024,343.8242				
		417,931.2500	4,024,320.3027				
		417,918.0938	4,024,295.7734				
		417,880.1250	4,024,228.6719				
		417,859.5000	4,024,190.0117				
		417,854.1250	4,024,181.0176				
		417,848.9375	4,024,173.2773				
		417,843.6250	4,024,166.4160				
		417,838.3125	4,024,160.3535				
		417,832.0938	4,024,154.4258				
		417,825.1250	4,024,149.1992				
		417,816.9688	4,024,144.4160				
S4	0.1488	417,410.5625	4,023,845.5176				
		417,398.8438	4,023,845.8750				
		417,387.4375	4,023,846.9883				
		417,377.4063	4,023,848.7207				
		417,367.8438	4,023,851.0527				
		417,358.9375	4,023,853.9434				
		417,350.9375	4,023,857.4238				
		417,343.0938	4,023,861.6250				
		417,335.2813	4,023,866.7793				
		417,327.4688	4,023,872.8066				
		417,319.6875	4,023,879.7500				
		417,310.5938	4,023,888.9688				
		417,301.9688	4,023,899.1680				
		417,293.6563	4,023,910.1230				

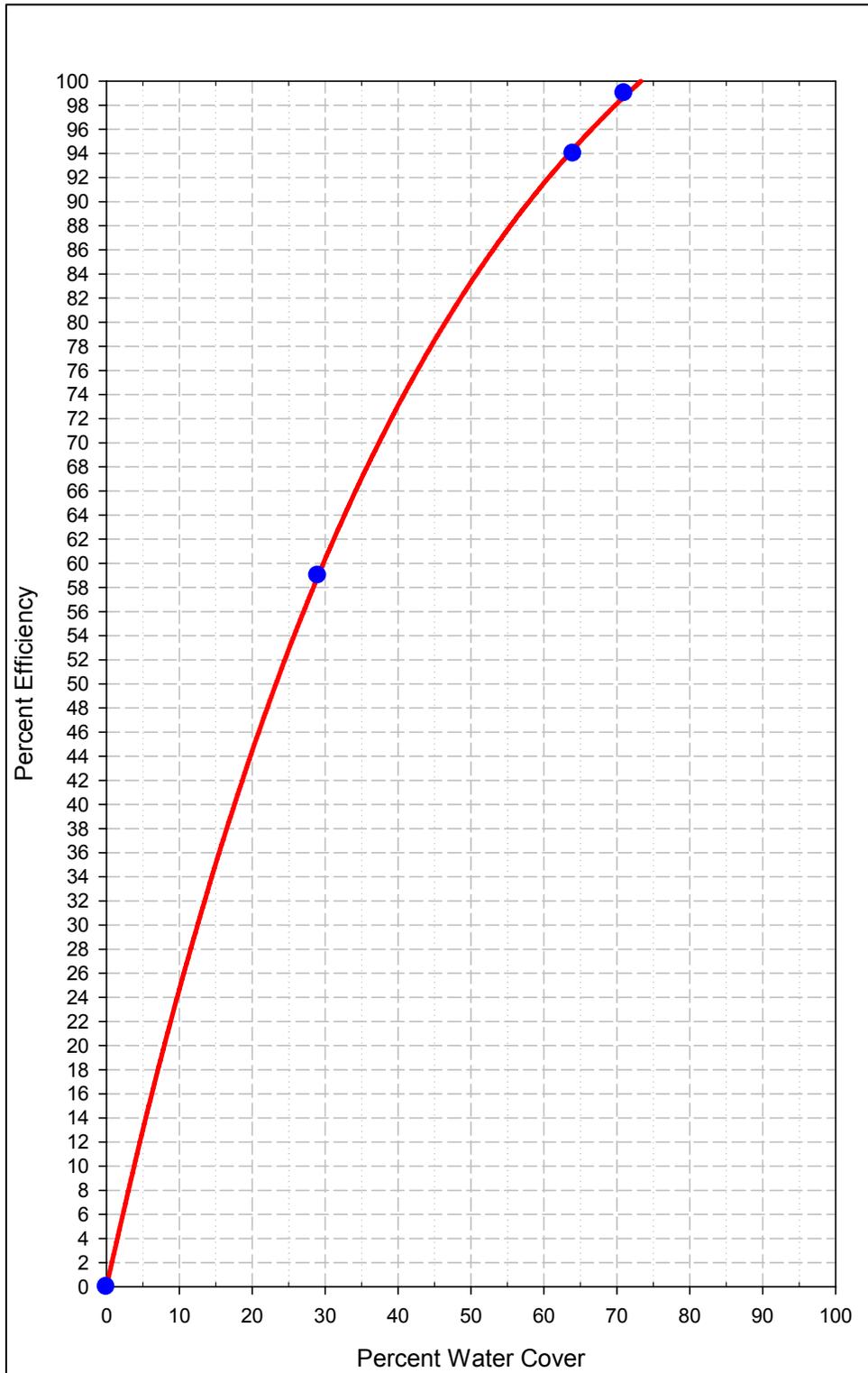
**Exhibit 1 - Coordinates of PM10 Control Areas**

Area / ID <i>Other Control Areas</i>	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)		Area / ID <i>Other Control Areas</i>	Area (miles <sup>2</sup> )	Coordinates(UTM Zone 11 meters NAD83)	
		X-coordinates	Y_coordinates			X-coordinates	Y_coordinates
S4 <i>continued</i>	0.1488	417,807.5625	4,024,140.0762				
		417,799.1250	4,024,136.8242				
		417,789.4688	4,024,133.5957				
		417,744.3750	4,024,120.6641				
		417,733.3125	4,024,116.6641				
		417,723.6250	4,024,112.4082				
		417,716.8438	4,024,108.7773				
		417,710.6875	4,024,104.8281				
		417,693.1875	4,024,092.0859				
		417,683.1250	4,024,084.1797				
		417,674.4375	4,024,076.5137				
		417,667.2813	4,024,069.1191				
		417,661.4688	4,024,061.8086				
		417,657.0625	4,024,054.5488				
		417,654.5000	4,024,048.2773				
		417,652.5000	4,024,040.8516				
		417,647.9063	4,024,009.5918				
		417,646.3750	4,024,002.8047				
		417,644.5938	4,023,996.9746				
		417,640.7500	4,023,988.9395				
		417,636.0313	4,023,980.8086				
		417,630.3750	4,023,972.9629				
		417,623.6563	4,023,965.2930				
		417,617.2813	4,023,958.7949				
		417,609.9688	4,023,952.3184				
		417,601.7813	4,023,945.7832				
		417,592.6250	4,023,939.0781				
		417,575.3438	4,023,927.6641				
		417,540.5938	4,023,906.3262				
		417,526.8438	4,023,897.4316				
		417,515.0938	4,023,889.3320				
		417,487.6875	4,023,868.7949				
		417,472.0938	4,023,858.9844				
		417,463.6563	4,023,854.8926				
		417,455.1875	4,023,851.9063				
		417,444.7813	4,023,849.1504				
		417,433.6250	4,023,847.1348				
		417,422.1563	4,023,845.9258				
		417,410.5625	4,023,845.5176				

# Exhibit 2 - TDCA Minimum Dust Control Efficiency map



### Exhibit 3 - Shallow Flood control efficiency curve



**Attachment A**SETTLEMENT AGREEMENT

This Settlement Agreement (Agreement) is entered into between the Great Basin Unified Air Pollution Control District (District) and the City of Los Angeles by and through its Department of Water and Power (collectively “City”) (the City and District to be referred to as the “Parties”) to resolve the City’s challenge to the District’s Supplemental Control Requirement (SCR) determination for the Owens Lake bed issued on December 21, 2005, and modified on April 4, 2006.

## RECITALS

## WHEREAS:

- A. Owens Lake is located in Inyo County in eastern California, south of the town of Lone Pine and north of the town of Olancho.
- B. Large portions of the Owens Lake bed are comprised primarily of dry saline soils and crusts.
- C. The lake bed soils and crusts are a source of wind-borne dust during significant wind events, and contribute to elevated concentrations of particulate matter less than 10 microns in diameter (PM<sub>10</sub>).
- D. PM<sub>10</sub> is a criteria pollutant regulated by the federal Clean Air Act, 42 U.S.C. Section 7401 *et seq.*, as amended (CAA).
- E. Under the National Ambient Air Quality Standard (NAAQS) adopted pursuant to the CAA, PM<sub>10</sub> levels may not exceed an average concentration of 150 micrograms per cubic meter (µg/m<sup>3</sup>) during a 24-hour period more than one time per calendar year averaged over three years.
- F. The District has regulatory authority over air quality issues in the region where Owens Lake is situated.
- G. Under Health and Safety Code Section 42316, enacted by the California Legislature in 1983, the District has authority to require the City to undertake reasonable measures at Owens Lake in order to address the impacts of its activities that cause or contribute to violations of federal and state air quality standards, including but not limited to the NAAQS for PM<sub>10</sub>.
- H. In 1987, the United States Environmental Protection Agency (EPA) identified the Owens Valley Planning Area (OVPA), which encompasses

**Attachment A**

Owens Lake, as an area not meeting the NAAQS for PM<sub>10</sub>. In 1993, the OVPA was reclassified as a serious non-attainment area under the CAA.

- I. In 1997, the District adopted the Owens Valley PM<sub>10</sub> Demonstration of Attainment State Implementation Plan as required by the CAA (1997 SIP). In 1998, the District and the City agreed that the City would construct control measures on 16.5 square miles of the Owens Lake bed by the end of 2003 as part of a SIP revision in 1998.
- J. In 2003, through District Board Order 03111-01 (Order), the District required the City to construct dust control measures (DCMs) on an additional 13.3 square miles of the Owens Lake bed by the end of 2006, for a total of 29.8 square miles of dust control measures, as part of a Revised SIP (2003 SIP). The Order and 2003 SIP also established a process whereby the Air Pollution Control Officer of the District (APCO) must evaluate on at least an annual basis the potential need for additional DCMs and “watch areas” at Owens Lake bed in order to attain the NAAQS. The process involves a determination by the APCO and an opportunity for the City to present an alternative analysis.
- K. On December 21, 2005, the APCO issued the 2004/2005 SCR determination finding that the City would be required to implement DCMs on an additional 9.31 square miles of Owens Lake bed and identifying 0.66 square miles as “watch area.”
- L. On January 20, 2006, the City appealed the 2004/2005 SCR determination to the California Air Resources Board (CARB). The District disagreed that the determination was subject to such an appeal.
- M. On February 22, 2006, the City submitted an Alternative Analysis contesting aspects of the 2004/2005 SCR determination.
- N. On April 4, 2006, the APCO modified the SCR determination issued on December 21, 2005 to reduce the supplemental DCM area to 8.66 square miles and increased the “watch area” to 0.79 square miles (Modified SCR determination).
- O. On May 3, 2006, the City filed an appeal of the April 4, 2006 Modified SCR determination with the CARB. The District disagreed that the determination was subject to such an appeal.
- P. On May 4, 2006, the City filed a petition for writ of mandate challenging the APCO’s April 4, 2006 Modified SCR determination (*City of Los Angeles Department of Water and Power v. Great Basin Unified Air Pollution Control District*, Kern County Superior Court Case No. S-1500-

**Attachment A**

CV-258678, RJO). The Parties entered into mediation and a temporary stay of the litigation.

**AGREEMENT**

NOW, THEREFORE, in consideration of the provisions herein contained and to resolve the disputes over methods to address air quality at Owens Lake, including the disputes over the SCR determination issued on December 21, 2005, and modified on April 4, 2006, the City and the District hereby agree as follows:

**DUST CONTROL MEASURES (DCMs)**

1. The City shall apply DCMs as provided in this Agreement on additional areas of the lake bed beyond the 29.8 square miles required in the 2003 SIP.
  - A. The areas on the lake bed on which DCMs will be applied are designated in this Agreement as follows:
    - (i) The 12.7 square-mile area of additional DCMs shall be known as the 2006 Supplemental Dust Control Area (SDCA).
    - (ii) The 29.8 square miles of DCMs required by the 2003 SIP shall be known as the 2003 Dust Control Area (DCA).
    - (iii) The 0.5 square miles of natural drainage channels on the south area of the lake bed shall be known as the Channel Area.
    - (iv) The combined 43.0 square miles of DCMs and Channel Area shall be known as the Total Dust Control Area (TDCA).
    - (v) The SDCA, DCA, Channel Area and TDCA are delineated on the TDCA Map, attached as Exhibit 1. The SDCA and Channel Area coordinate descriptions are attached as Exhibit 2. The DCA coordinate description is contained in the 2003 SIP.
  - B. Minor adjustments may be made to the boundaries of the SDCA upon written request by the City to the District and written approval by the APCO, which approval shall not be unreasonably withheld. In the event of such modification, the boundaries of the TDCA shall also be modified to reflect the modified SDCA boundaries.
  - C. The City may, at its sole option, apply DCMs to additional areas outside the TDCA.
  - D. The City shall begin full operation of the DCMs within the SDCA as follows:

## Attachment A

- (i) Moat and row controls shall be operational by October 1, 2009.
    - (ii) All other controls shall be operational by April 1, 2010.
  - E. Following the dates set out above in this Section, the City shall continuously operate and maintain the DCMs within the TDCA. The City shall continuously operate and maintain DCMs within the DCA as required under the 2003 SIP, except as otherwise provided in this Agreement.
- 2.
  - A. The City shall construct within the SDCA a minimum of 9.2 square miles of Shallow Flood dust controls. The Shallow Flood areas are delineated on the Dust Control Measure Map, attached as Exhibit 3.
  - B. On the remaining 3.5 square miles of the SDCA not specifically designated for Shallow Flood on the DCM Map (Exhibit 3), the City shall
    - (i) construct Shallow Flood, Managed Vegetation, or gravel cover, as described in the Dust Control Measures Description, attached as Exhibit 4, and which are currently approved as Best Available Control Measures (BACM) under the 2003 SIP; or
    - (ii) subject to Sections 3, 7 and 8, treat up to 3.5 square miles of the SDCA with the alternative dust control measure known as “Moat and Row,” as described in the DCM Description (Exhibit 4).
  - C. TDCA areas designated as Channel Area represent areas containing natural drainage channels having potentially significant resource issues and regulatory constraints. While these areas are not a part of the SDCA, they shall be addressed as part of the control strategy for the SDCA. However, it is acknowledged that the control strategy in this area may be subject to additional regulatory constraints, design considerations, and impacts caused by adjacent DCMs.
  - D. The internal control measure boundaries delineated on the DCM Map (Exhibit 3) are approximate and are subject to final written approval by the APCO. The areas designated on the DCM Map (Exhibit 3) for Shallow Flood and Moat and Row may be modified upon written request by the City to the District and written approval by the APCO, which approval shall not be unreasonably withheld.
- 3. All DCMs within the SDCA shall be designed, constructed, operated and maintained by the City to achieve the initial target minimum dust control efficiencies (MDCEs) shown on the MDCE Map, attached as Exhibit 5. The initial target MDCEs (Target MDCEs):

**Attachment A**

- A. Are based on the results of air quality modeling, as described in the 2003 SIP, conducted by the City and approved by the APCO for the period July 2002 through June 2006;
  - B. Assume 100 percent control efficiency in the 29.8 square miles of the DCA required under the 2003 SIP, except during the fall and spring ramping periods as described in Section 26, and achievement of the target MDCEs for the areas in the SDCA. Control efficiencies during the fall and spring ramping periods shall be based on modeling that accounts for reduced wetness cover pursuant to Sections 5 and 26;
  - C. Have been selected to achieve PM<sub>10</sub> concentrations that will not exceed the federal 24-hour PM<sub>10</sub> ambient air quality standard of 150 µg/m<sup>3</sup> (federal standard) at all historic shoreline (elevation 3600 feet above sea level) receptors.
4. Prior to April 1, 2010, the Target MDCEs may be modified, upon request of the City and written approval of the APCO, which approval shall not be unreasonably withheld, if the modified MDCEs meet the criteria set forth in the MDCE Selection Process Spreadsheet, attached as Exhibit 6, pursuant to Section 3.
  5. For the Shallow Flood areas identified in DCM Map (Exhibit 3), the percentage of each area that must be wetted shall be based on the Shallow Flood Control Efficiency Curve (SFCE Curve) attached as Exhibit 7, or an update of the SFCE Curve mutually agreeable to the Parties, to achieve the control efficiency levels in the MDCE Map (Exhibit 5).
  6. The Parties believe that the City's existing Managed Vegetation site may currently achieve a control efficiency of 99 percent. Therefore, the City shall continue to maintain and the District shall continue to monitor the site to ensure that it achieves 99 percent control efficiency. No later than July 1, 2007, the City shall submit to the District an operation and management plan for the City to maintain cover conditions that achieve 99 percent control efficiency in the Managed Vegetation areas. The plan shall be subject to written approval by the APCO, which approval shall not be unreasonably withheld. Prior to the time that the Managed Vegetation area is in compliance with an approved SIP, the District will not issue a Notice of Violation (NOV) for the existing Managed Vegetation area as long as:
    - A. From January 1, 2007, to the earlier of July 1, 2007 or the date when the City's operation and management plan is approved by the APCO, the City maintains its current operation and management practices for its Managed Vegetation areas; and

**Attachment A**

- B. After the APCO's written approval of the operation and management plan, the City implements all provisions of its operation and management plan; and
  - C. The City's Managed Vegetation area site does not cause an exceedance of the federal standard at the historic shoreline.
7. As Moat and Row is not a currently approved BACM dust control measure under the 2003 SIP, the City will develop, in consultation with the District, and conduct Moat and Row Demonstration Projects on the lake bed. These Demonstration Projects will be conducted on two or more locations on the lake bed outside of the DCA. The proposed location of these Demonstration Project areas are shown on attached Moat and Row Demonstration Project Map (Exhibit 8). The actual locations of the projects may be changed by the City, and in such event, the City shall notify the APCO in writing of the changed locations. The City will be the California Environmental Quality Act (CEQA) lead agency for implementation of the Moat and Row Demonstration Projects.
8. Based on results of the Moat and Row Demonstration Projects described in Section 7 and subject to Sections 2 and 3, the City in its sole discretion may decide which DCMs to implement in the areas designated for Moat and Row in Section 2 and Exhibit 3 of this Agreement. The City shall consult with the District before making its decision and inform the District of its decision in writing.
- A. Depending on the results of the Moat and Row Demonstration Projects, the measures implemented in these areas by the City may include Moat and Row, enhanced Moat and Row (*e.g.*, closer Moat and Row spacing, Moat and Row with some Shallow Flooding, Moat and Row with some vegetation), combined Moat and Row/Shallow Flood, MDCE-BACM, or BACM.
  - B. If the City implements Moat and Row, it shall design and construct Moat and Row to achieve the Target MDCEs described in Section 3. The Moat and Row configuration required to achieve these Target MDCEs will be decided solely by the City, after consultation with and written notification to the District.
  - C. In the event of a dispute regarding the City's proposed decision or action pursuant to Section 8.A or 8.B, either Party may initiate the Dispute Resolution Process pursuant to Section 32.
  - D. Upon written request of the City, the APCO shall determine in writing if Moat and Row and/or Enhanced Moat and Row constitutes BACM or MDCE-BACM, in accordance with the revisions to the 2003 SIP provided in Section 28.

**Attachment A**DUST IDENTIFICATION (DUST ID) PROGRAM

9. The Parties mutually recognize that a method for identifying sources of potential exceedances of the federal standard at the historic shoreline could be developed that is superior to and could replace or modify the current Dust ID Program.
  - A. The Parties will work cooperatively, with the participation of a mutually agreeable independent third party technical expert or experts under contract to the District and jointly managed by the Parties, in a good faith effort to develop, before April 1, 2010, an improved Dust ID Program. The APCO will implement all mutually-agreeable changes to the Dust ID Program and notify the City in writing of those changes.
  - B. The District will continue to work with the City after April 1, 2010 to further improve the Dust ID Program and will implement all additional mutually agreeable changes in a written decision.
  - C. In furtherance of efforts to improve the Dust ID Program:
    - (i) The Parties will promptly begin a mediated process for refining the Dust ID Program and resolving disputes.
    - (ii) The Parties will select a mutually agreeable expert or panel of independent third-party technical experts.
    - (iii) The District, after consultation with the City, will increase the number of PM<sub>10</sub> monitors at or near the historic shoreline. In all cases, the District will notify the City of the location of the monitors within 30 days of placement of the monitors. If a PM<sub>10</sub> monitor is located above the historic shoreline, the District will make reasonable attempts to account for non-lake bed sources that may affect the monitor.
    - (iv) The District, after consultation with the City, will modify the existing sand flux monitor network to concentrate on areas of special interest, and will, in all cases, notify the City of the modifications within 30 days of any modification.
    - (v) The Parties will establish mutually agreeable model performance measures. Such measures may, but are not required to, include a minimum model performance standard.
    - (vi) The District will make reasonable efforts to account for impacts of DCM construction activities.

**Attachment A**

10. The City will lead a joint effort with the District to develop methods for directly measuring PM<sub>10</sub> emission rates from the lake bed. The District will incorporate mutually agreeable methods into the Dust ID Program.
11. A. If the City is in compliance with Sections 1 and 2 of this Agreement, the following shall apply to the time period before April 1, 2010.
  - (i) The APCO will not issue any further determinations regarding the need for SCRs that provide for additional requirements beyond those in this Agreement. However, the District will continue to use the Dust ID Program, as that program may be modified pursuant to Sections 9 and 10. The District will periodically advise the City of results in writing and may recommend actions to the City based on the model results.
  - (ii) Data collected before April 1, 2010 will not be used in future determinations requiring SCRs, except in those areas delineated as Study Areas on the Study Area Map attached as Exhibit 9 and described in Exhibit 2. Data collected from the Study Areas between July 1, 2006 and April 1, 2010 may only be used in SCR determinations after April 1, 2010, and may be used only in accordance with the current form of the Dust ID Program that is in effect after April 1, 2010.
  - (iii) The District will not issue an order requiring the City to implement any additional controls on any lake bed dust source areas in order to achieve the state PM<sub>10</sub> standard of 50 micrograms per cubic meter unless compelled to issue such an order by state law.
- B. The District shall determine compliance with the state PM<sub>10</sub> standard based on concentrations only in the surrounding communities, unless otherwise compelled by state law.
12. The City, in consultation with the District, shall annually develop and provide to the District a Performance Monitoring Plan (PMP) to aid in its operation of the Owens Lake dust mitigation program on the Owens Lake bed.
  - A. The PMP will describe the measurements and methods used to verify the performance of the constructed DCMs and Moat and Row test areas. The PMP will also describe the measurements and methods used to maximize information on dust emissions from areas of special interest.
  - B. The City shall implement the PMP, and will use the results as a guide for making operational decisions about the type, location, timing, and level of dust control measures needed to prevent exceedances of the federal standard at the shoreline.

## Attachment A

- C. The District may use information from the PMP to assist in determining the likely sources of dust emissions causing or contributing to exceedances (if any) of the federal standard at the shoreline.

### SHALLOW FLOOD BACM REFINEMENT

- 13. The City shall have the option to conduct field testing to refine the wetness cover requirement to achieve 99 percent control efficiency in Shallow Flood areas within the DCA (Shallow Flood Cover Test).
  - A. The Shallow Flood Cover Test shall occur on one or more areas totaling not more than 1.5-square-miles, to be selected by the City and approved by the APCO, which approval shall not be unreasonably withheld, from within the TDCA areas requiring 99 percent control.
  - B. The Shallow Flood Cover Test design shall be prepared by the City and approved by the APCO, which approval shall not be unreasonably withheld, prior to implementation. Based on that design, the APCO will reasonably determine wetness cover requirements for the Shallow Flood Cover Test.
  - C. The City will be CEQA lead agency for the Shallow Flood Cover Test.
- 14. If the APCO reasonably determines in writing that DCMs in the TDCA have been operational for one full year (defined as 365 consecutive days) with no exceedance of the federal standard at monitors located at or above the historic shoreline caused solely by sources within the TDCA, the City shall be permitted to reduce the wetness cover by an average of 10 percent over Shallow Flood areas requiring 99 percent control efficiency, excluding areas identified in Section 14.C, provided that:
  - A. Application of the 10 percent reduction in wetness cover during the Fall and Spring Shallow Flood DCM Compliance periods set out in Sections 25 and 26 shall result in the lower of:
    - (i) The areal cover resulting from a 10 percent reduction; or
    - (ii) The areal cover required in Section 26.A.
  - B. To implement the reductions set out in this Section, the City shall be required to first submit a written Wetness Cover Plan to the District for reducing the wetness cover on the eligible areas. The Wetness Cover Plan shall take into account:

# Attachment A

- (i) the results of testing carried out pursuant to Section 13, if conducted; and
    - (ii) the results of fall and spring Shallow Flood wetness cover reduction operations carried out pursuant to Section 26.
  - C. If, in any year, the Wetness Cover Plan proposes reductions in wetness cover greater than 10 percent in any portion of the Shallow Flood areas covered by the Plan (consistent with the 10 percent limit on the overall average reduction), the City shall obtain the additional written approval of the APCO, which approval shall not be unreasonably withheld.
  - D. In the event shoreline monitors show an exceedance of the federal standard, whether that exceedance is caused by sources within, outside, or both within and outside of the TDCA, no further reductions in wetness cover shall be permitted for any Shallow Flood area that has contributed to the exceedance, as determined by the methodology in Section 18 and subject to the provisions of Section 16.
  - E. Except as provided in Section 16, the City may continue to operate using reductions of wetness cover pursuant to a previously approved Wetness Cover Plan.
15. For each Dust Control Season (October 1 of each year through June 30 of the next year) that wetness cover reductions have taken place under the provisions of Section 14, the City shall prepare and submit to the District a written report summarizing the results of the wetness cover reductions within 90 days after conclusion of the corresponding Dust Control Season. The report shall document the percentage of wetness cover for Shallow Flood areas and the effect(s) of wetness cover reductions on PM<sub>10</sub> concentrations at the historic shoreline.
16. Any areas for which wetness cover has been reduced pursuant to Section 14 and that cause or contribute to an exceedance of the federal standard at the historic shoreline shall be remediated by the City under the Remedial Action Plan requirements pursuant to Sections 18 and 22 below.
- A. Subject to APCO written approval, which approval shall not be unreasonably withheld, the City may further reduce the wetness cover beyond that allowed in Section 14 provided that:
    - (i) The maximum 24-hour PM<sub>10</sub> shoreline monitor values for at least 365 consecutive days of operation following initiation of the last approved Wetness Cover Plan does not exceed 130 µg/m<sup>3</sup>; and
    - (ii) The City demonstrates to the reasonable satisfaction of the APCO that the modeled contributions from the lake bed for the same time

## Attachment A

period set forth in Section 16.A.(i) plus the background of  $20 \mu\text{g}/\text{m}^3$  do not exceed  $120 \mu\text{g}/\text{m}^3$  at the historic shoreline.

- B. If the monitored values at the historic shoreline exceed  $130 \mu\text{g}/\text{m}^3$ , and it is determined that non-lake bed sources are contributing greater than  $20 \mu\text{g}/\text{m}^3$ , then the District will expeditiously seek to identify and require control of those non-lake bed sources so that the City may continue to implement efficient DCMs on the lake bed.
- C. If the City is entitled to further reduce wetness cover pursuant to this Section, the City shall prepare and submit an updated Wetness Cover Plan to the District to describe the wetness cover proposed for the subsequent, applicable Dust Control Season. The updated Wetness Cover Plan shall include:
  - (i) A map that depicts the eligible Shallow Flood areas;
  - (ii) The proposed amount of wetness cover for each eligible Shallow Flood area; and
  - (iii) The method for determining effectiveness of the proposed wetness cover.
- D. The Wetness Cover Plan shall be subject to approval of the APCO, which approval shall not be unreasonably withheld.

### ACTIONS TO ADDRESS STANDARD VIOLATIONS

- 17. After May 1, 2010, the APCO will recommence written SCR determinations under the revisions to the 2003 SIP as provided in Section 28. Recommended determinations will use Dust ID data collected only after April 1, 2010, except as provided in Section 11.A.(ii) for Study Areas, and shall be made at least once in every calendar year.
- 18. If, pursuant to Section 17, the APCO determines that a monitored or modeled exceedance of the federal standard caused by emissions from the lake bed has occurred at or above the historic shoreline:
  - A. The APCO, based on all available information, including visual observation, monitoring and modeling, and in consultation with the City, will identify the need for additional controls, monitoring, or both.
  - B. (i) If the APCO identifies the need for additional controls, the APCO shall issue a SCR determination.

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- (ii) If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an Alternative Analysis. If the City submits an Alternative Analysis, the APCO shall consider the Analysis and may withdraw, modify or confirm the SCR determination.
  - (iii) If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's action, the City may initiate the Dispute Resolution Process pursuant to Section 32. The APCO may modify the SCR determination based on the Dispute Resolution process.
  - (iv) In the event the Parties are unable to resolve disagreements over future SCR determinations through the Dispute Resolution Process, the City may appeal future determinations to CARB under the provisions of Health and Safety Code Section 42316 (Section 42316), provided that the Parties expressly intend that this Agreement be the final resolution regarding the existing disputes between the Parties that are the subject of this Agreement. Based on the foregoing, the City stipulates and agrees that all of the provisions and determinations, including the measures and procedures, contained in the 2003 SIP, the provisions of this Agreement to be included in modifications to the 2003 SIP pursuant to this Agreement, and the SCR determination dated April 4, 2006, which the City in good faith disputed, shall be deemed to be valid and reasonable, and that the City will not challenge those provisions or determinations by appeal under Section 42316 or in any other proceeding, including any other administrative or judicial forum. Subject to this Paragraph, the City may challenge any future SCR determination under Section 42316; however any arguments or challenges must be based on data and information that do not currently exist, but that exist after the execution of this Agreement.
- C. The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Section 21 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.
  - D. The District may, as appropriate, also issue a notice of violation.
19. In the event:
- A. The APCO has made a written determination pursuant to Section 18 that an exceedance of the federal standard, occurring after April 1, 2010,

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resulted from a Control Area or portion of a Control Area treated with Moat and Row; and

- B. That Control Area or portion of a Control Area causing the exceedance was remediated by the City as provided in Section 21 below; and
- C. That Control Area or a portion of that Control Area is subsequently the sole cause of an exceedance of the federal standard at or above the historic shoreline, (*i.e.*, an exceedance occurred after the City attempted to remediate that area under Section 21);

then the City shall convert that Control Area, or that portion of that Control Area, from Moat and Row to MDCE-BACM or BACM, to address the exceedance described in Section 19.C., for all or the portion of that Control Area that caused the subsequent exceedance, under the time deadlines provided for in Section 24.

- 20. If the APCO determines that Moat and Row constitutes BACM or MDCE-BACM, then upon issuance of such written determination, the provisions of Section 19 that require the City to convert to BACM or MDCE-BACM may be satisfied by applying the BACM or MDCE-BACM approved under this Section 20.
- 21. A Remedial Action Plan prepared by the City pursuant to Section 18 will contain a description of:
  - A. Any and all needed changes, repairs or enhancements to DCMs, including one or some combination of the following:
    - (i) Maintenance of facilities (*e.g.*, berms, moats and rows);
    - (ii) Changes to Shallow Flood or Managed Vegetation facilities or operations (*e.g.*, increase in wetness cover extent, improved wetness cover distribution, enhancement of vegetation);
    - (iii) Augmentation (*e.g.*, more moats and rows) or enhancement (*e.g.*, addition of sand fences, surface wetting, armoring, vegetation, surface roughening) of Moat and Row areas;
    - (iv) Transition of Moat and Row areas to BACM, or MDCE-BACM.
  - B. Any and all needed expansion of DCMs, and specific plans for expanding the measures.
  - C. A schedule for the work to be performed to implement the changes, clearly indicating the point at which facilities will be operational and effective at design levels.

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22. The Schedule of Contingency Measures attached to this Agreement as Exhibit 10 sets forth a non-exclusive list of items that shall be included by the City in its Remedial Action Plans, described in Section 21, and the timing required for their implementation.
23. Before any full-scale Moat and Row areas are operational, the City shall submit to the District a conceptual design and schedule for possible implementation of BACM or MDCE-BACM to each Moat and Row area consistent with Section 19. These designs and schedules are the potential contingency measures to be implemented by the City where a transition from Moat and Row to another DCM is needed, or where such transition is required pursuant to Section 19.
24. Areas to be transitioned from Moat and Row to BACM or MDCE-BACM will be operational within the times set forth in the Moat and Row Transition Schedule attached as Exhibit 11. DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule attached as Exhibit 12.

FALL AND SPRING SHALLOW FLOOD DCM COMPLIANCE

25. For the time period from October 16 of each year through May 15 of the next year, the Shallow Flood Control Areas shall be considered to be in compliance with this Agreement and applicable laws and regulations, if the areal wetness cover within each Shallow Flood Control Area in the TDCA meets the MDCE required in Exhibit 6 using the SFCE Curve in Exhibit 7.
26. The provisions set forth in this section shall apply to all Shallow Flood areas with target control efficiencies of 99 percent or more, except those which the City and the District may mutually agree to exclude.
  - A. Beginning on April 1, 2010, compliance of TDCA Control Areas with 99 percent control efficiency Shallow Flood requirements shall be as follows:
    - (i) Beginning May 16 and through May 31 of every year, Shallow Flood may be reduced to a minimum of 70 percent areal wetness cover.
    - (ii) Beginning June 1 and through June 15 of every year, Shallow Flood may be reduced to a minimum of 65 percent areal wetness cover.
    - (iii) Beginning June 16 and through June 30 of every year, Shallow Flood may be reduced to a minimum of 60 percent areal wetness cover.

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- (iv) If for any Shallow Flood area, the percent of areal wetness cover in the periods specified in Sections 26A.(i), (ii) and (iii) is below the minimum percentages specified in those sections, and there were no monitored or modeled exceedances of the federal standard at the historic shoreline, that area will be deemed to be in compliance with this Agreement and applicable laws and regulations if the City demonstrates in writing and the APCO reasonably determines in writing that maximum mainline flow was maintained in the applicable period.
  - B. From July 1 through September 30 of each year, the City is not required by the 2003 SIP to apply water for dust control, but is required to maintain minimum areal wetness cover as required by applicable environmental documents and approvals.
  - C. Beginning on April 1, 2010, if modeled or monitoring data shows an exceedance or exceedances of the federal standard at the historic shoreline as a result of excessive dry areas on Shallow Flood Control Areas during the dust control periods for each year between May 16 through June 30, and October 1 through October 15, the provisions of Sections 17 and 18 shall apply.
27. The provisions of Sections 25 and 26 are subject to the results of air quality modeling, to be conducted by the City and approved by the APCO, that demonstrates attainment of the federal standard at the historic shoreline using the reduced areal wetness covers set forth in Section 26. The modeling shall be conducted as described in the 2003 SIP using data for the period July 2002 through June 2006. The control efficiency of the areal wetness covers shall be modeled using the SFCE Curve as provided in Section 5.

REVISION OF THE STATE IMPLEMENTATION PLAN (SIP)

- 28. A. The APCO will propose a District Board Order that will revise the 2003 SIP to incorporate all of the terms and conditions of this Agreement, except such terms and conditions, if any, that may not lawfully be included in the SIP. The APCO will propose the Board Order and SIP revision at a time sufficient to allow the proposed revisions to be considered and adopted by the District Board by July 1, 2008. The time for consideration and adoption shall take into account, without limitation, the time for legally required environmental review and public notice and hearing. The District Board will act on the proposed SIP revisions by July 1, 2008.
- B. If the District Board has the legal ability to act and fails to act by November 1, 2008 on a proposed District Board Order as described in Subsection 28.A, the City may terminate this Agreement by providing

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written notice to the District, provided, however, that the City will not provide such notice prior to the conclusion of the Dispute Resolution Process pursuant to Section 32, which process may be initiated by either Party.

- C. The Parties have developed this Agreement with the intention that its provisions will be incorporated into a revision of the 2003 SIP and are consistent with applicable provisions of the Health and Safety Code, including Section 42316, and applicable provisions of federal law regarding attainment of the NAAQS.
- D. The APCO shall confer in good faith with the City to develop procedures to modify and authorize MDCE-BACM for incorporation into the revisions to the 2003 SIP.
- E. The District will be CEQA lead agency and will prepare, in consultation with the City, and will consider for certification on or before March 1, 2008 an environmental impact report (EIR) on the proposed SIP revisions.
- F.
  - (i) In the event:
    - (a) the District Board adopts a District Board Order revising the 2003 SIP that does not incorporate all the terms and conditions of this Agreement, except such terms and conditions, if any that may not lawfully be included in the SIP; or
    - (b) the District Board adopts a District Board Order revising the 2003 SIP that incorporates all the terms and conditions of this Agreement except such terms and conditions, if any, that may not lawfully be included in the SIP, and subsequent judicial action causes the revised SIP to be materially inconsistent or materially in conflict with the terms and conditions of this Agreement,

the City may terminate this Agreement in the case of Section 28.F(i)(a), and either Party may terminate this Agreement in the case of Section 28.F(i)(b), within 30 days of such action by providing written notice to the other Party.
  - (ii) If the City does not elect to terminate this Agreement pursuant to Section 28.F(i) and any inconsistencies or conflicts exist between this Agreement that preclude compliance with both, the provisions of the District Board Order shall prevail.

## Attachment A

- G. The City will support and will not appeal or in any other way challenge or oppose revisions to the 2003 SIP and resulting District Board Order that incorporate all of the terms and conditions of this Agreement, except such terms and conditions, if any, that may not lawfully be included in the SIP. After issuance of the District Board Order provided for in this Section, the City shall not challenge the order under CEQA to the extent that Order is consistent with this Agreement.
- H. In the event the District Board fails to certify the EIR by March 1, 2008 or to act on the proposed SIP revisions by July 1, 2008, the Parties shall meet and confer as provided in Section 33.A.
- I. Any provisions of this Agreement that are incorporated into the District Board Order as provided in Section 28.A. shall, upon adoption of that Order by the District Board, cease to have any further force and effect as part of this Agreement, and shall instead be effective as part of the District Board Order.
- J. Any provisions of this Agreement that are not incorporated into the District Board Order as provided in Section 28.A shall remain in full force and effect as part of this Agreement until May 1, 2012, at which time those provisions shall cease to be of any further force or effect as part of this Agreement, provided that the Parties may mutually agree in writing to extend this date.

### COVER MEASUREMENT TECHNIQUES AND PERFORMANCE SPECIFICATIONS

- 29. The District and City will collaboratively develop wetness and vegetative cover measurement techniques, control efficiency relationships, and compliance specifications. Final acceptance of those cover measurement techniques and compliance specifications with regulatory impact will be at the sole discretion of the APCO.

### KEELER DUNES

- 30. The Parties acknowledge that dust emissions from the area known as the Keeler Dunes may cause or contribute to exceedances of federal and state standards for PM<sub>10</sub>. The City hereby agrees to cooperate with the District and other federal, state and local agencies and experts as necessary to develop a plan to reduce dust emissions from the Keeler Dunes.

### COOPERATION BETWEEN PARTIES AND DISPUTE RESOLUTION

- 31. In carrying out the terms of this Agreement, the Parties intend to cooperate fully and to consult with each other effectively and on a regular basis. The Parties will make good faith efforts to provide each other with relevant documents and

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technical information in a timely manner, and they will keep each other informed of their respective progress in actions to implement the actions set forth in this Agreement, including, without limitation, progress in entering into consultant and construction contracts and in securing permits from agencies with permitting authority.

32. Notwithstanding the Parties' commitment to cooperate in implementing the terms of this Agreement, they recognize that differences may arise between them. To address this situation, the Parties agree that, in the event either Party believes that a dispute exists regarding implementation or interpretation of any provision of this Agreement, that Party may, by informing the other Party in writing within 21 days of the decision or determination, action or proposed action triggering the dispute, initiate non-binding mediation between the Parties. A party may not seek non-binding mediation for issues that were already the subject of mediation under this Section unless both Parties agree in writing.
- A. The mediator shall be a mediator mutually acceptable to the Parties. The Parties may also by mutual agreement include in the mediation, one or more of the technical experts selected pursuant to Section 9.C.(ii), or any other technical experts, such experts to be under contract to the District and jointly managed by the Parties. The City shall be responsible for the cost of the mediator and the technical experts pursuant to Health and Safety Code Section 42316. The mediation will be conducted and completed within 60 days of the notice initiating the Dispute Resolution Process unless that time period is extended by mutual agreement of the Parties. The mediation will be conducted under all applicable California laws regarding mediation, including but not limited to Cal. Evidence Code Sections 1115-1128.
- B. Neither Party will commence any litigation concerning the implementation of terms of this Agreement unless that Party has first initiated the mediation described in this Section, and the sooner of the following two events takes place:
- (i) Sixty (60) days has expired from the date that Party first sent written notice to commence the mediation; or
  - (ii) Both Parties agree, or the mediator(s) states, in writing that the mediation has been completed.
  - (iii) Notwithstanding the provisions of this Section 32.B, a Party may commence litigation at an earlier time if necessary to pursue a claim or cause of action that would otherwise be time barred under an applicable statute of limitations.

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- C. If the Dispute Resolution Process pursuant to this Section 32 is initiated to address a dispute regarding a SCR determination issued by the APCO pursuant to Section 18.B, then that SCR determination shall not be deemed final until the conclusion of this process under Section 32.B.
- D. Nothing in this section is intended to or shall be construed to restrict or eliminate a Party's right to utilize available legal remedies following completion of the mediation process.

EXTENSIONS OF TIME

- 33. A. In the event that the District

- (i) Anticipates that it will fail to certify or fails to certify an environmental impact report on the proposed SIP revisions and related actions by March 1, 2008; or
- (ii) Anticipates that it will fail to act on or fails to act on a proposed District Board Order pursuant to Section 28.A by July 1, 2008,

the District shall promptly notify the City, and Parties shall meet and confer to determine what if any revisions to other dates contained in this Agreement may be appropriate. The Parties may mutually agree to the participation of a mediator in the meet and confer process.

- B. In the event the City

- (i) Anticipates that it will be unable to complete implementation or fails to complete implementation of moat and row controls pursuant to this Agreement by October 1, 2009; or
- (ii) Anticipates that it will be unable to complete implementation or fails to complete implementation of all other controls by April 1, 2010,

the City may seek relief for such failure or delay by obtaining a variance from the Hearing Board of the Great Basin Unified Air Pollution Control District pursuant to District Regulation VI and all applicable law for variance relief from a District Order, including but not limited to Health and Safety Code Section 42350 *et seq.* In such event, the District shall, at the request of the City, meet with the City, prior to or after the filing of a request for a variance, in order to ascertain whether the District will support the City's variance request. In the event the District will not support the City's variance request, the City may invoke the Dispute Resolution Process pursuant to Section 32.

**Attachment A**

- C. Nothing in this Section is intended to or shall limit the ability of the City to seek a variance from requirements not included in this Section.
  - D. Each Party will undertake to inform the other Party as early as practicable of the fact that it anticipates that it will not meet or has failed to meet any of the dates set out in this Section.
34. In the event either Party claims that the other Party is in material breach of the terms of this Agreement, including without limitation, a claim by the District that the City is in material breach under Section 11, the Party claiming the breach shall provide written notice of the claimed breach to the other Party. In the event the Party claimed to be in breach contests such claim, the issue shall be subject to the Dispute Resolution Process in Section 32.

LAWSUIT/APPEAL SETTLEMENT CONDITIONS

35. Within 15 days of execution of this Agreement, the APCO shall issue a revised SCR determination that incorporates the terms of this Agreement and that supersedes all previous determinations.
36. Upon issuance by the APCO of the revised SCR determination as described in Section 35, the City shall immediately commence the process for implementing additional DCMs on the Owens Lake bed consistent with the terms of this Agreement.
37. Upon issuance by the APCO of the revised SCR determination as described in Section 35, the City shall within seven days dismiss with prejudice its CARB appeals and the litigation against the District as described in the Recitals at Paragraphs L, O. and P.

DEFINITIONS

38. Definitions of terms used in this Agreement are contained herein and in Exhibit 13. Where specifically identified in Exhibit 13, these terms as used in this Agreement and Exhibits shall have the meanings provided in this Exhibit 13. Where no definition is provided herein or in Exhibit 13, the words and terms shall have their meaning as provided in the federal Clean Air Act or state air pollution law in the Health and Safety Code, and where no definition is found there, shall have their ordinary meaning as read in the context of this Agreement and consistent with the expressed intent of the Parties.

NOTICES

39. Whenever, under the terms of this Agreement, written notice is required to be given or a report or other document is required to be sent by one Party to another, it shall be sent by overnight mail and directed to the individual at the address

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specified below, unless that individual or his or her successor gives notice of a change to the other Party in writing.

As to the City:

Ronald F. Deaton  
General Manager  
Los Angeles Department of Water and Power  
111 North Hope Street, Room 1550  
Los Angeles, CA 90012

As to the District:

Theodore D. Schade  
Air Pollution Control Officer  
Great Basin Unified Air Pollution Control District  
157 Short Street  
Bishop, California 93514

ADDITIONAL PROVISIONS

40. By this Agreement, the City and the District intend to settle their disputes regarding methods to address air quality issues at Owens Lake, including disagreements over the SCR determination issued on December 21, 2005, and the Modified SCR determination issued on April 4, 2006.
41. This Agreement is the final integrated agreement between the Parties regarding the matters addressed herein, and may not be modified except in a writing signed by both Parties.
42. This Agreement shall be construed in accordance with the laws of the State of California.
43. In the event any provision of this Agreement is judicially determined to be unenforceable, the Parties shall meet and confer and following such meeting, the Parties may amend the Agreement, or continue the Agreement without amendment, or either Party may terminate the Agreement.
44. This Agreement shall not create any rights in any third party.

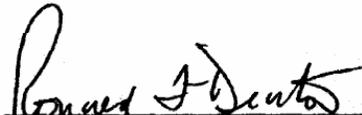
# Attachment A

- 45. No failure by a Party to insist on strict performance of any term or condition of this Agreement shall constitute a waiver of such term or condition or a breach hereof.
- 46. Each Party represents that their respective signatories below have the authority to bind them to the terms of this Agreement.

REVIEWED AND AGREED TO:

Dated: November 30, 2006

Dated: December 4, 2006

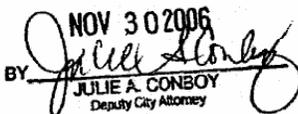
  
 \_\_\_\_\_  
 Ronald F. Deaton  
 General Manager, Los Angeles Department of  
 Water and Power

  
 \_\_\_\_\_  
 Henry "Skip" Weatch  
 Board Chairman

The City of Los Angeles  
 By and Through the  
 Los Angeles Department of Water and Power

Great Basin Unified Air Pollution Control  
 District

APPROVED AS TO FORM AND LEGALITY  
 ROCKARD J. DELGADILLO, CITY ATTORNEY

NOV 30 2006  
 BY   
 JULIE A. CONBOY  
 Deputy City Attorney

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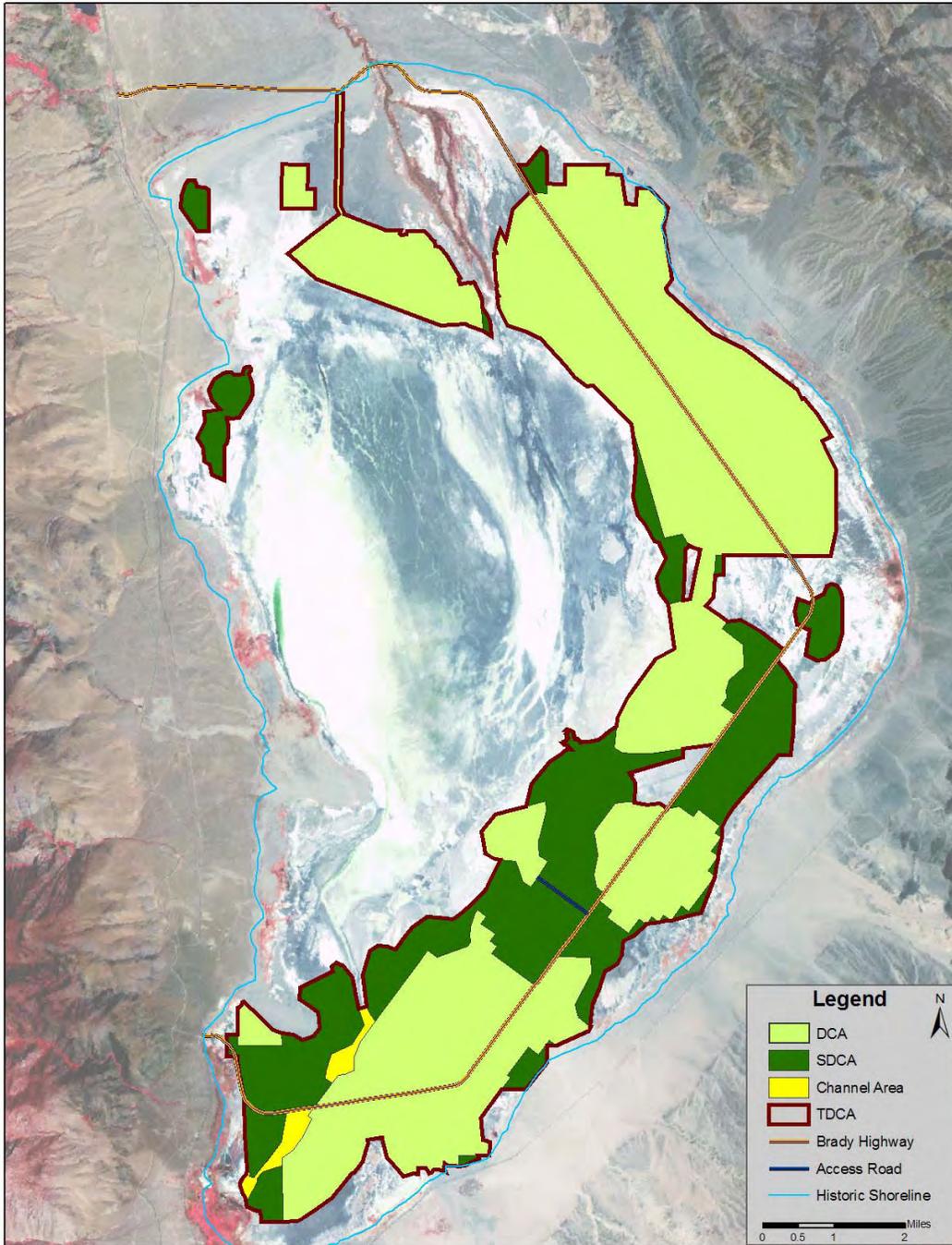
## List of Exhibits

1. Total Dust Control Area Map
2. 2006 Supplemental Dust Control Area Coordinate Description
3. Dust Control Measure Map
4. Dust Control Measures Description
5. Minimum Dust Control Efficiency Map
6. MDCE Selection Process Spreadsheet
7. Shallow Flood Control Efficiency Curve
8. Moat and Row Demonstration Project Location Map
9. Study Area Map
10. Schedule of Contingency Measures
11. Moat and Row Transition Schedule
12. DCM Operation Schedule
13. Definitions

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## EXHIBIT 1 -- TOTAL DUST CONTROL AREA MAP

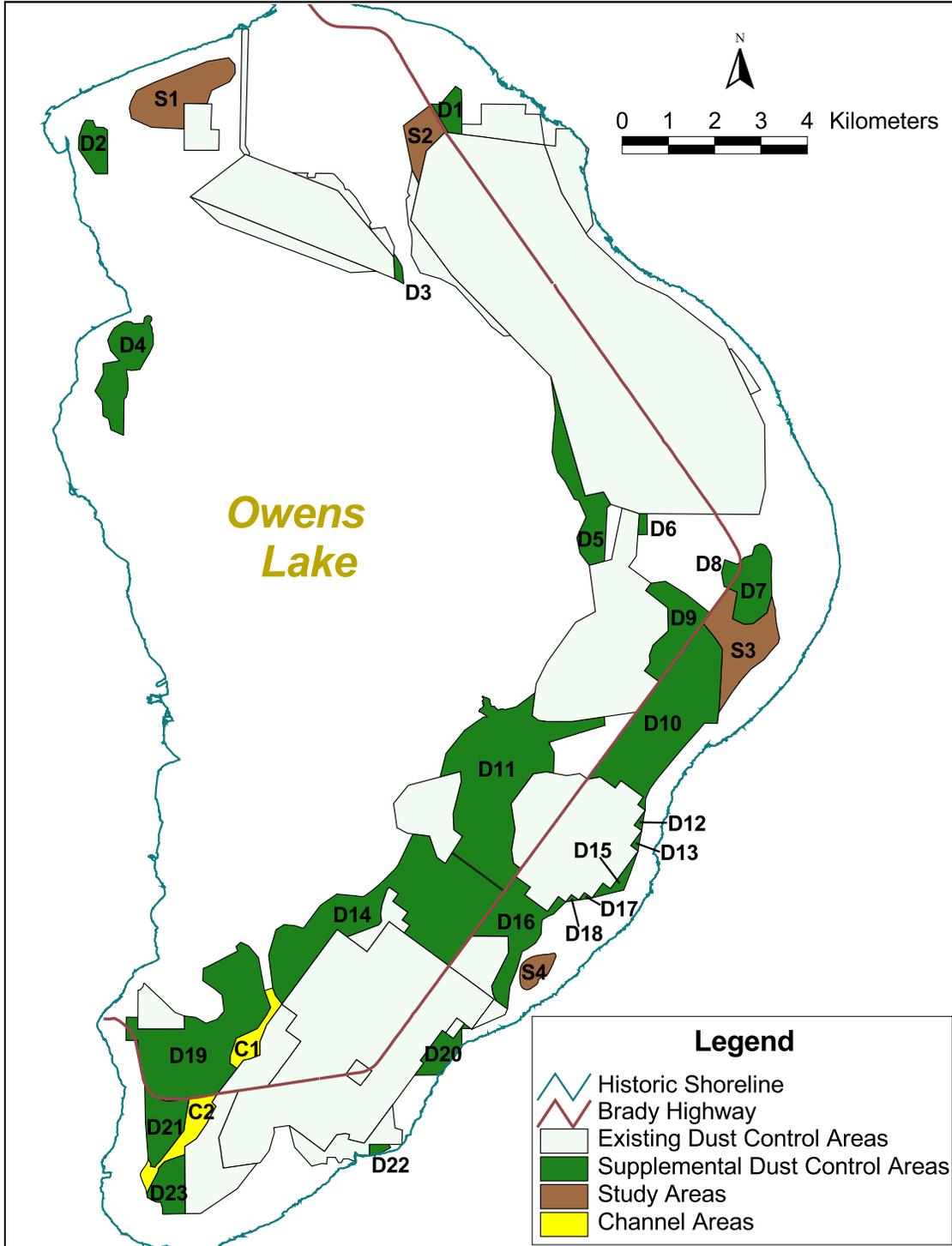
The Total Dust Control Area (TDCA) is comprised of the 2006 Supplemental Dust Control Area (SDCA) and the 2003 Dust Control Area (DCA).



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## EXHIBIT 2 -- 2006 SUPPLEMENTAL DUST CONTROL AREA COORDINATE DESCRIPTIONS

### KEY MAP



## Attachment A

## EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)				
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates			
D1	0.16	SDCA	416,001.0310	4,042,347.3789	D5	0.57	SDCA	418754.0310	4033026.5000			
			415,701.7500	4,042,385.7617				418552.9690	4033287.6914			
			415,343.2810	4,042,999.8633				418484.0000	4033621.1133			
			415,539.4060	4,042,999.0234				418689.0940	4034066.4102			
			415,866.3750	4,043,383.8359				418529.0310	4034424.5078			
			415,994.4060	4,043,304.2109				418434.8130	4034452.0664			
			416,002.6250	4,042,981.9922				418325.1880	4034653.5234			
			416,005.6250	4,042,568.5234				418224.7810	4034845.3438			
			416,001.0310	4,042,347.3789				418067.7500	4035047.7852			
									417953.1880	4035467.4961		
D2	0.21	SDCA	408,085.5000	4,041,493.3164	417980.5000	4035865.3203						
			407,718.8130	4,042,027.7422	418027.9060	4036319.6094						
			407,731.5000	4,042,299.3945	417924.4060	4037110.5117						
			407,804.9060	4,042,524.2148	418666.3750	4034527.9844						
			407,873.2810	4,042,654.1211	419065.6880	4034610.9648						
			408,032.2500	4,042,647.6875	419223.4690	4034342.1406						
			408,089.5630	4,042,502.0625	419141.3750	4034271.8047						
			408,267.6560	4,042,491.4219	419084.1880	4033110.8086						
			408,347.0630	4,042,440.3203	418754.0310	4033026.5000						
			408,348.9690	4,041,492.4844								
D3	0.03	SDCA	414,747.2500	4,039,108.7500	D6	0.03	SDCA	419801.2810	4033687.7539			
			414,550.5000	4,039,224.6641				419831.7500	4034141.1016			
			414,528.0310	4,039,697.5156				420006.8130	4034139.3281			
			414,532.5000	4,039,759.7891				420012.7190	4033690.4844			
			414,583.3750	4,039,699.2617				419801.2810	4033687.7539			
			414,643.3130	4,039,605.6250	D7	0.43	SDCA	422105.2500	4031749.0176			
			414,700.5000	4,039,498.9766				421854.9690	4031871.4102			
			414,718.6880	4,039,441.7188				421952.1880	4032442.4199			
			414,729.1250	4,039,314.2500				421827.1560	4032498.3555			
			414,747.2500	4,039,108.7500				421778.4380	4032522.0762			
D4	0.59	SDCA	408,694.5000	4,035,836.9883				421882.0310	4032660.6934			
			408,417.2190	4,035,957.7344				421931.3130	4032728.7031			
			408,370.5940	4,036,191.9453				421954.3130	4032765.7129			
			408,249.5940	4,036,258.3164				421966.3130	4032785.8828			
			408,231.6880	4,036,571.0625				421992.7810	4032841.0703			
			408,075.5000	4,036,791.1719				422013.5310	4032894.8164			
			408,254.4060	4,037,157.2813				422030.0630	4032956.1914			
			408,249.9060	4,037,387.3789				422039.5000	4033014.7422			
			408,606.5630	4,037,448.5391				422042.1560	4033068.7461			
			408,414.0000	4,037,664.3359				422042.4380	4033082.8008			
			408,348.8750	4,037,888.7227				422040.7810	4033127.2188			
			408,415.9060	4,038,042.2422				422103.3750	4033191.3320			
			408,494.0000	4,038,156.0977				422274.9380	4033248.8359			
			408,687.9380	4,038,284.6484				422331.4380	4033437.2383			
			408,762.7190	4,038,303.7813				422451.9060	4033492.2617			
			408,853.0940	4,038,290.2422				422530.2190	4033470.0195			
			408,911.3130	4,038,246.2109				422579.0940	4033430.6797			
			409,028.9380	4,038,251.5742				422659.7190	4033313.9453			
			409,126.1560	4,038,258.7344				422698.6880	4033173.2383			
			409,134.0630	4,038,309.6602				422688.0630	4032830.0469			
			409,144.5940	4,038,382.5547				422701.7500	4032367.5195			
			409,201.0630	4,038,424.0508				422592.2190	4031994.7988			
			409,255.5940	4,038,422.9180				422299.6560	4031762.5020			
			409,299.1250	4,038,391.3789				422105.2500	4031749.0176			
			409,304.7190	4,038,329.9609								
			409,254.9380	4,038,259.1797				D8	0.06	SDCA	421758.4690	4032529.3477
			409,308.0940	4,038,163.0195						421668.6250	4032569.9238	
			409,312.7190	4,038,061.7695						421615.5310	4032859.4297	
			409,335.7190	4,038,017.0195						421680.6250	4033146.5156	
			409,334.3750	4,037,792.3008						421959.5000	4033044.5586	
409,260.5630	4,037,628.4492						422021.5000	4033108.1875				
409,184.9060	4,037,508.1055						422022.5630	4033079.4023				
409,044.0630	4,037,256.8359						422019.3130	4033018.7031				
408,869.9060	4,037,236.6055						422010.1880	4032960.1484				
408,755.8130	4,037,260.8867						421994.8130	4032902.9766				
408,768.2810	4,037,143.0156						421977.7500	4032858.2227				
408,784.9690	4,037,079.6914						421948.4060	4032795.7422				
408,789.7190	4,036,817.3555						421918.7190	4032746.2988				
408,751.4060	4,036,667.7344						421884.3440	4032697.7148				
408,706.5940	4,036,616.2422						421806.2810	4032593.7305				
408,694.5000	4,035,836.9883						421758.4690	4032529.3477				

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## EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates
D9	0.53	SDCA	420,265.8440	4,030,508.7188	D11 continued	2.32	SDCA	416481.0000	4029994.3359
			419,947.7500	4,030,741.5176				416483.2500	4030000.4590
			420,067.1880	4,030,907.7324				416476.4690	4030004.0684
			420,051.5940	4,031,073.7461				416464.6250	4030013.5332
			420,132.5000	4,031,300.5000				416452.1250	4030020.7266
			420,460.9690	4,031,604.7441				416447.3130	4030031.0762
			420,449.4060	4,032,103.9551				416454.8750	4030042.8809
			419,975.9690	4,032,480.4902				416467.7500	4030052.9766
			420,091.3750	4,032,635.9316				416466.0630	4030067.6035
			420,399.6560	4,032,679.1270				416454.5310	4030077.5586
			420,847.1880	4,032,406.2988				416440.6250	4030076.0938
			421,363.7810	4,031,994.1230				416437.6250	4030084.6914
			420,995.8750	4,031,495.0273				416445.8130	4030098.3496
			420,265.8440	4,030,508.7188				416459.0310	4030110.6875
								416465.9060	4030126.0488
								416467.1560	4030142.7871
			D10	1.75				SDCA	419,965.0000
419,803.2190	4,027,847.7363	416450.1560			4030168.0938				
419,922.8440	4,028,009.4902	416439.0940			4030177.2402				
419,437.5940	4,028,368.0176	416443.8750			4030188.7227				
419,317.9690	4,028,206.2617	416458.4380			4030192.3809				
418,994.5310	4,028,445.2656	416470.3130			4030190.8789				
418,730.3440	4,028,397.0371	416479.0310			4030177.9727				
419,406.8750	4,029,323.4316	416493.8130			4030171.2637				
421,010.9060	4,031,484.3145	416510.6250			4030166.2656				
421,216.1560	4,031,761.8594	416527.2190			4030165.8828				
421,439.0940	4,031,498.2363	416541.7810			4030161.9238				
421,631.0310	4,031,208.7773	416568.0630			4030143.3945				
421,571.8750	4,030,077.3184	416585.0000			4030137.3281				
421,548.9690	4,029,833.7383	416601.6250			4030130.7734				
421,523.2500	4,029,607.1328	416608.7190			4030112.7188				
421,241.1880	4,029,607.8887	416614.8750			4030093.7324				
421,116.0000	4,029,457.7559	416614.1560			4030081.1367				
420,776.0000	4,029,075.9551	416606.9690	4030057.0176						
420,233.7500	4,028,421.8027	416610.2810	4030041.6328						
420,070.9690	4,028,193.2832	416621.0310	4030029.7910						
419,973.2500	4,027,978.3457	416626.8440	4030016.4492						
419,965.0000	4,027,728.2520	416634.6560	4030003.4863						
D11	2.32	SDCA	416,924.2190	4,025,991.8965	416639.6560	4029988.0273			
			416,906.7190	4,026,000.2598	416642.2500	4029973.2676			
			416,817.3750	4,026,065.2832	416656.7190	4029972.4727			
			415,808.9380	4,026,810.0977	416688.3750	4029977.5293			
			415,803.8440	4,026,822.5840	416704.9380	4029976.5762			
			415,810.1250	4,026,837.9219	416715.9690	4029964.5742			
			416,016.5310	4,027,163.7559	416723.1250	4029949.7949			
			415,829.9690	4,027,301.7383	416734.4690	4029937.7109			
			415,812.0000	4,027,654.7500	416747.7190	4029929.2070			
			415,987.3440	4,028,348.8008	416759.0310	4029916.4004			
			415,969.6880	4,028,562.7461	416768.4690	4029902.2207			
			415,530.3750	4,028,446.4922	416781.8130	4029898.3633			
			415,660.2500	4,028,955.4551	416790.3750	4029900.3945			
			416,062.8130	4,029,458.0664	416827.0940	4029907.2129			
			416,386.1560	4,029,683.9746	416838.2500	4029915.7813			
			416,436.9060	4,029,720.7148	416845.7500	4029917.9492			
			416,449.5000	4,029,732.7207	416852.5940	4029916.0938			
			416,468.5940	4,029,742.7246	416867.9690	4029916.1543			
			416,489.8750	4,029,746.4355	416880.3440	4029917.7637			
			416,529.4060	4,029,741.9941	416895.6880	4029914.7402			
			416,547.9690	4,029,741.4180	416925.9380	4029904.3965			
			416,541.4060	4,029,755.8789	416940.7190	4029903.4805			
			416,528.0940	4,029,767.9277	416954.8130	4029907.8730			
			416,515.2190	4,029,777.7969	416966.3750	4029914.2246			
			416,501.9690	4,029,786.2637	417119.3130	4029946.7070			
			416,489.6560	4,029,794.9004	417187.6250	4029971.9180			
			416,430.1250	4,029,834.6543	417582.2500	4030268.0078			
			416,415.3750	4,029,843.4570	417521.0310	4029772.5176			
			416,400.7190	4,029,849.4766	417701.5630	4029667.0430			
			416,387.3130	4,029,856.1563	417771.4380	4029656.0293			
			416,372.5940	4,029,860.3105	417852.7810	4029647.5566			
			416,368.5310	4,029,870.0703	418130.3750	4029643.4648			
			416,375.7810	4,029,880.6270	418383.2810	4029647.0859			
416,384.4690	4,029,895.7617	419083.7810	4029748.1953						
416,385.5310	4,029,910.9023	419086.1880	4029746.9258						
416,395.3130	4,029,918.6621	419093.6560	4029564.0527						
416,406.0630	4,029,922.9727	417887.0630	4029198.4668						
416,419.9060	4,029,929.8086	417896.1560	4029182.4668						
416,435.1560	4,029,936.6543	417881.5000	4029187.7246						
416,449.2500	4,029,947.3340	418000.2190	4028968.8594						
416,459.1250	4,029,961.2246	417985.8130	4028531.7539						
416,462.9690	4,029,976.8418	417825.0940	4028556.4668						
416,471.5630	4,029,988.3965	417545.0000	4028513.0254						

## Attachment A

## EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates	
D11 continued	2.32	SDCA	417,068.6250 417,152.6880 417,077.1880 417,117.7810 417,277.7500 416,924.2190	4,027,867.9766 4,027,307.1758 4,026,864.2910 4,026,581.1016 4,026,460.9707 4,025,991.8965	D16	0.70	SDCA	416987.0630 416718.5630 416734.5310 416700.3440 416689.5630 416678.1560 416644.1560 417010.6880 417000.8130 417004.5630 416997.8130 416224.2500 416932.7810 417170.5000 417483.0940 417363.6250 417848.8440 418087.8130 418249.6250 417981.1560 417862.3130 417742.6560 417731.0940 417711.4060 417596.9060 417427.9690 417308.1560 417192.2500 417038.6560 416987.0630	4023427.0801 4023625.5098 4023647.0078 4023672.5195 4023734.1953 4023741.8613 4023925.0195 4024645.2734 4024984.0566 4024995.9414 4025001.7578 4025007.0430 4025971.6777 4026294.0039 4026061.2461 4025899.4863 4025541.0000 4025864.5176 4025744.9961 4025483.1621 4025432.8262 4025357.7832 4025299.8848 4025042.9023 4024857.0391 4024735.2051 4024673.9160 4024288.4082 4023907.3789 4023427.0801	
D12	0.02	SDCA	419,887.8440 419,726.0310 419,965.0000 419,949.5310 419,887.8440	4,027,285.2500 4,027,404.7344 4,027,728.2520 4,027,659.1582 4,027,285.2500	D17	0.01	SDCA	418812.6560 418722.7810 418531.3750 418650.8440 418812.6560	4025829.9941 4025817.3457 4025787.7188 4025949.5527 4025829.9941	
D13	0.02	SDCA	419,810.5000 419,648.7190 419,772.4690 419,887.8440 419,880.3750 419,832.8130 419,810.5000	4,026,842.2539 4,026,961.7383 4,027,130.8359 4,027,285.2500 4,027,234.3164 4,026,984.5820 4,026,842.2539	D18	0.01	SDCA	418250.0940 418369.5630 418531.2190 418422.7500 418250.0940	4025745.5586 4025907.3164 4025787.8750 4025775.2305 4025745.5586	
D14	2.46	SDCA	412,117.6560 411,983.4060 411,915.1560 411,828.0940 411,988.0310 412,161.8440 412,387.4060 412,577.3130 412,752.9380 412,942.5940 413,298.0630 413,700.7190 413,843.4060 413,892.3750 414,103.4380 414,294.0310 414,574.5630 414,628.3130 414,946.8130 415,303.7810 415,463.6880 415,639.0630 415,777.6250 415,787.8440 415,793.6560 416,290.3440 416,545.3750 416,908.5000 416,207.2500 415,765.2810 415,712.3440 414,755.6880 414,875.1560 414,715.5000 414,832.8440 414,509.4060 414,628.8750 414,432.8750 414,383.9380 414,274.7500 414,249.7810 414,266.4690 414,210.4380 413,519.9380 413,307.2500 413,144.4690 412,117.6560	4,023,538.0977 4,023,714.6152 4,023,883.7793 4,024,594.2207 4,025,141.2695 4,025,254.5859 4,025,234.3184 4,025,175.8184 4,025,413.6777 4,025,667.2090 4,025,913.1816 4,025,878.1113 4,025,859.0313 4,025,869.0625 4,026,021.7207 4,026,188.3672 4,026,473.5742 4,026,552.7695 4,027,212.3789 4,027,171.2480 4,026,711.0117 4,026,577.9492 4,026,784.4590 4,026,793.4668 4,026,794.4512 4,026,429.5527 4,026,241.2695 4,025,969.6309 4,025,017.7598 4,024,422.9277 4,024,368.7461 4,025,075.7559 4,025,237.5156 4,025,356.9941 4,025,518.7598 4,025,757.7637 4,025,919.4863 4,026,064.2539 4,025,997.9883 4,025,678.2109 4,025,496.0098 4,025,323.2305 4,025,245.9863 4,024,988.5723 4,025,145.7637 4,024,931.4102 4,023,538.0977	D19	1.88	SDCA	410989.2810 411145.7810 410728.5630 410525.7190 410434.2500 410330.1560 410249.0940 410165.6880 410012.7810 409988.7810 409958.9380 409834.5940 409710.8750 409588.2190 409472.9060 409364.2190 409273.0310 409231.3750 409192.6560 409142.4380 409121.8750 409108.8130 409094.0000 409085.6880 409078.5310 409061.1250 409045.9690 409033.1250 409029.3750 409009.4380 409000.8440 408748.8130 408748.6880 408752.0000 409002.0630 408999.6250 410005.0940 410001.1880 410254.3750	4022251.9551 4022140.5918 4021605.7773 4021575.8516 4021553.4805 4021538.0020 4021523.9121 4021513.8320 4021489.0801 4021485.5020 4021487.3027 4021472.0918 4021458.8867 4021468.2129 4021506.2676 4021564.2617 4021648.9043 4021698.0781 4021749.2871 4021863.0625 4021936.3730 4021989.7910 4022070.1055 4022117.5977 4022146.7773 4022247.9473 4022310.3633 4022381.5703 4022398.8301 4022518.7207 4022749.8164 4022752.2285 4022994.9199 4023250.6855 4023249.9121 4023000.2637 4022997.9844 4023280.3379 4023245.9746	
D15	0.08	SDCA	418,812.6560 419,051.1560 419,213.4060 419,810.5000 419,655.1250 419,499.9380 419,182.9690 418,812.6560	4,025,829.9941 4,026,152.9863 4,026,034.2168 4,026,842.2539 4,026,404.8789 4,025,999.3496 4,025,925.2813 4,025,829.9941						

## Attachment A

## EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates
D19 continued	1.88	SDCA	410,472.1880	4,023,123.1172	S1	0.71	Study	410001.6560	4042464.2656
			410,718.0630	4,023,206.8965				409290.7190	4042500.2383
			410,862.1250	4,023,378.8164				408861.2190	4042688.4688
			410,821.5940	4,023,731.0039				408813.8750	4042910.9609
			410,665.3750	4,023,862.7910				408859.4380	4043071.8984
			410,401.5000	4,024,041.8867				408972.0940	4043285.6914
			410,411.4380	4,024,308.5215				409337.5310	4043461.0000
			410,520.6560	4,024,349.3066				410500.6560	4043924.3945
			411,162.2810	4,024,681.8047				410962.4690	4044000.3555
			411,124.9690	4,024,778.6250				411096.8440	4043852.2109
			411,222.3440	4,024,873.7930				411108.0630	4043672.6836
			411,392.4060	4,024,792.1602				410984.4380	4043481.0273
			411,607.8130	4,024,539.2461				410592.0940	4043294.9219
			411,737.1560	4,023,825.0313				410496.6250	4043013.0352
			411,867.2500	4,023,463.2520				410003.5310	4043008.3594
			411,784.7500	4,023,306.3613				410001.6560	4042464.2656
			411,582.4060	4,023,006.9551					
			411,126.7810	4,022,795.5957					
			410,994.2500	4,022,416.6367					
			410,989.2810	4,022,251.9551					
D20	0.21	SDCA	414,982.2190	4,021,997.8164	S2	0.27	Study	415072.8130	4041278.8984
			415,176.7190	4,022,263.2852				414928.6560	4041572.7422
			415,103.2190	4,022,320.4727				414740.2500	4042529.6992
			415,581.2500	4,022,965.4922				415304.2190	4042966.9609
			415,817.9380	4,022,790.5078				415642.3130	4042393.3203
			416,056.9060	4,023,113.9902				415234.1250	4041986.6914
			416,207.6250	4,023,003.7656				415072.8130	4041278.8984
			415,998.3750	4,023,002.3203					
			416,002.5310	4,022,602.1270					
			415,526.5000	4,022,002.0215					
D21	0.39	SDCA	414,982.2190	4,021,997.8164	S3	0.72	Study	421548.9690	4029833.7383
			409,784.0630	4,021,446.5840				421571.8750	4030077.3184
			409,836.5940	4,021,452.1992				421631.0310	4031208.7773
			409,959.4380	4,021,467.4043				421439.0940	4031498.2363
			409,986.8440	4,021,465.6152				421216.1560	4031761.8594
			410,014.9380	4,021,469.1094				421260.3750	4031837.4414
			410,109.0000	4,021,484.2637				421371.5310	4031985.9238
			410,027.5940	4,021,036.2754				421398.8440	4032023.9863
			409,998.0310	4,020,801.4766				421454.5000	4032099.1406
			409,487.5940	4,020,143.3262				421509.5310	4032174.3066
			409,409.3130	4,020,065.3262				421645.9690	4032358.6465
			409,373.6560	4,020,006.3652				421725.3130	4032466.9844
			409,360.9380	4,020,010.4766				421769.8440	4032526.2539
			409,276.4690	4,020,023.0879				421827.1560	4032498.3555
			409,280.3750	4,020,086.8984				421952.1880	4032442.4199
			409,223.5310	4,020,182.5996				421854.9690	4031871.4102
			409,166.6250	4,020,986.3672				422105.2500	4031749.0176
			409,146.5630	4,021,804.0762				422299.6560	4031762.5020
			409,176.1250	4,021,738.1621				422592.2190	4031994.7988
			409,218.6880	4,021,681.9980				422701.7500	4032367.5195
409,255.5940	4,021,639.3984	422732.5630	4032243.8984						
409,351.8750	4,021,549.4316	422746.8130	4032159.0254						
409,464.4690	4,021,488.9551	422779.7500	4032064.7734						
409,583.4380	4,021,449.5684	422779.7190	4031946.8984						
409,710.2810	4,021,438.8574	422793.9060	4031814.8984						
409,784.0630	4,021,446.5840	422817.5310	4031682.9316						
D22	0.03	SDCA	414,001.2500	4,020,257.5078	S4	0.15	Study	417410.5630	4023845.5176
			414,001.4690	4,020,502.5137				417398.8440	4023845.8750
			414,426.0000	4,020,500.8262				417387.4380	4023846.9883
			414,464.0310	4,020,432.0313				417377.4060	4023848.7207
			414,293.7190	4,020,338.7207				417367.8440	4023851.0527
			414,135.9690	4,020,279.6660				417358.9380	4023853.9434
			414,001.2500	4,020,257.5078				417350.9380	4023857.4238
D23	0.29	SDCA	409,535.8130	4,018,994.6445				417343.0940	4023861.6250
			409,534.9380	4,019,112.7676				417335.2810	4023866.7793
			409,493.8750	4,019,250.0898				417327.4690	4023872.8066
			409,428.5630	4,019,253.1973				417319.6880	4023879.7500
			409,374.7500	4,019,259.9512				417310.5940	4023888.9688
			409,200.4380	4,019,355.6914				417301.9690	4023899.1680
			409,208.0310	4,019,472.8008				417293.6560	4023910.1230
			409,435.7810	4,019,902.2852				417286.2810	4023921.5137
			409,445.4060	4,019,983.3887				417281.1250	4023930.3848
			409,576.6880	4,020,126.1250				417276.9060	4023939.6543
			410,016.9060	4,020,278.1445				417273.1560	4023949.9414
			410,025.1560	4,019,002.0527				417269.7190	4023961.3281
			409,535.8130	4,018,994.6445				417266.5000	4023975.5664
					417263.6560	4023992.3125			

## Attachment A

## EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)		Area ID	Area (miles )	Area type	Coordinates(UTM Zone11 meters NAD83)				
			X-coordinates	Y-coordinates				X-coordinates	Y-coordinates			
S4 continued	0.15	Study	417,257.5630	4,024,036.4043	S4 continued	0.15	Study	417723.6250	4024112.4082			
			417,255.7810	4,024,053.0898				417716.8440	4024108.7773			
			417,254.3440	4,024,071.4844				417710.6880	4024104.8281			
			417,253.3440	4,024,112.0410				417693.1880	4024092.0859			
			417,253.6880	4,024,135.3887				417683.1250	4024084.1797			
			417,256.4690	4,024,211.2207				417674.4380	4024076.5137			
			417,258.9380	4,024,248.6602				417667.2810	4024069.1191			
			417,260.8130	4,024,266.7930				417661.4690	4024061.8086			
			417,266.0630	4,024,299.1426				417657.0630	4024054.5488			
			417,269.5630	4,024,313.8516				417654.5000	4024048.2773			
			417,274.6560	4,024,330.5859				417652.5000	4024040.8516			
			417,281.5940	4,024,349.5684				417647.9060	4024009.5918			
			417,289.7810	4,024,368.9414				417646.3750	4024002.8047			
			417,298.0630	4,024,386.4863				417644.5940	4023996.9746			
			417,306.2810	4,024,401.4785				417640.7500	4023988.9395			
			417,314.9690	4,024,415.0508				417636.0310	4023980.8086			
			417,324.0630	4,024,427.2441				417630.3750	4023972.9629			
			417,333.2500	4,024,437.8730				417623.6560	4023965.2930			
			417,341.8130	4,024,446.3809				417617.2810	4023958.7949			
			417,362.2810	4,024,463.6328				417609.9690	4023952.3184			
			417,374.6880	4,024,472.7871				417601.7810	4023945.7832			
			417,391.6880	4,024,484.4727				417592.6250	4023939.0781			
			417,422.5940	4,024,504.8984				417575.3440	4023927.6641			
			417,438.9380	4,024,515.1504				417540.5940	4023906.3262			
			417,454.8440	4,024,524.5742				417526.8440	4023897.4316			
			417,469.5000	4,024,532.6895				417515.0940	4023889.3320			
			417,483.8130	4,024,540.1250				417487.6880	4023868.7949			
			417,497.9690	4,024,546.9180				417472.0940	4023858.9844			
			417,525.0310	4,024,558.3184				417463.6560	4023854.8926			
			417,537.3130	4,024,562.7500				417455.1880	4023851.9063			
			417,550.9690	4,024,567.0371				417444.7810	4023849.1504			
			417,565.6880	4,024,571.1504				417433.6250	4023847.1348			
			417,595.7190	4,024,578.3379				417422.1560	4023845.9258			
			417,644.3750	4,024,588.4512				417410.5630	4023845.5176			
			417,671.1560	4,024,593.2676				C1	0.21	Channel	411145.9380	4022140.5117
			417,699.5630	4,024,597.4395							410989.3130	4022252.0020
			417,729.9690	4,024,601.0371							410994.2500	4022416.6367
			417,763.4060	4,024,604.2285							411126.7810	4022795.5957
			417,801.4380	4,024,607.2109							411582.4060	4023006.9551
			417,876.5000	4,024,612.3184							411784.7500	4023306.3613
			417,885.9690	4,024,613.4160							411867.2500	4023463.2520
			417,906.1880	4,024,617.6074							411737.1560	4023825.0313
			417,954.9060	4,024,630.4629							411915.1560	4023883.7793
			417,966.3750	4,024,632.8535							411983.4060	4023714.6152
			417,976.4690	4,024,634.2813							412117.6560	4023538.0977
			417,984.4060	4,024,634.8398							411792.0630	4023094.1152
			417,991.7190	4,024,634.7266							411782.4060	4023076.2949
			417,998.0940	4,024,633.9082							411748.7190	4022994.3965
			418,004.0310	4,024,632.4531							411643.6250	4022726.7266
418,009.1560	4,024,630.2891	411641.6880	4022435.3887									
418,013.8130	4,024,627.4102	411419.2190	4022347.2383									
418,017.8750	4,024,623.8594	411284.5000	4022318.9453									
418,021.4380	4,024,619.5566	411145.9380	4022140.5117									
418,027.1560	4,024,609.7598	C2	0.30	Channel	409201.5000	4019370.5664						
418,032.4060	4,024,597.6895				409173.3130	4019532.8418						
418,034.6560	4,024,589.4512				409115.7190	4019657.4395						
418,035.8750	4,024,580.7773				409058.5940	4019813.5703						
418,035.6560	4,024,570.7617				409055.4380	4019859.0117						
418,034.0630	4,024,559.9766				409098.6560	4019944.7520						
418,031.0630	4,024,548.3418				409192.5940	4020079.2344						
418,026.3750	4,024,535.4473				409223.5310	4020182.5996						
418,020.4690	4,024,521.3984				409280.3750	4020086.8984						
418,000.5310	4,024,478.6465				409276.4690	4020023.0879						
417,984.5630	4,024,435.9668				409352.7190	4020011.6758						
417,970.9060	4,024,402.7227				409373.6560	4020006.3652						
417,957.8130	4,024,373.8125				409409.3130	4020065.3262						
417,943.3130	4,024,343.8242				409487.8750	4020143.3594						
417,931.2500	4,024,320.3027				409998.1880	4020801.4746						
417,918.0940	4,024,295.7734				410027.7500	4021036.2715						
417,880.1250	4,024,228.6719				410109.2810	4021484.2578						
417,859.5000	4,024,190.0117				410174.2810	4021494.7188						
417,854.1250	4,024,181.0176				410242.0940	4021502.6836						
417,848.9380	4,024,173.2773				410335.4060	4021518.5000						
417,843.6250	4,024,166.4160				410438.7190	4021533.8438						
417,838.3130	4,024,160.3535				410529.8750	4021556.1816						
417,832.0940	4,024,154.4258				410712.0940	4021583.1074						
417,825.1250	4,024,149.1992				410602.7500	4021411.3418						
417,816.9690	4,024,144.4160				410686.8440	4021328.9805						
417,807.5630	4,024,140.0762				410488.7190	4020946.7344						
417,799.1250	4,024,136.8242				410264.6250	4020620.0820						
417,789.4690	4,024,133.5957				410015.6880	4020454.4902						
417,744.3750	4,024,120.6641											
417,733.3130	4,024,116.6641											

# Attachment A

## EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

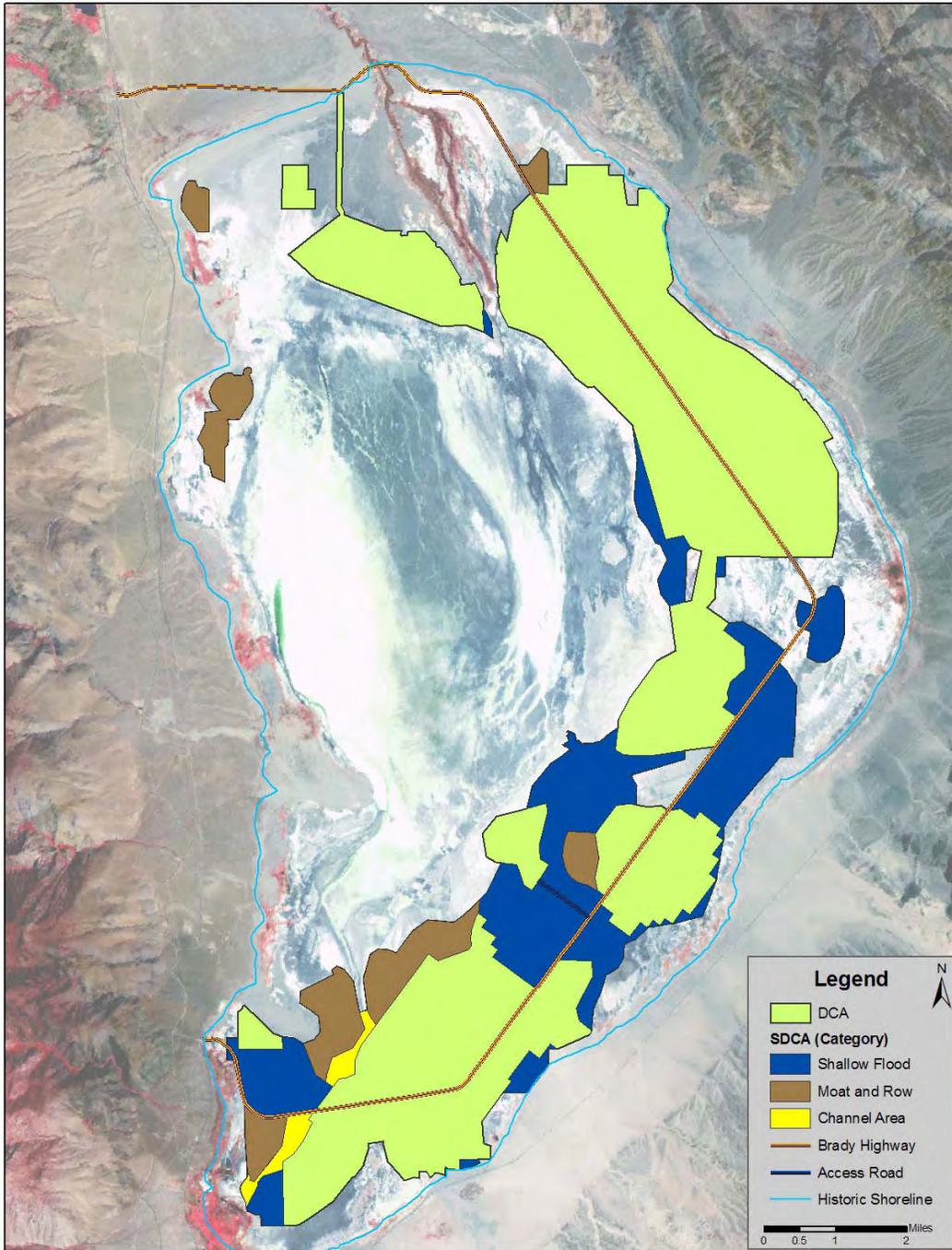
Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates
C2 continued	0.30	Channel	410,016.9060 409,576.6880 409,445.4060 409,435.7810 409,208.0310 409,201.5000	4,020,278.1445 4,020,126.1250 4,019,983.3887 4,019,902.2852 4,019,472.8008 4,019,370.5664

Total SDCA	12.77
Total Study	1.85
Total Channel	0.50

# Attachment A

## EXHIBIT 3 -- DUST CONTROL MEASURE MAP

*Shown are dust control measures assigned to areas within the SDCA.*



# Attachment A

## EXHIBIT 4 -- DUST CONTROL MEASURE DESCRIPTIONS

Brief descriptions of dust control measures for use on Owens Lake are given below. More detailed descriptions of the three BACM approved dust control methods (shallow flooding, managed vegetation and gravel) are provided in the 2003 SIP. Modifications to these measures as provided in the Settlement Agreement (Agreement) are noted. All references are to sections of the Agreement; section numbers of the Agreement are contained in square brackets.

### Shallow Flooding

The “shallow flooding” (SF) dust control measure involves wetting emissive lake bed surfaces to reduce dust emissions. Performance specifications and a detailed description of the SF measure are provided in the 2003 SIP for achieving 99 percent PM<sub>10</sub> control efficiency. Otherwise, water shall be applied in amounts sufficient to achieve the required wetness cover as specified in Sections 3 through 5, 25, 26, and 27, or as modified under the provisions of Sections 5, 14, 15, 18, and 29. Satellite imagery, aerial photography or other methods approved by the APCO under the provisions of Section 29 are used to measure wetness cover for compliance.

### Managed Vegetation

The “managed vegetation” (MV) dust control measure involves establishing a plant cover on emissive lake bed surfaces to protect them from the wind, thereby reducing dust emissions. Performance specifications and a detailed description of the MV control measure are provided in the 2003 SIP for achieving 99 percent PM<sub>10</sub> control efficiency. Vegetative cover on the MV site present on the lake bed on January 1, 2007 shall be as specified in Section 6. The performance specification of MV may be modified under the provisions of Section 29. Point-frame measurements satellite imagery or other methods approved by the APCO under the provisions of Section 29 are used to measure plant cover for compliance.

### Gravel Cover

The “gravel cover” (GC) dust control measure involves placing a layer of gravel on emissive lake bed surfaces to protect them from the wind, thereby reducing dust emissions. Performance specifications are described in the 2003 SIP.

### Moat and Row

The general form of the “moat and row” (MR) measure is an array (see Figure E4-1) of earthen berms (rows) about 5 feet high with sloping sides, flanked on either side by ditches (moats) about 4 feet deep (see Figure E4-2). Moats serve to capture moving soil particles, and rows physically shelter the downwind lake bed from the wind. The individual MR elements are constructed in a serpentine layout across the lake bed surface, generally parallel to one another, and spaced at variable intervals, so as to minimize the fetch between rows along the predominant wind directions. The serpentine layout of the MR array is intended to control emissions under the full range of principal wind directions (see Figure E4-1). Initial pre-test

## Attachment A

modeling indicates that MR elements' spacing will generally vary from 250 to 1000 feet, depending on the surface soil type and the PM<sub>10</sub> control effectiveness required on the MR area.

The PM<sub>10</sub> control effectiveness of MR may be enhanced by combining it with other dust control methods such as vegetation, water, gravel, sand fences, or the addition of other features that enhance sand capture and sheltering or directly protect the lake bed surface from wind erosion. The effectiveness of the array can also be increased by adding moats and rows to the array, which reduces the distance between rows.

The final form of MR will largely be determined from the results of testing on the lake bed as provided in Sections 7 and 8. Final design is subject to test results, required PM<sub>10</sub> control effectiveness, environmental documentation and permitting, engineering, and monitoring considerations.

In areas where MR is used as a control measure, the City shall implement the measure in a manner consistent with the Agreement, particularly Sections 7 and 8, or as modified by actions pursuant to Sections 18 through 24.

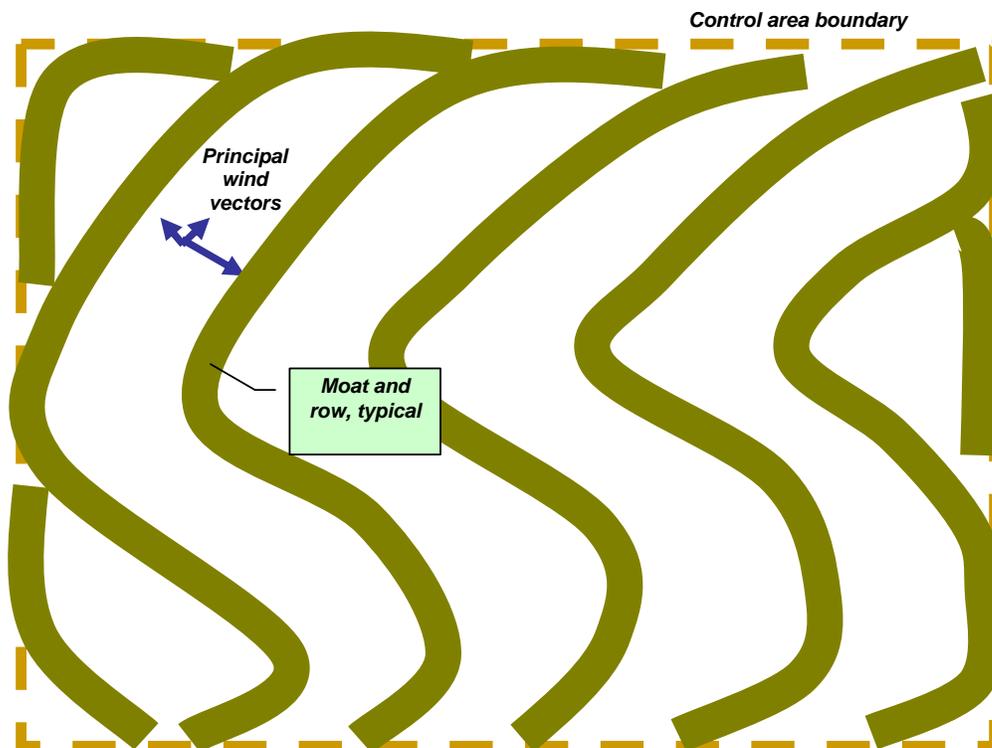


Figure E4-1. Moat and Row Array Plan View (schematic).

# Attachment A

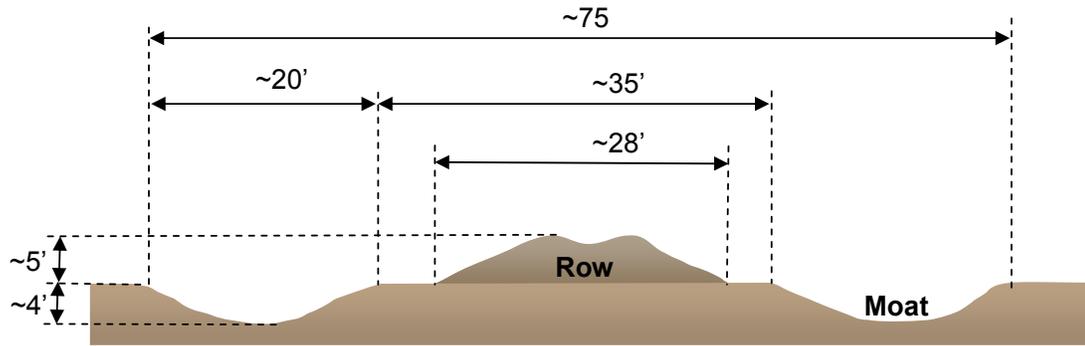


Figure E4-2. Profile of Moat and Row with Approximate Dimensions (schematic).



# Attachment A

## EXHIBIT 6 -- MDCE SELECTION PROCESS

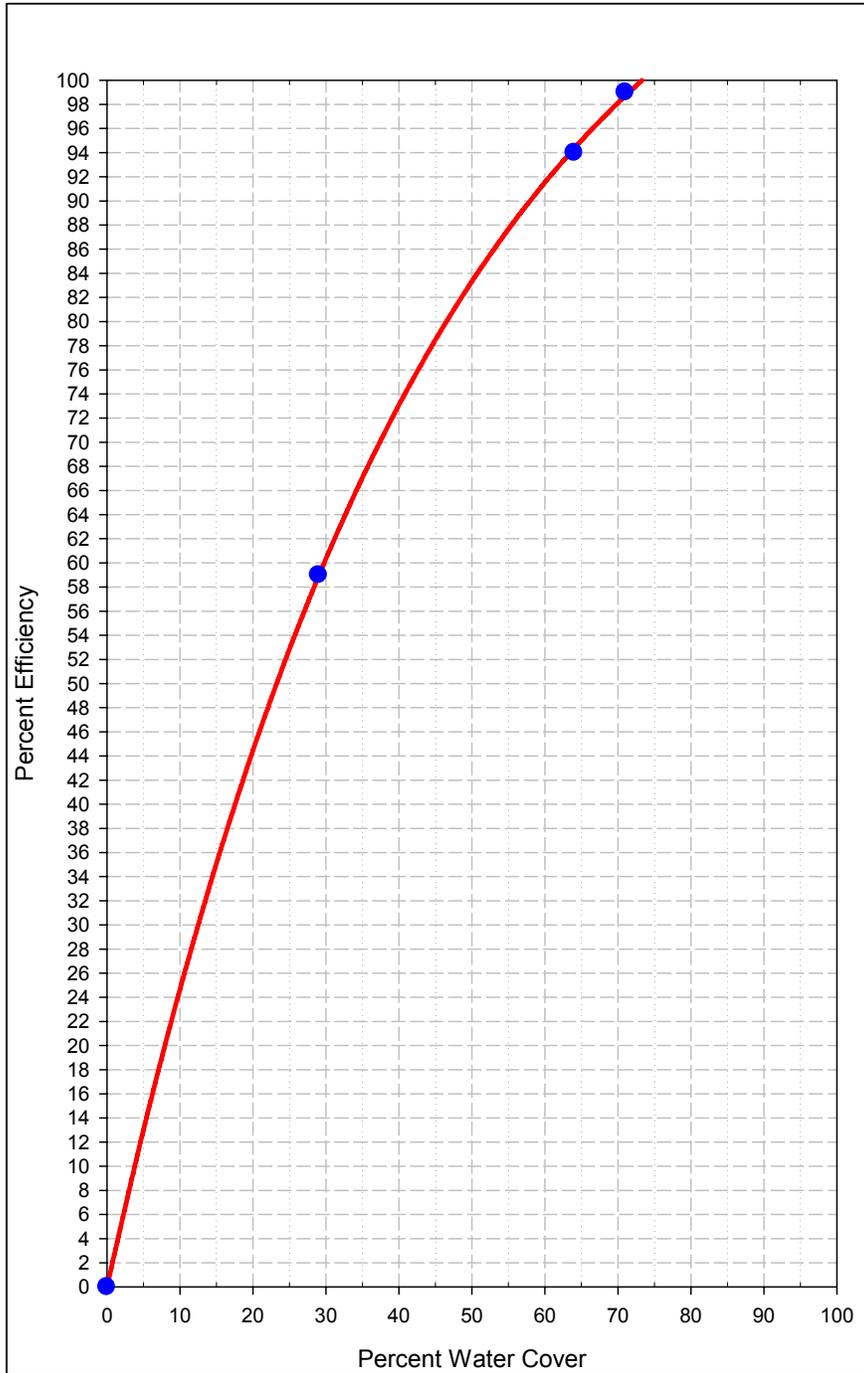
This exhibit summarizes the purpose of the MDCE Selection Process Spreadsheet. A copy of the Process Spreadsheet, which contains a description of the spreadsheet structure and operation, may be downloaded from the District's website at <http://www.gbuapcd.org/>.

The District developed the Dust ID Model as a tool for identifying dust control areas on the lake bed. The Dust ID Model computes the amount of dust being generated from each source area on the lake bed, but the results cannot be used without additional processing to identify the acceptable combinations of dust control required on each source area (that is, each area's minimum dust control efficiency or "MDCE") to achieve the federal 24-hour PM<sub>10</sub> standard along the shoreline. There are many possible combinations of MDCEs that could produce the acceptable result of achieving the standard at the shoreline. For example, 50 percent control on hypothetical Area 1 and 99 percent control on Area 2 may produce the same modeled shoreline concentration as 99 percent control on Area 1 and 50 percent control on Area 2. However, the first combination might be more practical and less costly than the second, and for that reason it is important to have a process that can quickly and efficiently identify acceptable combinations. In all cases, the outcome of this process is some combination of area-by-area dust control efficiencies that produces a modeled attainment of the federal PM<sub>10</sub> standard everywhere along the shoreline.

The process for selecting the acceptable combinations of dust control levels has been, heretofore, a manual process. The MDCE Selection Process Spreadsheet (Process Spreadsheet) was developed to more quickly and efficiently identify combinations of dust controls required to produce compliance with the federal 24-hour PM<sub>10</sub> standard along the shoreline. The worksheet is set up so that MDCE calculations are automatic, yet it still allows manual adjustments to be made.

# Attachment A

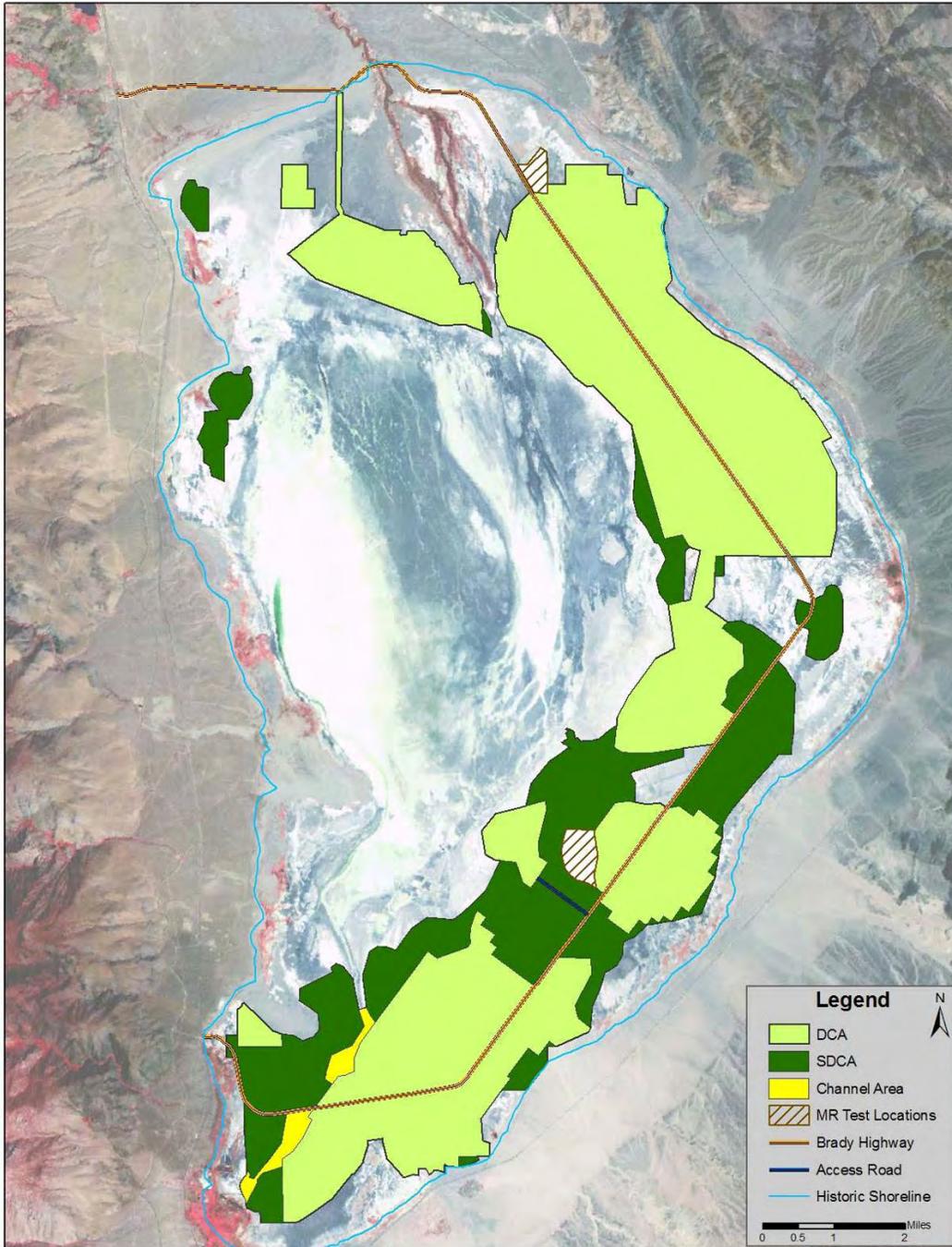
## EXHIBIT 7 -- SHALLOW FLOOD CONTROL EFFICIENCY CURVE



# Attachment A

## EXHIBIT 8 -- MOAT AND ROW DEMONSTRATION PROJECT LOCATION MAP

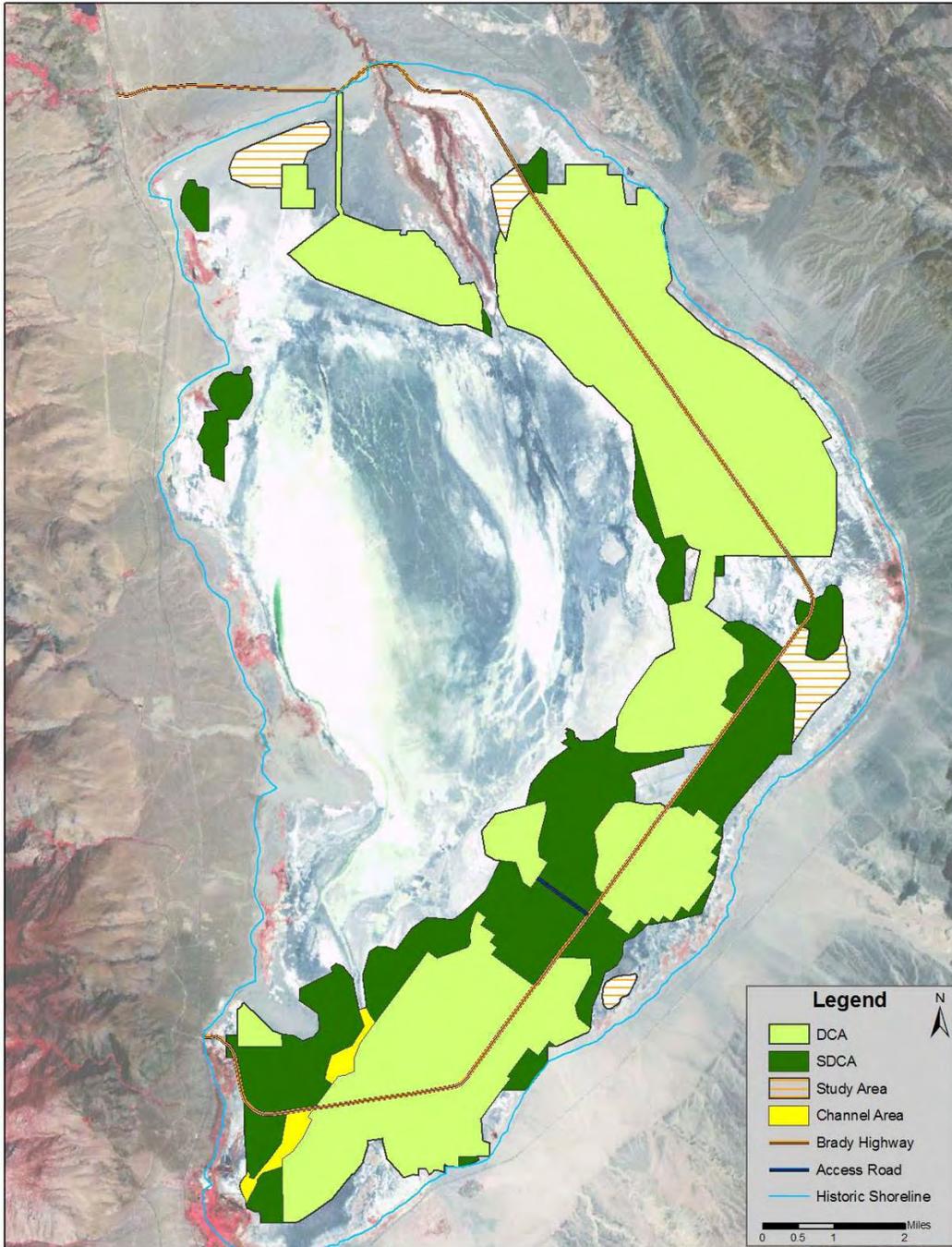
*Two proposed moat and row demonstration project locations*



# Attachment A

## EXHIBIT 9 -- STUDY AREA MAP

*Four proposed study area locations*



## Attachment A

## EXHIBIT 10 -- SCHEDULE OF CONTINGENCY MEASURES

<i>Issue</i>	<i>Resolution</i>	<i>Duration</i>	<i>Units</i>
<b>Moat and Row</b>			
Eroded row	Install armoring to prevent further erosion	2	mo/mile
	Install sand fences to prevent further erosion	1	mo/mile
	Reconstruct row in place or adjacent	2	mo/mile
Filled moat	Re-excavate new moat outboard of filled moat, expand existing row onto filled moat	2	mo/mile
Filled sand fence	Clean out or flank with new sand fences	2	mo/mile
Collapsed sand fence	Repair or flank with new sand fences	1	mo/mile
Spacing too large	Pull in intervening sand fence	1	mo/mile
	Add intervening moat and row	3	mo/mile
	Enhance with vegetation and/or wetness	12 to 36	months
	Soil roughening	1 to 3	months/sq mi
	Conversion to reduced BACM/BACM	See Exhibit 11	
<b>Managed Vegetation</b>			
Emissions from bare areas	Enhance/restore vegetation	36	months
Emissions from vegetated areas	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
	Determine and establish necessary cover	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
<b>Gravel Patches</b>			
Infilling pore spaces	Supplement gravel depth	4	months/sq mi
	Stabilize by other means (e.g., vegetation, wetness, sand fences)	6 to 36	months
<b>Shallow Flood</b>			
Emissions from dry areas (insufficient uniformity of wetting )	Wet dry areas. May require land leveling and/or additional laterals.	12	months
Generally too dry	Increase water application rate relative to ET	1	month
<b>Other features</b>			
Gravel source	Open new or re-open existing quarry	4	months
Emissions from roads, berms, etc.	Increase watering frequency	1	month
	Stabilize by other means (e.g., gravel, stabilizing agents)	1 to 4	months/sq mi

# Attachment A

## EXHIBIT 11 -- MOAT AND ROW TRANSITION SCHEDULE

Activity	Duration (years )
Shallow flood transition from moat & row	1.9
Managed vegetation transition from moat & row	5.9
Gravel cover transition from moat & row	1.8
<i>Mutually agreeable exceptions:</i>	
	<i>Increase over and above durations listed above (years)</i>
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0

## EXHIBIT 12 -- DCM OPERATION SCHEDULE

Activity	Duration (years )
New area shallow flood DCM <sup>a</sup>	2.9
New area managed vegetation DCM <sup>a</sup>	6.1
New area gravel cover DCM <sup>a</sup>	2.2
<i>Mutually agreeable exceptions:</i>	
	<i>Increase over and above durations listed above (years)</i>
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0
4. Expanded CEQA triggered	1.4
<sup>a</sup> Assumes that total new area <2 square miles per year	

**Attachment A****EXHIBIT 13. DEFINITIONS**

- A. “Background PM<sub>10</sub> concentration” shall mean the concentration of PM<sub>10</sub> caused by sources other than from wind blown dust emanating from the Owens Lake bed. For the purpose of modeling air quality impacts, the background concentration is assumed to be 20 µg/m<sup>3</sup> (micrograms per cubic meter) during every hour at all receptor locations. The monitored and modeled PM<sub>10</sub> emissions from the Keeler Dunes, which are located off the lake bed are treated as a separate dust source area and are not included in the background concentration.
- B. “Best Available Control Measures” or “BACM” shall have the same definition as in the federal Clean Air Act. Approved BACM in the 2003 SIP was associated with PM<sub>10</sub> emission reductions of at least 99 percent and includes managed vegetation, shallow flood, and gravel cover.
- C. “Contingency measures” shall mean dust control measures or modifications to the dust control measures that can be implemented to mitigate dust source areas that cause or contribute to an exceedance of the federal standard at the historic shoreline in the event that a previously approved control strategy was found to be insufficient.
- D. “Control Area” shall mean an area on the lake bed for which dust control is required.
- E. “Control efficiency” shall mean the relative reduction or percent reduction in PM<sub>10</sub> emissions resulting from the implementation of a control measure compared to the uncontrolled emissions.
- F. “Control measures” shall mean measures effective in reducing the PM<sub>10</sub> emissions from the lakebed surface over which they are implemented.
- G. “Dust control measure” or “DCM” shall mean measures designed to suppress sand motion and reduce dust emissions from the Owens Lake bed.
- H. “Dust ID Model” shall mean a computer-based air quality modeling approach developed as part of the 2003 SIP to identify emissive areas on the Owens Lake bed and to estimate the resulting PM<sub>10</sub> concentrations at the shoreline. See also “Dust ID Program.”
- I. “Dust ID Program” shall mean a long-term monitoring and modeling program that is used to identify dust source areas at Owens Lake that cause or contribute to exceedances and violations of the federal PM<sub>10</sub> standard. The current protocol for conducting the Dust ID Program is

**Attachment A**

included in the 2003 SIP (Exhibit 2 – Attachment 4). See also “Dust ID Model.”

- J. “Emission rate” shall mean the rate (expressed as mass per unit area per unit time) at which an air constituent (PM<sub>10</sub>, for example) is transported away from the surface of the lake bed.
- K. “Exceedance of the federal standard” or “exceedance” shall mean any single-day PM<sub>10</sub> concentration that is monitored or modeled to be above 150 µg/m<sup>3</sup> (24-hour average from midnight to midnight) at any location at or above the historic shoreline.
- L. “Historic shoreline” or “shoreline” shall mean the elevation contour line of 3,600 feet above mean sea level at Owens Lake, California.
- M. “Lake bed” or “Owens Lake bed” or “playa” shall mean the exposed surface within and below the historic shoreline.
- N. “Managed Vegetation” is a Dust Control Measure consisting of lakebed surfaces planted with protective vegetation.
- O. “May not lawfully be included in the SIP” shall mean that inclusion of the provision in question in the revisions to the 2003 SIP has been determined by binding judicial order to be unlawful.
- P. “MCDE-BACM” shall mean Dust Control Measures that achieve Minimum Dust Control Efficiency and are found to be appropriate for the area of application.
- Q. “Minimum Dust Control Efficiency” or “MDCE” shall mean the lowest dust control efficiency, as determined by the Dust ID model, in the Supplemental Dust Control Area necessary to meet the federal standard at the historic shoreline.
- R. “Moat and Row” shall mean a Dust Control Measure consisting of arrays of sand breaks that arrest sand motion.
- S. “PM<sub>10</sub>” or “particulate matter” shall mean atmospheric particulate matter less than 10 micrometers in nominal aerodynamic diameter.
- T. “PM<sub>10</sub> monitor” shall mean an instrument used to detect the concentrations of PM<sub>10</sub> in the air.
- U. “Sand flux monitor” shall mean a device used to measure the amount and/or rate of moving or saltating sand and sand-sized particles caused by wind erosion.

**Attachment A**

- V. “Shallow Flood” is a Dust Control Measure consisting of lakebed areas wetted to a specified proportion of surface coverage.
- W. “2003 SIP” or “2003 Owens Valley PM<sub>10</sub> State Implementation Plan” shall mean the Owens Valley PM<sub>10</sub> Planning Area Demonstration of Attainment State Implementation Plan 2003 Revision – Adopted November 13, 2003.
- X. “Supplemental Control Requirements” or “SCR” shall mean Dust Control Measures required by the District on areas outside of the DCA that cause or contribute to an exceedance of the federal PM<sub>10</sub> standard at the historic shoreline of Owens Lake.

# Attachment A

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**Attachment B****Board Order 080128-01  
Attachment B****2008 Owens Valley Planning Area  
Supplemental Control Requirements Determination Procedure****BACKGROUND**

The State Implementation Plan (SIP) adopted by the Great Basin Unified Air Pollution Control District (District) in 2003 required the City of Los Angeles (City) to install and operate PM<sub>10</sub> controls on a total of 29.8 square miles of the dried Owens Lake bed by the end of 2006. The 2003 SIP also contained a provision and procedures for an annual review of air quality monitoring data by the District's Air Pollution Control Officer (APCO) in order to determine if controls were needed on additional areas beyond the 29.8 square miles in order for the Owens Valley Planning Area to attain or maintain the federal 24-hour PM<sub>10</sub> National Ambient Air Quality Standard (NAAQS). If additional controls were needed, the 2003 SIP provided for the APCO to require the City to implement the necessary controls. This annual review and possible requirement for additional controls is known as the Supplemental Control Requirements (SCR) determination. The 2003 SIP required that SCR determinations use data collected starting July 1, 2002.

In December 2005, after analyzing data collected from July 2002 through June 2004, the District's APCO made the first SCR determination under the provisions of the 2003 SIP. The City objected to the APCO's analysis and submitted an alternative analysis of the data. After reviewing the City's analysis, the APCO revised the SCR determination in April 2006. The City also objected to the revised determination and filed a lawsuit against the District in May 2006. In June 2006 the City and the District entered into settlement negotiations in an attempt to resolve their disputes.

In December 2006 a final Settlement Agreement was approved by the District and the City. This agreement is Attachment A to Board Order 080128-01. Among other issues, the Settlement Agreement provides for modifications to be made to the 2003 SIP's SCR determination procedure. These modifications are incorporated into this revised 2008 SCR determination procedure.

**CONDITIONS**

The 2008 Owens Lake Dust Source Identification Program Protocol (Protocol) (Attachment C) contains the procedures to collect, screen, analyze and model the data used by the District's APCO to determine if exceedances of the 24-hour PM<sub>10</sub> NAAQS have occurred and additional Supplemental Controls are necessary on the Owens Lake bed. The following actions may be taken by the APCO and will not be considered a change to the Protocol:

- Add, remove or move PM<sub>10</sub> monitors and meteorological stations
- Replace TEOMs with any other USEPA-approved Reference or Equivalent Method monitors that collect hourly concentration data
- Replace Sensits with any other sand flux monitor (SFM) that collects hourly data
- Replace Cox Sand Catchers with any other SFM

## Attachment B

- Add, remove or move SFMs as long as the maximum grid cell size for modeling remains at one square kilometer
- Calculate “from-the-lake” wind directions for new PM<sub>10</sub> monitor sites
- Determine default K-factors for new source areas

The Protocol and these Supplemental Control Requirements (SCR) specify many assumptions and decision trees to be followed that may need to be changed in the future. The following changes to the Protocol and the SCR may be made by written agreement of the APCO and the General Manager of the City of Los Angeles (City) Department of Water and Power:

- The background value of 20 µg/m<sup>3</sup> may be changed to another value or a procedure may be established to calculate the background from upwind/downwind lake bed monitors
- The default K-factors may be updated
- The default seasonal cut points may be updated
- The CalPUFF modeling system may be changed to another USEPA guideline model
- The procedure for determining the sand flux from a Dust Control Measure (DCM) area may be updated
- The K-factor screening criteria may be updated
- From-the-lake wind directions in Attachment B, Table 1 may be changed to avoid including off-lake sources
- Non-reference or non-equivalent method special purpose PM<sub>10</sub> monitors may be added
- Procedures for determining source area boundaries may be updated
- Methods for directly measuring source area emission rates may be implemented

### DEFINITIONS

A **shoreline or near-shore PM<sub>10</sub> monitor** is a fixed or portable USEPA-approved Federal Reference Method or Equivalent Method PM<sub>10</sub> Monitor located approximately on the 3600-foot elevation (historic shoreline) contour, or within the Owens Valley Non-Attainment Area above the 3600-foot elevation. The existing shoreline or near-shore PM<sub>10</sub> monitors are at Keeler, Flat Rock, Shell Cut, Dirty Socks, Olanca, Bill Stanley and Lone Pine (see Attachment B, Map 1).

A **special purpose PM<sub>10</sub> monitor** is a fixed or portable USEPA-approved Federal Reference Method or Equivalent Method PM<sub>10</sub> monitor installed upwind of or near potential dust source areas on the lake bed below the 3600-foot elevation. These lake bed PM<sub>10</sub> monitors will be used to monitor new dust sources areas to generate new K-factors and to evaluate model predictions at the PM<sub>10</sub> sites. They shall not be used to monitor compliance with the NAAQS and the data will not be submitted to USEPA’s Aerometric Information and Retrieval System (AIRS).

An **exceedance** is a midnight to midnight Pacific Standard Time 24-hour average PM<sub>10</sub> concentration greater than 150 µg/m<sup>3</sup> measured by a shoreline or near-shore PM<sub>10</sub> monitor.

**From-the-lake wind directions** are determined by extending two straight lines from the PM<sub>10</sub> monitor site to the points on the 3600-foot contour of the Owens Lake bed that maximize the angle in the direction of the lake bed between the two straight lines. From-the-lake and non-lake wind directions for the existing PM<sub>10</sub> monitor sites are shown in Attachment B, Table 1.

## Attachment B

**Physical evidence** of a source area boundary consists of Global Positioning System (GPS) data, visual observations, photographic observations, video observations, or any other method described for this purpose in the Dust ID Protocol.

**BACM** are Best Available Control Measures/Most Stringent Measures (MSM) defined as the dust controls determined to be BACM/MSM for Owens Lake in Paragraphs 15, 16 and 17 of Board Order 080128-01. If, in the future, the District changes or deletes existing BACM or adds new BACM, then the dust controls are those as revised by the latest District action.

**Implements BACM control measures** means BACM are constructed and meeting the performance standards outlined Paragraphs 15, 16 and 17 of Board Order 080128-01.

**Extreme violators** are areas currently required to implement BACM, but BACM are found to be insufficient to adequately control emissions.

**Environmental analysis document complete** means that a project level environmental document has been certified covering the location and the BACM/MSM selected for implementation by the City.

### GENERAL SCR DETERMINATION PROCEDURE

1. If the City is in compliance with Paragraphs 1 and 3 of Board Order 08128-01 regarding the amount, timing and operation of existing and future dust controls, the APCO will not issue additional written SCR determinations until after May 1, 2010 and will not use data collected prior to April 1, 2010 for new determinations, except for Study Areas as provided in Paragraph 2, below. This will allow the City time to complete construction and implementation of the additional PM<sub>10</sub> controls within the 2008 Total Dust Control Area.
2. After May 1, 2010, the APCO will recommence written SCR determinations using the latest SCR procedure. Recommended determinations will use data collected only after April 1, 2010, except in those areas delineated as Study Areas. SCR determinations for Study Areas shall use data collected after July 1, 2006. The APCO shall make SCR determinations at least once in every calendar year. SCR determinations shall make reasonable efforts to account for impacts caused by Dust Control Measure construction activities.
3. If, pursuant to Paragraph 2, herein, the APCO determines that a monitored or modeled exceedance of the federal 24-hour PM<sub>10</sub> NAAQS caused by emissions from the lake bed has occurred at or above the historic shoreline:
  - A. The APCO, based on all available information, including, visual observation, physical evidence, monitoring and modeling, and in consultation with the City, will identify the need for additional controls, monitoring, or both.
    - (i) If the APCO identifies the need for additional controls and/or increased MDCE on existing controls, the APCO shall issue a written SCR determination to the City.

**Attachment B**

- (ii) If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an alternative analysis of the data used by the APCO to make the determination.
  - (iii) If the City submits an alternative analysis, the APCO shall consider the City's analysis and has full and sole discretion to withdraw, modify or confirm the SCR determination. If the APCO takes action to withdraw or modify the SCR determination, he shall do so within 60 days of the City's submittal of the alternative analysis.
  - (iv) If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's action, the City may initiate the Dispute Resolution Process pursuant to Paragraph 32 of the 2006 Settlement Agreement between the District and the City (Attachment A to Board Order 080128-01). The APCO may modify the SCR determination based on the outcome of the Dispute Resolution Process.
  - (v) In the event the Parties are unable to resolve disagreements over the APCO's SCR determinations through the Dispute Resolution Process, the City may appeal the APCO's SCR determinations to the California Air Resources Board (CARB) under the provisions of Health and Safety Code Section 42316. The CARB will act within 90 days on the City's appeal.
  - (vi) The implementation of additional control measures under the SCR determination process will be considered contingency measures under Section 172(c)(9) of the federal Clean Air Act and will be implemented automatically upon final action of the SCR determination.
- B. The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Paragraph 6 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.
- C. If the City proposes in their Remedial Action Plan to decrease the control efficiency in any previously controlled dust source area, the City must demonstrate that the proposed strategy will control dust sources to the extent that there are no modeled exceedances at the shoreline based on:
- (i) new dust event(s) that caused or contributed to a modeled or monitored exceedance,
  - (ii) dust events that took place from July 2002 through June 2006 based on the results of the MDCE Selection Process Spreadsheet as set forth in the 2006 Settlement Agreement, and
  - (iii) that previously determined control efficiency levels are maintained in (a) all areas that are required to have 99% control efficiency or higher in the 2003 SIP Dust Control Area and (b) new dust source areas that are not included in the MDCE Selection Process Spreadsheet.

## Attachment B

D. The District may, as appropriate, also issue Notices of Violation.

4. In the event:

- A. The APCO has made a written determination pursuant to Paragraph 3 that an exceedance of the federal standard, occurring after April 1, 2010, resulted from a Control Area or portion of a Control Area treated with the Moat & Row PM<sub>10</sub> control measure; and
- B. That Control Area or portion of a Control Area causing the exceedance was remediated by the City as provided in Paragraph 6 below; and
- C. That Control Area or a portion of that Control Area is subsequently the sole cause of an exceedance of the federal standard at or above the historic shoreline, (i.e., an exceedance occurred after the City's initial attempt to remediate that area under Paragraph 6);

then the City shall convert that Control Area, or that portion of that Control Area, from Moat & Row to MDCE-BACM or BACM as described in Paragraphs 15, 16 and 17 of Board Order 080128-01, to address the exceedance described in Paragraph 4.C., for all or the portion of that Control Area that caused the subsequent exceedance, under the time deadlines provided for in Paragraph 9.

- 5. If the APCO determines that Moat & Row constitutes BACM or MDCE-BACM as provided for in Attachment D of Board Order 080128-01, "2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area," then upon issuance of such written determination, the provisions of Paragraph 4 that require the City to convert to BACM or MDCE-BACM may be satisfied by applying the BACM or MDCE-BACM approved under this Paragraph 5.
- 6. A Remedial Action Plan prepared by the City pursuant to Paragraph 3.B will contain a description of:
  - A. Any and all needed changes, repairs or enhancements to DCMs, including one or some combination of the following:
    - (i) Maintenance of facilities (*e.g.*, berms, moats and rows);
    - (ii) Changes to Shallow Flood or Managed Vegetation facilities or operations (*e.g.*, increase in wetness cover extent, improved wetness cover distribution, enhancement of vegetation);
    - (iii) Augmentation (*e.g.*, more moats and rows) or enhancement (*e.g.*, surface-protecting elements) of Moat & Row areas;
    - (iv) Transition of Moat & Row areas to BACM, or MDCE-BACM.

## Attachment B

- B. Any and all needed expansion of DCMs, and specific plans for expanding the measures.
  - C. A schedule for the work to be performed to implement the changes, clearly indicating the point at which facilities will be operational and effective at design levels.
7. The Schedule of Contingency Measures incorporated as part of this Procedure as Attachment B, Exhibit 1 sets forth a non-exclusive list of items that shall be included by the City in its Remedial Action Plans, described in Paragraph 6, and the timing required for their implementation.
  8. Before any full-scale Moat & Row areas are operational, the City shall submit to the District a conceptual design and schedule for possible implementation of BACM or MDCE-BACM to each Moat & Row area consistent with Paragraph 4. These designs and schedules are the potential contingency measures to be implemented by the City where a transition from Moat & Row to another DCM is needed, or where such transition is required pursuant to Paragraph 4.
  9. Areas to be transitioned from Moat & Row to BACM or MDCE-BACM will be operational within the times set forth in the Moat & Row Transition Schedule incorporated as Attachment B, Exhibit 2. DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule incorporated as Attachment B, Exhibit 3. In all cases, the time allowed for implementation of control measures shall not include any time between the City's appeal to the California Air Resources Board under the provisions of Health and Safety Code Section 42316 and resolution of such an appeal.

### **DETAILED SCR DETERMINATION PROCEDURE**

Exceedances of the federal 24-hour PM<sub>10</sub> National Ambient Air Quality Standard of 150 µg/m<sup>3</sup> at or above the historic shoreline of Owens Lake (elevation 3600 feet above mean sea level) can either be measured directly via a PM<sub>10</sub> monitor or they can be modeled using the procedures set forth in the latest Owens Lake Dust Source Identification Program Protocol. Set forth below are the two procedures to be used by the APCO in making SCR determinations: the first uses directly monitored exceedances and the second uses modeled exceedances.

#### **A. MONITORED EXCEEDANCES**

##### **A.1 – Do lake bed source areas cause or contribute to a monitored 24-hour average PM<sub>10</sub> concentration greater than 150 µg/m<sup>3</sup> at an historic shoreline PM<sub>10</sub> monitor or at a near-shore PM<sub>10</sub> monitor?**

Any event that causes a monitored 24-hour average PM<sub>10</sub> concentration greater than 150 µg/m<sup>3</sup> at a shoreline or near-shore PM<sub>10</sub> monitor will be evaluated to determine if lake bed dust source areas caused or contributed to the exceedance. The following steps will be used to screen hourly PM<sub>10</sub> concentrations to determine if a lake bed source area caused or contributed to a monitored exceedance:

- 1) For hourly average from-the-lake wind directions, use the recorded hourly PM<sub>10</sub> concentration.
- 2) For hourly average non-lake wind directions or missing data, replace the recorded hourly PM<sub>10</sub> concentration with the background concentration of 20 µg/m<sup>3</sup>.

## Attachment B

- 3) Average the adjusted hourly concentrations from steps 1 and 2 for the 24-hour period from midnight to midnight, Pacific Standard Time.

If the 24-hour average of the adjusted hourly PM<sub>10</sub> concentrations exceeds 150 µg/m<sup>3</sup> at the monitor site, go to A.2. If not, go to B.1.

### A.2 – Is there physical evidence of lake bed emissions and/or air quality modeling sufficient to define boundaries for the area to be controlled?

#### Source Delineation.

If possible, the boundary of a dust source area will be delineated by a GPS survey. Under certain circumstances, the surveyed boundary of the dust source area will not result in a closed polygon. If the GPS survey yields a partial boundary and not a closed polygon, then the polygon area may be closed, if the length of the closure is equal to or less than one-half kilometer or is less than 20 percent of the surveyed source area perimeter, whichever is smaller. The ends of the partial surveyed area boundary will be completed with a straight line, unless survey notes or visual observations indicate that a different shaped boundary should be used. If the surveyed source area boundary has a complex shape, then the partial boundary to be closed will use the best available field and visual data to connect the two ends and form the polygon. Boundaries of existing controlled areas or other previously located boundaries will be used in place of a GPS survey boundary, if the survey notes or visual observations indicate the erosion area extends to that boundary.

If the GPS boundary described above is not available, the area will be defined by any one or a combination of GPS surveying, visual observations, and video observations or any other method described in the Dust ID Protocol (Attachment C).

If neither the GPS boundary nor other physical evidence, as described above, is available, the default area size will be one square kilometer centered on the sand flux monitor (SFM), or one grid cell if the SFMs are in a closer array.

If there is physical evidence, as described above, to define the boundaries for the area to be controlled, and no K-factor for that area or no sand catch data above one gram for the sampling period from a sand flux sampler located within a 30 degree upwind cone centered on the wind direction of the defined source, then modeling cannot be performed. Go to A.3.

#### Modeling.

If sand flux data is available for the exceedance identified in A.1, the District will model the event. Modeling will be performed following the latest Dust ID Modeling Protocol using the source area determined above.

The order of priority for applying K-factors in the model will be:

- 1) When available, the District will use event specific storm-average K-factors to model dust events at the PM<sub>10</sub> monitor if there are three or more hours of screened hourly K-factors for a 48-hour period. If not,

## Attachment B

- 2) The District will use the most recent temporal and spatial 75-percentile hourly K-factors to model events, if there are nine or more screened hourly K-factors for a period and they are determined by the methods described in the most current Dust ID Protocol. If not,
- 3) The District will use the default K-factors in Attachment B, Table 2 to model events, based on the month of the event being investigated and the K-factor area.

Only those on-lake and off-lake dust sources with sand flux data will be included in the model. All data collected by the District pursuant to this Section shall be shared with the City within 30 days of final data review.

The modeling results will be used to prioritize multiple upwind source areas for control, or to determine the fraction of a single upwind source area that needs to be controlled.

Go to A.3

If neither physical evidence nor model results are available, go to A.5.

### A.3 – District directs City to implement dust controls.

Source areas in A.2 that cause or contribute to an exceedance may be new source areas, or may be emissions from areas with existing dust controls. The APCO will determine, in writing, that conditions specified in Section A.1 were met for a specified area determined by A.2. For emissions from areas with existing dust controls, the City will have the choice of increasing the controls in the existing dust control areas or controlling other contributing sources that will result in lowering the monitored impact below the 150  $\mu\text{g}/\text{m}^3$  exceedance threshold, if such areas exist. If the APCO identifies the need for additional controls, the APCO shall issue a written SCR determination to the City.

If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an alternative analysis of the data used by the APCO to make the determination. If the City submits an alternative analysis, the APCO shall consider the City's analysis and may withdraw, modify or confirm the SCR determination. If the APCO takes action to withdraw or modify the SCR determination, he shall do so within 60 days of the City's submittal of the alternative analysis.

If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's final action, the City may initiate the Dispute Resolution Process pursuant to Paragraph 32 of the 2006 Settlement Agreement between the District and the City (Attachment A to Board Order 080128-01). The APCO may modify the SCR determination based on the Dispute Resolution Process.

In the event the Parties are unable to resolve disagreements over the APCO's SCR determinations through the Dispute Resolution Process, the City may appeal the APCO's SCR determinations to the California Air Resources Board (CARB) under the provisions of Health and Safety Code Section 42316 (Section 42316). The CARB will act within 90 days on the City's appeal.

## Attachment B

The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Paragraph 6 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

Go to A.4.

### A.4 – City implements dust controls.

DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule incorporated as Attachment B, Exhibit 3. The City is solely responsible for all environmental impact analyses required by the California Environmental Quality Act and for all required permits and leases.

### A.5– District collects additional physical evidence and installs sand flux monitors in suspected areas.

If there is insufficient physical evidence and no sand flux monitor data to determine the emissive area on the lake bed that caused the monitored or modeled exceedance, the District will install Sensits and Cox Sand Catchers (CSC) sand flux monitors in the suspected area in a sampling array with a maximum spacing of one kilometer. The District will also continue to collect other physical evidence.

## **B. MODELED EXCEEDANCES**

### B.1 – Does the Dust ID model predict a 24-hour shoreline concentration greater than 150 $\mu\text{g}/\text{m}^3$ , including background?

#### Dispersion Modeling Analysis.

At least once a year, the District will examine the Dust ID information and dispersion model to determine if there have been any modeled shoreline exceedances since the period included in the last model run. Modeling will be performed following the 2008 Owens Lake Dust Source Identification Program (Dust ID) Protocol (Attachment C).

#### K-factors.

New K-factors may be generated from  $\text{PM}_{10}$  concentrations measured at any shoreline or near-shore  $\text{PM}_{10}$  monitor using the methods described in the Dust ID Protocol. The order of priority for applying K-factors in the model will be:

- 1) The current temporal and spatial 75th percentile hourly K-factors. The District will use the current modeling period temporal and spatial 75th percentile hourly K-factors to model events, if there are nine or more hourly K-factors for an agreed upon seasonal period and area determined by the methods described in the most current Dust ID Protocol.
- 2) If there is no agreement on seasonal cut-points, the default cut points, as shown in Attachment B, Table 2, will be used with number 1, above.
- 3) If there is no agreement on area, the default areas, as shown in Attachment B, Map 1, will be used with number 1, above.

## Attachment B

- 4) If there are fewer than nine hourly K-factors for any area and period, go to 5), below.
- 5) Default K-factors from Attachment B, Table 2. The District will use the K-factors in Attachment B, Table 2 to model events, based on the month of the event being investigated and the K-factor area. If the new dust source area is not within a K-factor area shown in Attachment B, Table 2, the APCO shall determine the default K-factor for the new source area based on the default K-factors of areas with similar soil characteristics.

### Source Area Size, Location and Sand Flux.

The boundary of a dust source area will be delineated by a GPS survey. Under certain circumstances, the surveyed boundary of the dust source area will not result in a closed polygon. If the GPS survey yields a partial boundary and not a closed polygon, then the polygon area may be closed, if the length of the closure is equal to or less than one-half kilometer or is less than 20 percent of the surveyed source area perimeter, whichever is smaller. The ends of the partial surveyed area boundary will be completed with a straight line, unless survey notes or visual observations indicate that a different shaped boundary should be used. If the surveyed source area boundary has a complex shape, then the partial boundary to be closed will use the best available field and visual data to connect the two ends and form the polygon. Boundaries of existing controlled areas or other previously located boundaries will be used in place of a GPS survey boundary, if the survey notes or visual observations indicate the erosion area extends to that boundary.

If the GPS boundary described above is not available, the area will be defined by any one or a combination of GPS surveying, visual observations, and video observations or any other method described in the Dust ID Protocol.

The details of how to delineate source area boundaries are contained in the Dust ID Protocol.

If neither the GPS boundary nor the other physical evidence as described above is available, the default area size will be one square kilometer centered on the SFM, or one grid cell if the SFM are in a closer array.

All data collected by the District pursuant to this Section shall be shared with the City within 30 days of final data review. If the modeling shows that lake bed source areas have caused or contributed to any modeled shoreline PM<sub>10</sub> impact greater than 150 µg/m<sup>3</sup> for a 24-hour average, go to B.7. If not, go to B.2.

### B.2 – Is the modeled concentration less than 100 µg/m<sup>3</sup>?

This refers to the modeled concentration calculated in B.1 and includes the background PM<sub>10</sub> level of 20 µg/m<sup>3</sup>. If yes, go to B.6. If no, go to B.3.

### B.3 – District directs the City to commence environmental impact analysis, design and permitting.

The APCO will direct the City in writing to choose the BACM it wishes to implement in the area identified in B.1.

## Attachment B

The City will develop a scope of work for the identified potential source areas, including: (1) a summary of the sites pertinent conditions, features, and location, (2) appropriate control alternatives and approach, including a conceptual layout of dust control and integration into the TDCA (roads, water supply, drainage, and power), (3) standard and site-specific permitting considerations, (4) anticipated environmental documentation considerations and approach, and (5) an approximate timetable for implementation beginning at an undefined start date that might coincide with a future SCR determination. City shall complete these steps within 180 days of the date of the written direction from the APCO. Go to B.4.

### B.4 – District deploys reference and/or non-reference method Special Purpose PM<sub>10</sub> monitor(s) to confirm model (if not already deployed).

The District will deploy reference and/or non-reference method Special Purpose PM<sub>10</sub> monitor(s) on the lake bed upwind and downwind of the identified emissive area, if there are no existing monitors at locations that can be used in Section B.5 to refine the model predictions. Monitors will be sited between 250 and 5000 meters outside of any GPS'd or observed source area boundaries. These PM<sub>10</sub> monitoring sites may be removed after the model confirmation procedure described in B.5. Shoreline and near-shore PM<sub>10</sub> monitors that are sited to confirm the model may be used for NAAQS compliance, if an exceedance is monitored. Go to B.5.

### B.5 – Is the refined model prediction greater than 150 µg/m<sup>3</sup>?

For each event measured under Section B.4 that results in a 24-hour monitored concentration of greater than 100 µg/m<sup>3</sup>, the event-specific K-factor (defined in the Dust ID Protocol) will be used to model the concentration at the shoreline receptors. If the event-specific K-factor was derived for the same year and season as the original event modeled in B.1, the Section B.1 event will be remodeled using the new K-factor. If either that remodeled concentration for the Section B.1 event, or the new modeled concentration for the on-lake monitored event, is greater than 150 µg/m<sup>3</sup> at a shoreline receptor, go to B.7. If not, go to B.6.

The District will make a determination if any currently modeled event within the same season and K-factor area using the appropriate K-factors as determined by this procedure causes a shoreline receptor to exceed 150 µg/m<sup>3</sup>. If yes, go to B.7.

### B.6 – No action required.

No action is required of the City at this time. Data collected during this period can be used in conjunction with data collected at a later time to define emissive areas on the lake bed according to this protocol and to develop K-factors for emissive areas.

### B.7 – District directs the City to implement dust controls.

Source areas in B.1 and B.5 that cause or contribute to an exceedance may be new source areas or existing source areas with less than the required level of control (MDCE not high enough to prevent exceedances).

The APCO will determine, in writing, that conditions specified in Sections B.1 or B.5 were met for the specified area. Within 30 days of that determination by the APCO, the City will be notified of that determination in writing. If possible, the City will have the choice of increasing

## Attachment B

the control efficiencies on existing dust control areas and/or controlling other contributing sources that will result in lowering the modeled impact below the 150  $\mu\text{g}/\text{m}^3$  exceedance threshold. If the APCO identifies the need for additional controls, the APCO shall issue a written SCR determination to the City.

If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an alternative analysis of the data used by the APCO to make the determination. If the City submits an alternative analysis, the APCO shall consider the City's analysis and may withdraw, modify or confirm the SCR determination. If the APCO takes action to withdraw or modify the SCR determination, he shall do so within 60 days of the City's submittal of the alternative analysis.

If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's final action, the City may initiate the Dispute Resolution Process pursuant to Paragraph 32 of the 2006 Settlement Agreement between the District and the City (Attachment A to Board Order 080128-01). The APCO may modify the SCR determination based on the Dispute Resolution Process.

In the event the Parties are unable to resolve disagreements over the APCO's SCR determinations through the Dispute Resolution Process, the City may appeal the APCO's SCR determinations to the California Air Resources Board (CARB) under the provisions of Health and Safety Code Section 42316 (Section 42316). The CARB will act within 90 days on the City's appeal.

The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Paragraph 6, above, to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

Go to B.8.

### B.8 – City implements BACM.

DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule incorporated as Attachment B, Exhibit 3. The City is solely responsible for all environmental impact analyses required by the California Environmental Quality Act and for all required permits and leases.

For source areas that arrive at B.7 from B.5, all time periods in the above referenced implementation schedule in B.8 shall apply but be reduced by the time period elapsed since the date of the written direction from the APCO described in Section B.3, or one year, whichever is less.

**Attachment B**Attachment B Enclosures

Map 1: Owens Lake Dust ID Monitoring Map

Table 1: From-the-lake and Non-lake Wind Directions for PM<sub>10</sub> Monitor Sites

Table 2: Default Spatial and Temporal K-factors for the Dust ID Model

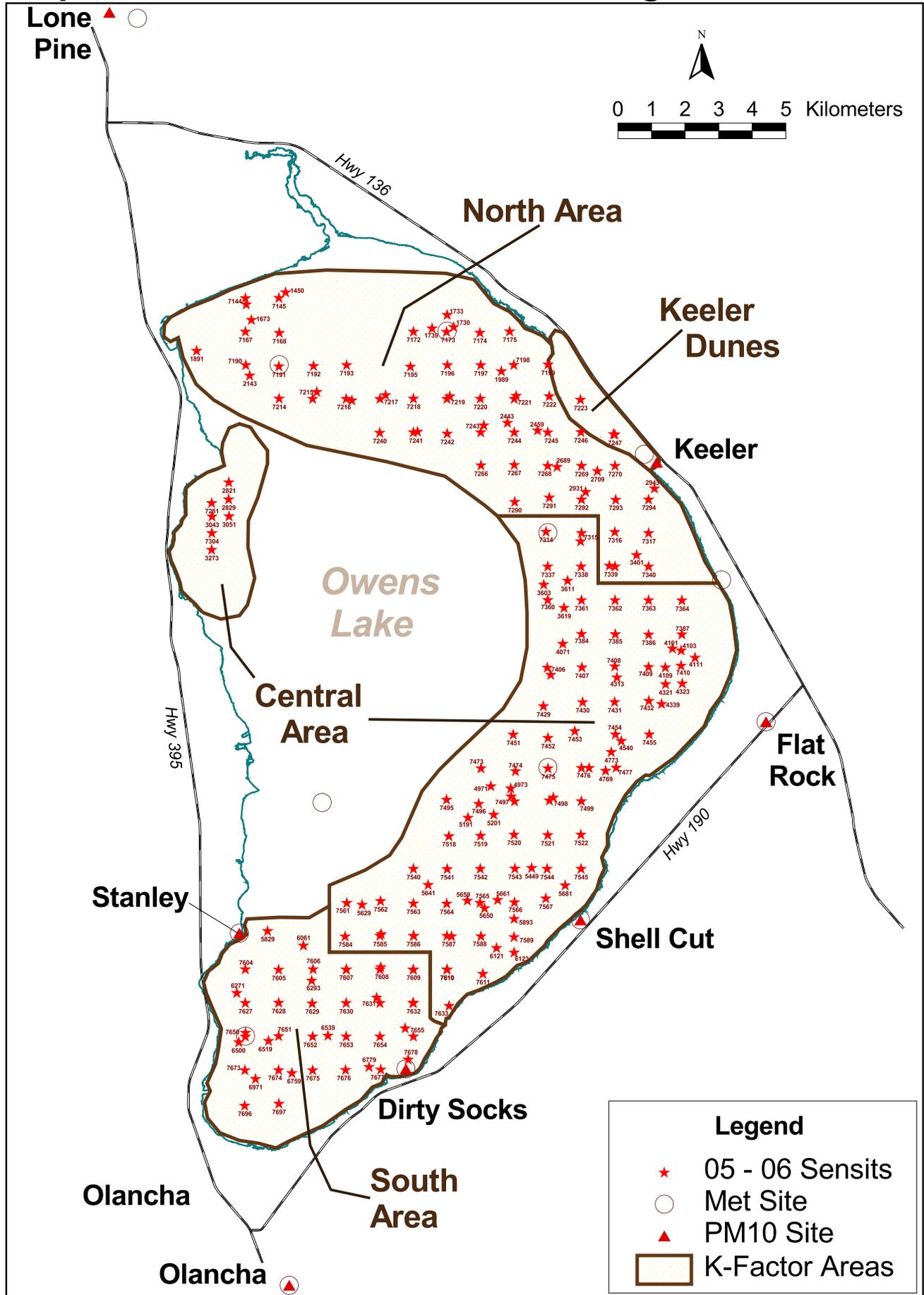
Exhibit 1: Schedule of Contingency Measures

Exhibit 2: Moat & Row Transition Schedule

Exhibit 3: DCM Operation Schedule

# Attachment B

## Map 1 - Owens Lake Dust ID monitoring network



# Attachment B

## Attachment B - Table 1

### From-the-Lake and Non-Lake Wind Directions for PM<sub>10</sub> Monitor Sites

PM <sub>10</sub>	From-the-Lake	Non-lake	
Monitor Site	Wind Dir. (Deg.)	Wind Dir. (Deg.)	Met Tower
Lone Pine	126≤WD≤176	WD<126 or WD>176	Lone Pine
Keeler	147≤WD≤290	WD<147 or WD>290	Keeler
Flat Rock	224≤WD≤345	WD<224 or WD>345	Flat Rock
Shell Cut	WD≥227 or WD≤33	33<WD<227	Shell Cut
Dirty Socks	WD≥234 or WD≤50	50<WD<234	Dirty Socks
Olancha	WD≥333 or WD≤39	39<WD<333	Olancha
Bill Stanley	WD≥349 or WD≤230	WD<349 or WD>230	Bill Stanley
New Sites	TBD	TBD	TBD

TBD – From-the-lake and non-lake wind directions will be determined for new sites by the APCO when sites are selected.

## Attachment B - Table 2

### Default Spatial and Temporal K-factors for the Dust ID Model

<u>AREA</u>	<u>K-factor</u>	
	<u>Jan.– Apr. &amp; Dec.</u>	<u>May–Nov. (These are the default cutpoints.)</u>
Keeler Dunes	7.4 x 10 <sup>-5</sup>	6.0 x 10 <sup>-5</sup>
North Area	3.9 x 10 <sup>-5</sup>	1.5 x 10 <sup>-5</sup>
Central Area	12.0 x 10 <sup>-5</sup>	6.9 x 10 <sup>-5</sup>
South Area	4.0 x 10 <sup>-5</sup>	1.9 x 10 <sup>-5</sup>

**Attachment B**

## Attachment B - Exhibit 1: Schedule of Contingency Measures

From 2006 Settlement Agreement

**EXHIBIT 10 -- SCHEDULE OF CONTINGENCY MEASURES**

<b>Issue</b>	<b>Resolution</b>	<b>Duration</b>	<b>Units</b>
<b>Moat and Row</b>			
Eroded row	Install armoring to prevent further erosion	2	mo/mile
	Install sand fences to prevent further erosion	1	mo/mile
	Reconstruct row in place or adjacent	2	mo/mile
Filled moat	Re-excavate new moat outboard of filled moat, expand existing row onto filled moat	2	mo/mile
Filled sand fence	Clean out or flank with new sand fences	2	mo/mile
Collapsed sand fence	Repair or flank with new sand fences	1	mo/mile
Spacing too large	Pull in intervening sand fence	1	mo/mile
	Add intervening moat and row	3	mo/mile
	Enhance with vegetation and/or wetness	12 to 36	months
	Soil roughening	1 to 3	months/sq mi
	Conversion to reduced BACM/BACM	See Exhibit 11	
<b>Managed Vegetation</b>			
Emissions from bare areas	Enhance/restore vegetation	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Emissions from vegetated areas	Determine and establish necessary cover	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
<b>Gravel Patches</b>			
Infilling pore spaces	Supplement gravel depth	4	months/sq mi
	Stabilize by other means (e.g., vegetation, wetness, sand fences)	6 to 36	months
<b>Shallow Flood</b>			
Emissions from dry areas (insufficient uniformity of wetting )	Wet dry areas. May require land leveling and/or additional laterals.	12	months
Generally too dry	Increase water application rate relative to ET	1	month
<b>Other features</b>			
Gravel source	Open new or re-open existing quarry	4	months
Emissions from roads, berms, etc.	Increase watering frequency	1	month
	Stabilize by other means (e.g., gravel, stabilizing agents)	1 to 4	months/sq mi

**Attachment B**

## Attachment B - Exhibit 2

From 2006 Settlement Agreement

**EXHIBIT 11 -- MOAT AND ROW TRANSITION SCHEDULE**

<b>Activity</b>	<b>Duration (years )</b>
Shallow flood transition from moat & row	1.9
Managed vegetation transition from moat & row	5.9
Gravel cover transition from moat & row	1.8
<i>Mutually agreeable exceptions:</i>	<i>Increase over and above durations listed above (years)</i>
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0

## Attachment B - Exhibit 3

From 2006 Settlement Agreement

**EXHIBIT 12 -- DCM OPERATION SCHEDULE**

<b>Activity</b>	<b>Duration (years )</b>
New area shallow flood DCM <sup>a</sup>	2.9
New area managed vegetation DCM <sup>a</sup>	6.1
New area gravel cover DCM <sup>a</sup>	2.2
<i>Mutually agreeable exceptions:</i>	<i>Increase over and above durations listed above (years)</i>
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0
4. Expanded CEQA triggered	1.4
<sup>a</sup> Assumes that total new area <2 square miles per year	

**Attachment C**

**Board Order 080128-01  
Attachment C**

**2008 Owens Lake Dust  
Source Identification  
Program Protocol**



**Great Basin Unified Air Pollution Control District**

157 Short Street, Bishop, California 93514  
Telephone (760) 872-8211

# Attachment C

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## Attachment C

# 2008 Owens Lake Dust Source Identification Program Protocol

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### Glossary of Terms and Symbols

AIRS	US Environmental Protection Agency's Aerometric Information and Retrieval System
ATV	All-Terrain Vehicle
APCO	Air Pollution Control Officer
BACM	Best Available Control Measure
BACT	Best Available Control Technology
CAAA	Clean Air Act Amendments of 1990
CALMET	A meteorological preprocessor program for CALPUFF.
CALPUFF	An air pollution model
CARB	California Air Resources Board
CSC	Cox Sand Catcher, a passive sand flux measurement device.
DCA	Dust Control Area
DCM	Dust Control Measure
Dust ID Program	Owens Lake Dust Source Identification Program
EIR	Environmental Impact Report
Event-specific $K_f$	Weighted-average of hourly K-factors for a dust event, weighted by the hourly $PM_{10}$ concentration
Exceedance	Modeled or monitored $PM_{10} > 150 \mu g/m^3$ at the shoreline
FTEE	Full-time equivalent employee
GBUAPCD	Great Basin Unified Air Pollution Control District
GIS	Geographic Information System
GPS	Global Positioning System
KE	Kinetic energy
K-factor	Proportionality constant for sand flux and $PM_{10}$ emissions, $K_f$
LADWP	City of Los Angeles Department of Water and Power (also City)
$m^3$	cubic meter
met	meteorological
mg	milligram
MSM	Most Stringent Measure
NAAQS	National Ambient Air Quality Standards
NEAP	Natural Events Action Plan
OVPA	Owens Valley $PM_{10}$ Planning Area
PC	Particle count
$PM_{10}$	Particulate matter less than 10 microns aerodynamic diameter
QA	Quality Assurance
RASS	Radio Acoustic Sounding System
RSIP	Great Basin APCD 2003 Owens Valley $PM_{10}$ Planning Area Revised State Implementation Plan

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Sensit	An electronic sand motion detector.
Settlement Agreement	2006 Settlement Agreement between LADWP and GBUAPCD
Storm-average $K_f$	Arithmetic average of hourly K-factors for a dust event
SCR	Supplemental Control Requirements of the 2003 SIP
SFM	Sand flux monitor
TEOM	Tapered-Element Oscillating Microbalance, measures PM <sub>10</sub> .
USEPA	United States Environmental Protection Agency
USGS	US Geological Survey
WD	Wind direction
2003 SIP	Great Basin APCD 2003 Owens Valley PM <sub>10</sub> Planning Area Revised State Implementation Plan
μg	microgram

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# 2008 Owens Lake Dust Source Identification Program Protocol

## 1. Program Overview

### 1.1 Introduction

The objective of the Owens Lake Dust Source Identification (Dust ID) Program is to identify dust source areas at Owens Lake that can cause or contribute to violations of the National Ambient Air Quality Standards (NAAQS) for PM<sub>10</sub>. The Dust ID Program is a long-term monitoring program that is intended to identify dust source areas for control under the provisions of the Supplemental Control Requirements (SCR) in the 2003 revised Owens Valley PM<sub>10</sub> State Implementation Plan (RSIP) and the 2006 Owens Lake Settlement Agreement (Settlement Agreement). The text of the Settlement Agreement and SCR provisions is included in the appendices to this document.

The RSIP and Settlement Agreement require the City of Los Angeles Department of Water & Power (City) to control all sources of wind blown dust from the lake bed of Owens Lake that cause or contribute to an exceedance of the PM<sub>10</sub> NAAQS at the historic shoreline (3,600-foot contour line). Based on dust events that occurred between January 2000 and July 2006, 43 square miles of the lake bed were found to cause or contribute to NAAQS violations. Dust controls are required to be implemented on 29.8 square miles of the lake bed by December 31, 2006, and an additional 13.2 square miles by April 1, 2010.

Provided that these control measures are implemented in accordance with the RSIP and Settlement Agreement, the District will suspend making determinations to control additional dust source areas from December 4, 2006 until May 1, 2010. During this period, all monitoring, modeling and observations will continue as described in this Dust ID Program Protocol. Data and information collected during this period will be used to determine any control requirements for Study Areas as described in the Settlement Agreement, and to advise the City on any monitored dust emissions from the lake bed and surrounding areas. If any new lake bed dust source areas are identified from data collected after April 1, 2010, they will be subject to dust control requirements as provided for in the Settlement Agreement and any future revisions to the Owens Valley PM<sub>10</sub> State Implementation Plan. SCR determinations shall make reasonable efforts to account for impacts caused by Dust Control Measure (DCM) construction activities.

### 1.2 Locating Dust Source Areas

A network of sand flux samplers, PM<sub>10</sub> monitors, meteorological towers and remote camera sites will be used to monitor and locate dust source areas at Owens Lake. Figure 1.1 shows a map of the Dust ID network at Owens Lake. As configured in 2003, the Dust ID network included: sand flux monitors at 136 lake bed sites at 1-km spacing, 7 PM<sub>10</sub> monitors, 13 met towers, 8 observation sites, and 10 time-lapse cameras at 7 sites. At the discretion of the Air Pollution Control Officer, additional sand flux, PM<sub>10</sub> and met sites will be added as necessary to collect

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information that can be used to monitor and model the impact from new areas that may become emissive on the lake bed.

The automated monitoring network will be augmented with information from observers who will map dust source locations from off-lake sites when dust events take place during normal work hours. These maps will be used to help document source areas that may be outside the sand flux network or that may be within the network, but missed by the samplers. Field personnel will inspect active source areas and map the source area boundaries using a GPS (Global Positioning System) as conditions allow. Data collected from the sand flux network, visual mapping and GPS surveys will be included in a Geographic Information System (GIS) database for mapping and analysis. Maps generated using these different methods will be compared qualitatively to help delineate source area boundaries.

### 1.3 Monitored Exceedances

Analysis of hourly  $PM_{10}$  concentrations at shoreline and off-lake monitoring sites may show that lake bed source areas cause or contribute to  $PM_{10}$  exceedances. Monitoring of  $PM_{10}$  concentrations will be done using US EPA-approved monitors. Currently, hourly  $PM_{10}$  readings are obtained using TEOM (Tapered-Element Oscillating Microbalance)  $PM_{10}$  monitors manufactured by R&P, Inc. If a  $PM_{10}$  exceedance is monitored,  $PM_{10}$  concentrations will be paired with the local wind direction for each hour of that event to determine if lake bed source areas caused or contributed to the exceedance.

Twenty-four hour average  $PM_{10}$  monitor concentrations will be adjusted for winds coming from the direction of the lake to the monitor (from-the-lake) and from directions not from the lake to the monitor (non-lake).  $PM_{10}$  concentrations during any hour with winds from a non-lake wind direction will be assumed to have an average background concentration of  $20 \mu\text{g}/\text{m}^3$  and from-the-lake wind directions will be given their hourly value. If the adjusted 24-hour average is greater than  $150 \mu\text{g}/\text{m}^3$ , then an exceedance will have been monitored from a lake bed source or sources.

If a lake bed source area causes or contributes to an exceedance, hourly  $PM_{10}$  concentrations and wind directions will be reviewed to see if a new source area (or areas) is associated with that exceedance. If sand flux data are available that show erosion activity in the direction of a new source area, this event will also be modeled as described in the air quality modeling protocol. If the  $PM_{10}$  monitor data indicate that a new source area caused or contributed to an exceedance, DCMs may be required under the provisions of the Settlement Agreement or current SIP.

### 1.4 Modeled Exceedances

Air quality modeling will be performed with the CALPUFF modeling system or other United States Environmental Protection Agency (USEPA) approved modeling method. At least once a year, the Dust ID information will be examined and the model will be run to determine if there were any modeled shoreline exceedances since the period covered by the last model run.  $PM_{10}$  emissions for the model will be based on hourly sand flux measured at lake bed sites and spatial and temporal factors derived using the empirical relationship between sand motion on the lake

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## 2006-2007 Configuration

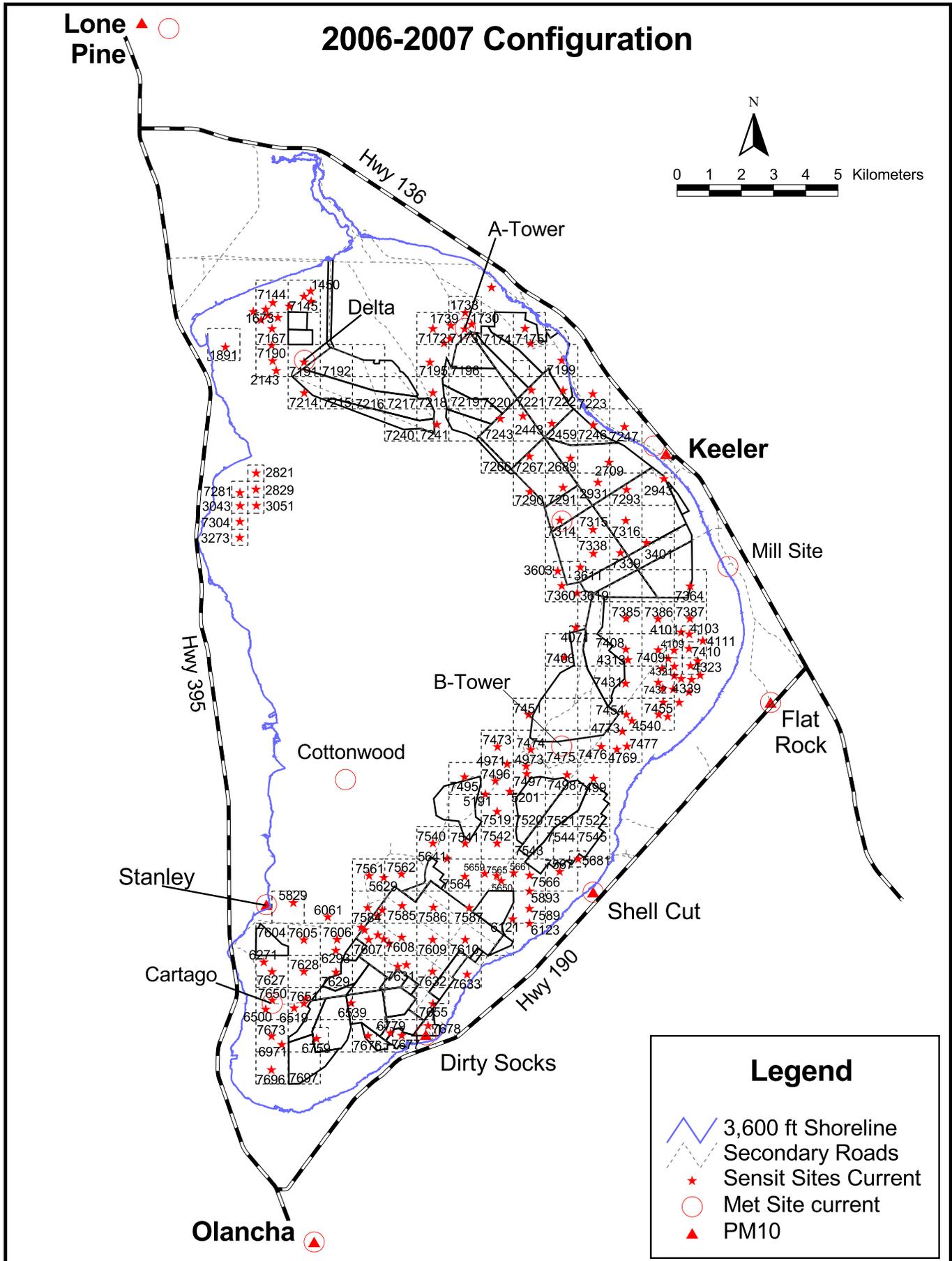


Figure 1.1 - Owens Lake Dust ID monitoring network

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bed and measured PM<sub>10</sub> values. CALPUFF will be run using the following equation to estimate emissions and to model PM<sub>10</sub> impacts at the shoreline:

### Equation 1.1

$$PM_{10} = K_f \times q$$

where,

- $q$  = Sand flux measured at 15 cm above the surface [g/cm<sup>2</sup>/hr]
- $K_f$  = K-factor, empirically-derived ratio of the PM<sub>10</sub> emission flux to the sand flux at 15 cm.

The ratio of PM<sub>10</sub> to sand flux ( $K_f$ ) is referred to as the K-factor. The initial Dust ID program results showed that K-factors could be derived empirically by comparing model predictions to monitored PM<sub>10</sub> concentrations. Initial studies also showed that average K-factors can vary spatially and seasonally at Owens Lake. Default K-factors will be used with Equation 1.1 to estimate hourly PM<sub>10</sub> emissions unless new K-factors are generated from future dust events following the modeling procedures in this program protocol. If the CALPUFF model results indicate that a new lake bed source area caused or contributed to an exceedance at a shoreline location, dust controls may be required under the provisions of the 2006 Settlement Agreement or the current SIP.

### 1.5 Sand Flux Measurements

Sand flux is measured using a combination of Cox Sand Catchers (CSC) and Sensits. CSCs are sand collection devices that provide a mass collection amount for a certain time period (about 1 to 3 months), and Sensits are electronic sand motion detectors used to time-resolve the collected mass to estimate hourly sand flux rates. The sand flux rate is applied to the area represented by the sand flux sampling site, which may vary in size and shape depending on the source area delineated by field observations.

### 1.6 Dust ID Program Protocol Content

Section 2 of the Dust ID Program Protocol describes the methods and instrumentation that will be used to monitor sand flux with Sensits and CSCs on the lake bed. Section 3 provides a brief description of the PM<sub>10</sub> and meteorological monitoring network that will be used to monitor PM<sub>10</sub> exceedances, develop K-factors and to call public health advisories. Section 4 describes methods that will be used by visual observers and field personnel to map lake bed dust source areas and delineate boundaries using GPS. Section 5 explains the procedures for developing K-factors using air quality modeling and monitoring data. Section 6 provides the protocol for dispersion modeling.

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### 2. Protocol for Measuring Sand Flux Rates and Operation of the Sensit and Cox Sand Catcher Network

#### 2.1 Objective

Sand flux measurements will be used as a surrogate to estimate  $PM_{10}$  emissions coming off the lake bed. The objective of the sand flux measurements is to provide an hourly emissions estimate for all active source areas on the lake bed.

#### 2.2 Methods and Instrumentation

Sand flux will be measured with Sensits and Cox Sand Catchers (CSCs). Collocated Sensits and CSCs are used to measure hourly sand flux rates at different locations on the lake bed. The 2006-2007 Sensit/CSC network locations are shown in Figure 1.1. The instruments are placed with their sensors or inlets positioned 15 cm above the surface. Sensits are electronic sensors that measure the kinetic energy or the particle counts of sand-sized particles as they saltate, or bounce, across the surface. Sensits are used to time-resolve the CSC mass to provide hourly sand flux rates.

Figure 2.1 shows a Sensit suspended above the ground on the right, and a CSC in the ground to the left. The photo was taken at a site that was used to test the accuracy of Sensits and CSCs before the Dust ID Program began. The battery powered Sensits are augmented with a solar charging system. A datalogger records 5-minute Sensit data during active saltation periods. Data collection is triggered by particle count activity and continues until particle counts are zero for an hourly period. Each datalogger has a radio transmitter that sends Sensit data to the District's Keeler field office once a day to provide updates on erosion activity at each site. These daily updates are used to alert field personnel to active source areas for possible Global Positioning System (GPS) mapping and inspection. Daily transmission of the data may be temporarily suspended if the solar battery power is low due to extended days of cloud cover.

CSCs are passive collection instruments that capture windblown, sand-sized particles. These instruments were designed and built by the District as a reliable instrument that could withstand the harsh conditions at Owens Lake. CSCs have no moving parts and can collect sand for a month or more at Owens Lake without overloading the collectors. Field personnel visit CSC sites to measure the mass of the collected sand catch. A diagram of the CSC is shown in Figure 2.2. Not shown in the diagram is an internal sampling tube that can be seen in the photo in Figure 2.3. The internal sampling tube is removed from the PVC casing to measure the sand catch sample. The lengths of the sampling tubes and casings are adjusted during construction to accommodate the amount of sand flux in each area and to avoid overloading the CSC. The CSC length ranges from about one to three feet. Because the PVC casing is buried in the ground, an adjustment sleeve is used to keep the inlet height at 15 cm to compensate for surface erosion and deposition. Field techs use a standardized measuring device to check or adjust the sampling inlets to 15 cm after collecting each sample.

Figure 2.4 shows an example of the linear relationship between the CSC collected sand mass and the kinetic energy measured with a co-located Sensit. Sensits measure saltation in terms of

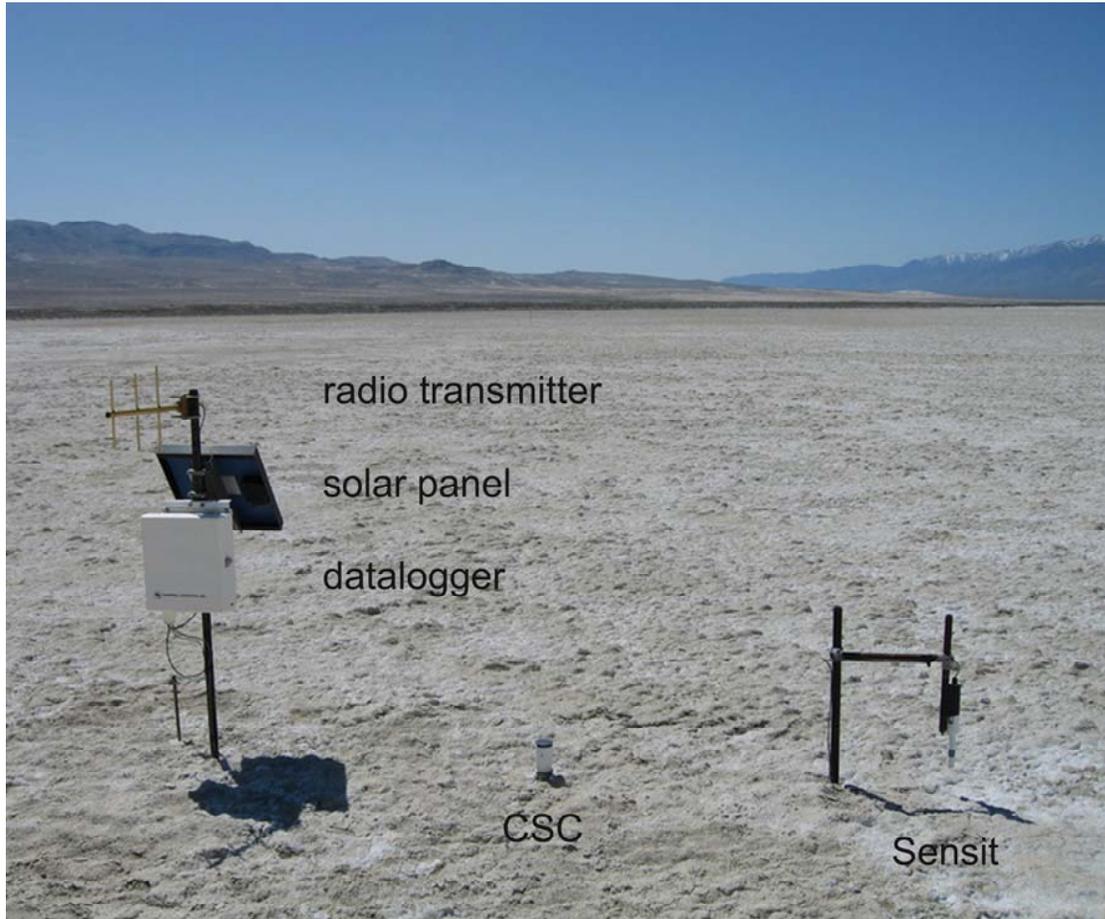
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Figure 2.1 - Dust ID sand flux monitor sites measure wind erosion activity using CSCs to collect sand-sized particles and Sensits that electronically detect moving particles. Sensit data are recorded on dataloggers and transmitted by radio from each site to the District's office in Keeler.

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Figure 2.2 - Diagram of the Cox Sand Catcher (CSC) used to measure sand flux at Owens Lake.

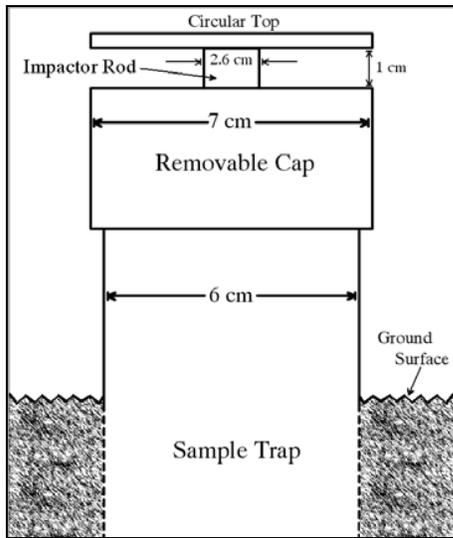


Figure 2.3 - Example of a Cox Sand Catcher (CSC) with the inner sampling collection tube removed.

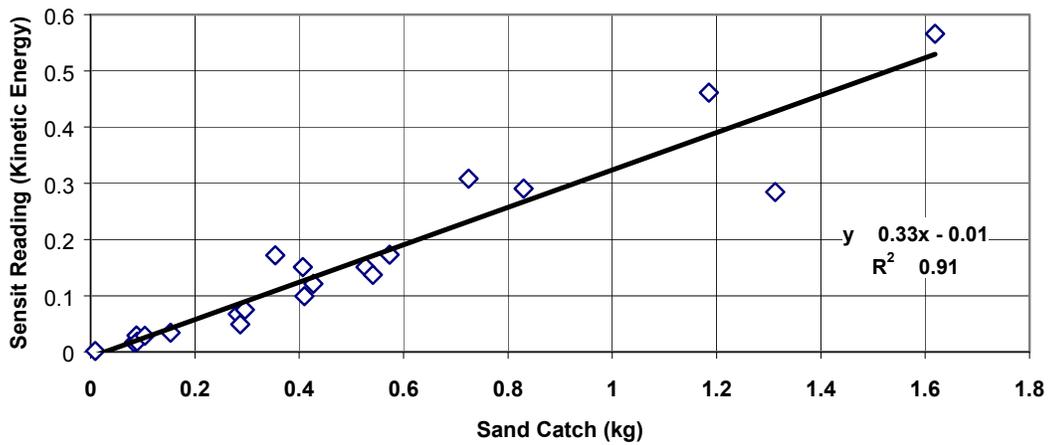


Figure 2.4 - Example of the linearity between CSC mass and a Sensit reading using kinetic energy reading (Sensit No. 7291).

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kinetic energy (KE) and particle count (PC). The District uses the output (KE or PC) that provides the best precision and accuracy for the range of saltation activity expected at each site.

Because the electronic Sensit response to the saltation flux can vary, Sensits were used in combination with CSCs to determine hourly sand flux rates. This combination takes advantage of the good precision and accuracy of the CSC sand catch data, and the ability of Sensits to time-resolve the sand flux for each hour of the CSC sampling period. In this way, the sum of the hourly sand catches always matches the CSC sand catch for each sampling period, and it minimizes the error in the hourly sand flux.

Changes to the sand flux monitoring network are made as necessary to improve the characterization of dust source areas on the lake bed. Sand flux sampler sites are added to the network to monitor new source areas or to improve the sand flux estimates for known dust source areas. Although the sand flux network was originally designed in a fixed grid pattern with 1 km site spacing, the current practice is to place the samplers at sites that represent smaller source areas. Some sites may be less than 250 m apart, and their locations may be off the regular grid pattern to better represent sand flux activity in the dust source area. In addition, many of the original sampling sites that are now in flooded portions of the shallow flood DCM were removed, since  $PM_{10}$  emissions from the flooded sites can be assumed to be zero in the Dust ID model.

### 2.3 Operating Procedures

Sand captured in the CSCs will be weighed in the Keeler lab to the nearest tenth of a gram. A field technician will visit each site every one to three months to collect the sample tubes. The following procedures will be used when collecting the CSC samples and downloading Sensit data:

- 1) Park field vehicle 10 meters or more east of the site and walk the remaining distance to the sampling site. Field personnel will access all Sensit and CSC sites from an easterly approach to minimize upwind surface impacts near the sampling sites.
- 2) Measure and record the inlet height above the surface to the middle of the inlet.
- 3) Remove the sample collection tube from the CSC.
- 4) Verify collection tube number corresponds to site number on the field form.
- 5) Weigh and record the gross weight of the collection tube and sample to the nearest 1 gram using a field scale.
- 6) If any soil material is visible in the tube, seal the collection tube and place it in the tube rack for transport to the lab. If no soil material is visible, note this on the collection form and reuse the collection tube for the next sampling period.
- 7) Place a clean collection tube in the CSC and record the collection tube number.
- 8) Replace the CSC inlet and adjust the height to 15 cm ( $\pm 1$  cm).
- 9) Download Sensit data from the datalogger to a storage module.
- 10) Measure and record the Sensit sensor height above the surface to the center of the sensor using the Height Adjustment Tool, and adjust if necessary to 15 cm. See Figure 2.5.
- 11) Inspect the sensor and radio transmitter wiring and clean or repair, if needed.

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- 12) A field operational response test on the Sensit will be completed during each visit and the Sensit will be replaced, if it fails the test.
- 13) CSC samples will be removed from the sample collection tubes and weighed on a calibrated bench-top scale in the Keeler lab to the nearest 0.1 gram.
- 14) Wet samples will be removed from the collection tubes and oven dried before weighing in the lab.

### 2.4 Data Collection

A field form will be used to document the information for the CSC and Sensit (see example in Figure 2.6). The form will have the site number, date and time of measurement (Pacific Standard Time), "as is" CSC inlet and Sensit sensor height ( $\pm 1$  cm), tube tare weight prior to sand catch ( $\pm 0.001$  kg), total sand catch weight ( $\pm 0.001$  kg), and post-catch tube weight ( $\pm 0.001$  kg), Sensit response test (particle counts or kinetic energy), operator's initials, and a comments section where the condition of the sampler and any other relevant factors, such as surface condition will be documented. The Data Processing Department will calculate the net sand catch weight from the CSC during data analysis. CSC lab weights, measured to the nearest 0.1 g will be recorded on the Lab Form shown in Figure 2.7. After completion of the forms, the field technician will make a copy of the completed forms and file the copies at the Keeler office. The original forms will be sent to Data Processing in the Bishop office. Data Processing will enter the data into an electronic file. The original hard copy forms will be filed in the Bishop office.

Each day, dataloggers for all Sensit sites will be downloaded by radio transmission to the Keeler Field office. Data from the storage modules will be downloaded to the computer at the Keeler office by the field technician at the end of a collection period. The radio transmitted Sensit data will be used as the data of record. Storage module data will be collected at least quarterly and will serve as a back-up file.

Technicians will keep a log of all the repairs, maintenance, or replacement of Sensits or CSCs, radio transmitters, and datalogger equipment. This log will be kept in a field notebook and the field forms sent to Data Processing as they are completed. It is the technician's or operator's responsibility to review the data and notify the Air Monitoring Specialist and Data Processing who will decide whether any data should be edited or deleted and why.

### 2.5 Chain of Custody

Each field form will be initialed and dated by the field technician during each site visit. The form will be signed and dated by the person receiving the data when delivered to the Bishop office. If no person is available to sign the form in the Bishop office, the delivery person will sign and date the form and place it in the Data Processor's box.

### 2.6 Quality Assurance

All field and lab scales will be checked at least every two months using Class F weights. Field scales will also be checked with a 100-gram weight at each sample site before weighing the sand catch and the weight recorded on the field form. The bench-top scale in the Keeler office will be

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Figure 2.5 - A Height Adjustment Tool is used to measure the height of Sensits and CSCs and to adjust the sensor and inlet height to 15 cm above the soil surface.





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checked with the Class F weights before each set of sand catches are weighed. The test weights will be recorded on the scale log sheet in the laboratory. Both scales will be calibrated and certified at least once every year. Ten percent of the CSC sand catch samples will be stored for at least one year from the date of collection before discarding.

### 2.7 Calculating Hourly Sand Flux

For modeling purposes discussed in Section 6, hourly sand flux is calculated for each Sensit/CSC site using the sand catch to Sensit reading ratio for each collection period and apportioning the sand catch to the hourly Sensit reading. The hourly sand flux is divided by 1.2 cm<sup>2</sup>, which is the equivalent inlet opening size of the CSC for flux calculation purposes.

For Sensits using kinetic energy,

#### Equation 2.1

$$q_{n,t} = (S_{n,t} - S_{n,bg}) \times \frac{CSC_{n,p}}{\sum_{t=1}^N (S_{n,t} - S_{n,bg})} \times \frac{1}{1.2} \quad [\text{g/cm}^2/\text{hr}]$$

Where,

- $q_{n,t}$  = hourly sand flux at site n, for hour t [g/cm<sup>2</sup>/hr]
- $CSC_{n,p}$  = CSC mass for site n, for collection period p [g]
- $S_{n,t}$  = Sensit total KE reading for site n, for hour t [non-dimensional]
- $S_{n,bg}$  = Sensit KE background reading for site n, [non-dimensional]
- N = Total number of hours in CSC collection period p.

For Sensits using particle count,

#### Equation 2.2

$$q_{n,t} = S'_{n,t} \times \frac{CSC_{n,p}}{\sum_{t=1}^N S'_{n,t}} \times \frac{1}{1.2} \quad [\text{g/cm}^2/\text{hr}]$$

Where,

- $S'_{n,t}$  = Sensit total PC reading for site n, for hour t [non-dimensional]

### 2.8 Sensit Calibration and Data Analysis

#### 2.8.1 Sensit Calibration Check

Data Processing will track Sensits by their serial number. After each sample collection period, Sensit and CSC data will be added to data from other sample collections. Data Processing will determine the average sand catch to Sensit ratio for each Sensit. Sensit readings will be collected

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for particle counts and kinetic energy for each Sensit. Due to differences in individual Sensit responses, some Sensits have a more consistent sand flux to Sensit reading ratio using particle count rather than kinetic energy. This normally depends on the manufacturer's electronic design. At high sand flux sites, kinetic energy provides a more linear response for most Sensits. If KE is used, a background KE is subtracted from the reading if it is not zero. A background KE is determined from the KE reading when the PC reading is zero.

The ratio of the Sensit response to the collected mass will be compared for each collection period to previous ratios for the same instrument to ensure that the Sensit is responding consistently. As seen in Figure 2.4 this ratio can vary, especially at low collection masses, so large deviations in the ratio should only be used as an indicator for a possible problem. Sensits will be replaced if they show no readings with significant sand associated CSC collection, have significant readings during calm wind periods, have an erratic response as compared to previous collection periods, or if they fail the field operational response test.

### 2.8.2 Replacing Missing Sand Catch Data

Sand catch data can be lost if the CSC collector tube is full, or damaged, or if the sample is spilled during weighing. The lost sand catch data will be estimated using Sensit data. A cumulative sand catch to Sensit ratio is calculated by adding all of the valid sand catches and all of the corresponding Sensit data for that particular Sensit/CSC pair, and then dividing them to obtain the total ratio. The cumulative ratio is applied to the Sensit data to estimate the hourly sand flux. If there was a Sensit change, only data generated after the Sensit change is used to calculate the cumulative sand catch to Sensit ratio.

CSC collection tubes will be weighed and reset at the same time as any Sensit change at a site in order to maintain the time correlation between the two devices.

### 2.8.3 Replacing Missing Sensit Data

Sensit data can be lost when the datalogger or Sensit fails. In such cases, the sand catch data will be time resolved using a neighboring site. The historical hourly sand flux data are compared to determine which neighboring site behaves most similarly to the site with the lost data. The correlation coefficients between the data sets will be used to determine which site behaves most similarly. If no adjacent sites were active during the period of lost Sensit data, then the nearest active sites will be used for comparison.

## 3. Protocol for Measuring Ambient PM<sub>10</sub> and Meteorological Conditions

### 3.1 Objective

Ambient PM<sub>10</sub> monitors will be placed at locations generally around the shoreline of Owens Lake and in local communities to monitor the ambient air for exceedances of the PM<sub>10</sub> NAAQS and to develop K-factors for modeling PM<sub>10</sub> emissions from lake bed sources. PM<sub>10</sub> monitors may be placed on the lake bed for short-term special-purpose monitoring studies.

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### 3.2 Methods and Instrumentation for PM<sub>10</sub> and Meteorological Data

PM<sub>10</sub> monitoring will be performed using USEPA-approved reference or equivalent method monitors. The current monitoring network shown in Figure 1.1 includes seven PM<sub>10</sub> monitor sites – Keeler, Lone Pine, Olancho, Dirty Socks, Shell Cut, Bill Stanley and Flat Rock. Each PM<sub>10</sub> site is equipped with a Tapered Element Oscillating Microbalance (TEOM) PM<sub>10</sub> monitor. TEOM monitors are capable of measuring hourly PM<sub>10</sub> concentrations. The Dust ID Program will rely on the TEOM to determine if an exceedance is caused by a lake bed source, since the data can be correlated with hourly wind directions to determine dust source directions. TEOM data will also be used to generate K-factors to model the PM<sub>10</sub> emissions from lake bed sources.

Ten-meter meteorological towers will be located near each PM<sub>10</sub> monitor site and at other locations around the lakeshore and on the lake bed. The current met sites are shown in Figure 1.1. The met data are used to create wind fields with the CALMET model that are used with CALPUFF to model air quality impacts. All met towers include instrumentation to measure wind speed and wind direction. Two lake bed met sites (A & B Towers) measure wind speed at different heights (0.5, 1, 2, 5 and 10 m) to determine surface roughness and vertical wind speed profiles. Some met sites also measure temperature, relative humidity, barometric pressure, and/or precipitation.

### 3.3 Operating Procedures, Instrument Calibration and Quality Assurance

PM<sub>10</sub> monitoring will be performed in accordance with USEPA monitoring guidelines found in 40 CFR, Part 58 and meteorological monitoring will be performed in accordance with USEPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volumes I, II, and IV.

### 3.4 Data Handling and Data Access via Modem

TEOM PM<sub>10</sub> data will be delivered to Data Processing on a routine monthly schedule. After the data pass the proper data review and QA checks they will be submitted to the USEPA's AIRS database. PM<sub>10</sub> data from special-purpose monitors that may be located on the lake bed will not be submitted to the AIRS database.

All the PM<sub>10</sub> sites and some met sites are equipped with modem links that allow for access to the hourly concentrations. These data are useful for alerting field personnel to possible new sources of PM<sub>10</sub>, and for alerting the public in case of high concentrations. For hourly concentrations above 400 µg/m<sup>3</sup> the District will issue public health advisories when the communities of Keeler, Lone Pine or Olancho are affected. The public can view real-time wind speed, direction and PM<sub>10</sub> data from the Dust ID monitoring network on the District's website at [www.gbuapcd.org/data](http://www.gbuapcd.org/data).

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### 4. Protocol for Observing and Mapping Source Areas and Dust Plume Paths

#### 4.1 Objective

The objective for source area mapping is to use the best available information from visual observations, GPS mapping, and sand flux measurements to delineate the boundaries of dust source areas for as many events as possible. This information will be used to help delineate the control area boundaries for new sources.

#### 4.2 Methods and Instrumentation

The Dust ID Program includes four methods to help locate dust source areas and to delineate the source area boundaries. The methods are: 1) visual mapping by trained observers, 2) time-lapse cameras, 3) surface inspections with GPS mapping, and 4) sand flux activity (as measured with Sensits and CSCs).

##### 4.2.1 Mapping Dust Source Areas from Off-Lake Observation Sites

One or more trained observers will complete observations from viewpoints to best observe the active dust source areas. For instance, two observers may be at viewpoints on the east side of the dust plume in the Inyo and Coso Mountains and a third may be on the west side in the Sierra. The observers will create hourly maps of the visible boundaries of any dust source areas, their plume direction and note if the visible plume crosses the shoreline. To the extent practicable, all lake bed and off-lake dust sources will be included in the observations. Figure 4.1 shows an example of sand flux measurements and the cumulative information that can be collected by observers mapping the dust plumes from different locations.

##### 4.2.2 Video Cameras

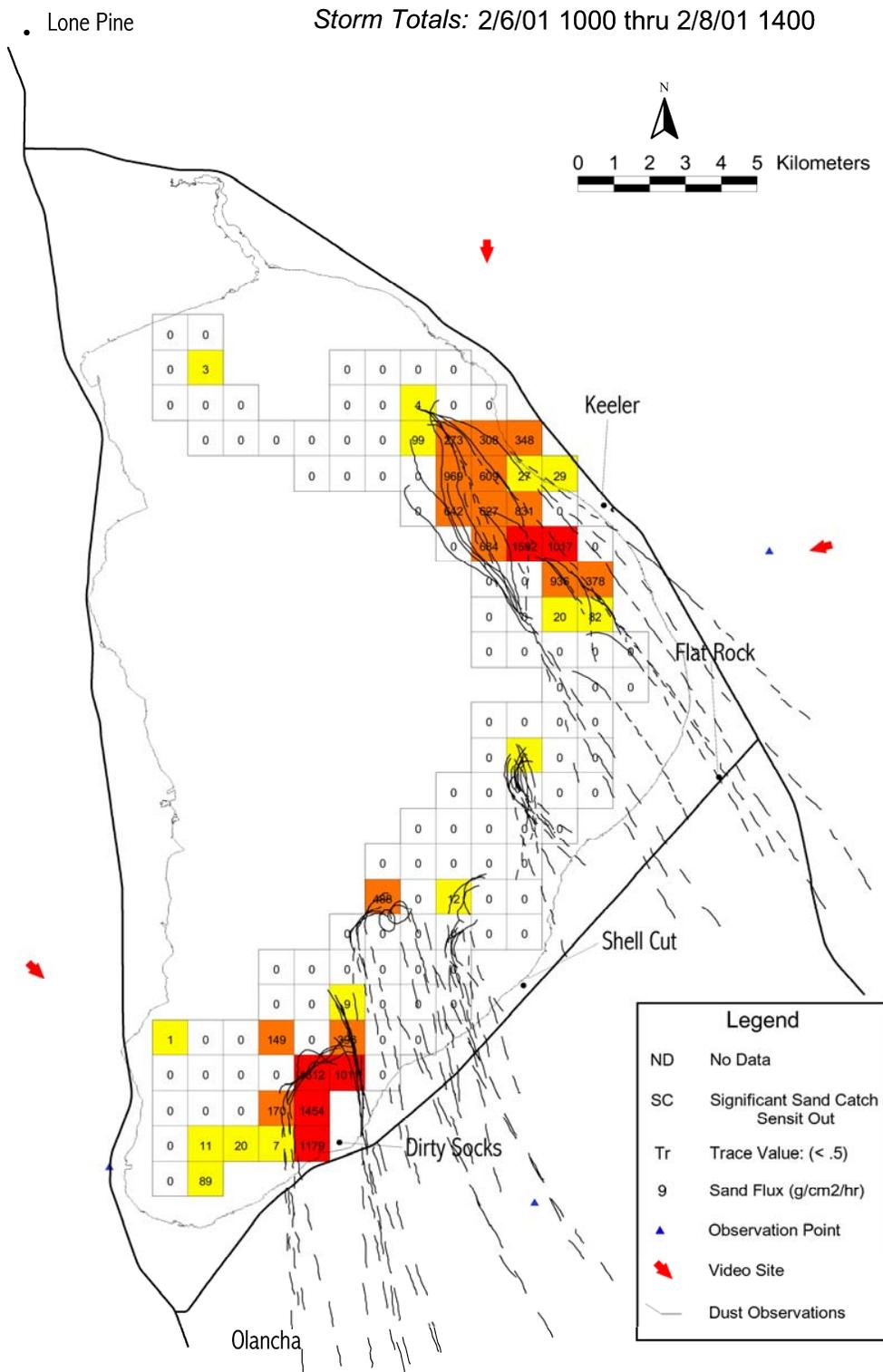
Remote time-lapse video cameras will record dust events during daylight hours. This information will be reviewed to help identify source areas that may have been missed by observers, or to help confirm source area activity detected by  $PM_{10}$  monitors or the sand flux network. Remote time-lapse video can also be used to help verify modeled impacts that were not monitored by the  $PM_{10}$  network, to check compliance of dust control areas, and to identify off-lake sources not measured by any of the other methods.

##### 4.2.3 Mapping Using GPS

###### 4.2.3.1 “Trigger” Levels for Initiating Field Inspections and GPS Surveys

Dust observations, Sensit activity, elevated  $PM_{10}$  concentrations and video will be used as “trigger data” to determine the time and location for a Dust Source Area Survey (survey). Sensit and  $PM_{10}$  data will be automatically collected via radio transmission every workday. A technician will summarize and review the data each workday. The summary will list all Sensit activity greater than background output levels, and hourly TEOM  $PM_{10}$  concentrations over

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*Dust Observations were recorded for 6 hours of the 53 hour Storm Period.*

Figure 4.1 - Example of dust plume maps drawn by observers during daylight hours and total sand flux for a dust event on February 6-8, 2001.

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50  $\mu\text{g}/\text{m}^3$  with corresponding wind speed and direction data. If dust observations are available from a recent dust storm, they will be used to confirm the location of the dust source(s) that correspond with the Sensit activity and elevated  $\text{PM}_{10}$  concentration. Video will be used to identify a source or sources that were not identified by observations, Sensit data or  $\text{PM}_{10}$  information. Wind speed and wind direction data will be used to help determine if a lake bed dust source could have caused elevated  $\text{PM}_{10}$  concentrations. All of the trigger information will be used to identify any lake bed dust source area to initiate a dust source survey and/or surface inspection. The survey should be completed the same day if weather conditions are favorable. For larger areas, surveying may continue for several days or until precipitation obscures the boundaries of the source area.

In addition to the above process, general field inspections will be completed after dust storms to verify lake bed emission activity and the need for a survey. A survey will be completed if the trigger data and /or field inspections indicate emissive conditions in an area that has not been previously surveyed during the current dust period (Section 4.3) or in an area that has been previously surveyed but has increased in size since its last survey. The priorities for completing a survey are:

- 1) new lake bed source areas outside the instrumented Sensit network;
- 2) new lake bed source areas that have not been surveyed within the instrumented Sensit network; and
- 3) lake bed source areas that have previously been surveyed.

### 4.2.3.2 GPS Mapping Procedures

After a dust source is identified by dust observation, Sensit data, sand catch data, video,  $\text{PM}_{10}$  concentration or inspection of the lake bed surface, District staff will map the exterior boundary of as many of the source areas identified as possible during daylight hours, as weather conditions allow. The mapping will begin as soon as possible after a dust storm and continue until all the identified areas are mapped or precipitation occurs. The boundary of the emissive area(s) will be mapped using a Global Positioning System (GPS). Surveyors conducting the mapping will ride an ATV or walk around the outer boundary of the wind-damaged surface surveying a line with the GPS. A wind-damaged surface is defined as a soil surface with wind erosion evidence and/or aeolian deposition that has not been modified to an unrecognizable point by precipitation since the last identified dust storm.

GPS line data should be collected at an interval of one record every 10 seconds or less. Data should be collected in NAD83 UTM Zone 11 coordinates. Only GPS units capable of continuously recording line data will be used. Data should be processed and corrected using base station data (either from a commercial correction service or using data from the District's Keeler base station) to ensure positional accuracy.

Before beginning a survey, the edge of the source area is determined by a visual review of the surface conditions within a representative one square meter area along the edge of the source area. An undamaged surface is evident if there is no visible evidence of a disturbed lake bed surface due to wind damage. As an aid to calibrate the level of disturbed surface, a surveyor will

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begin each survey by estimating the percentage of surface that is undamaged by the wind. The surveyor visually determines where a surface with 70 to 80 percent of undisturbed surface is located. The surveyor completes the survey by following a line of travel that closely represents the initial one-meter calibration. The following defined list, Boundary Conditions and Survey Procedures (see below), can be used to determine how to map the source boundary under differing surface boundary conditions.

Boundary Conditions and Survey Procedures:

- Distinct Boundary:** A visibly sharp transition, 25 feet or less in width, between a wind-damaged lake bed surface and an undamaged lake bed surface. The surveyor should travel directly along this distinct outside edge, if possible, and may deviate 25 feet to the inside or outside on occasion. Small (25-foot wide or less) channels, boundary indentations, roads, mounds, and other obstacles may be directly crossed if the continuation of the main source boundary is clearly visible on the opposite side.
- Diffuse Boundary:** A visibly distinct transition, 25 to 100 feet in width, between a wind-damaged lake bed surface and an undamaged lake bed surface. Every effort should be made to travel along the outermost edge of the visible distinction.
- Indistinct Boundary:** A boundary that is not obvious to the surveyor where the edge of the source is located. Mapping would be stopped at this point until a Distinct or Diffuse Boundary can be located.

Generally the surveyor will maintain a constant course of travel following the Distinct Boundary of the wind-damaged area. As the boundary becomes less distinct, it is recommended to move the course of travel further into or outside the source to maintain recognition of surface damage. It is acceptable to travel within approximately 50 feet of the outer or inner edge of the larger more noticeable active area if the boundary is Diffuse. When encountering an Indistinct Boundary condition, the surveyor should note if the boundary can be found or if the boundary cannot be mapped during the existing survey and why. If the boundary cannot be mapped, the survey shall end at that point leaving an unclosed source area polygon.

It is possible for the surveyor to find himself or herself greater than 50 feet within or outside of the source area boundary. When this happens, the surveyor should turn perpendicular to the direction they were traveling and travel in the direction where the distinct edge should be located. For example, if the surveyor were inside the source area, they would turn in the direction where erosion evidence was not observed earlier along their path. If the surveyor were outside the source area, they would turn toward the side where they previously observed the source. Boundary loss may occur because of an Indistinct Boundary or unfavorable lighting conditions. The time and coordinates should always be noted when it is necessary to relocate the boundary during a survey.

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Another alternative for relocating a source area edge is to pause the GPS unit from recording data until the boundary is located and then resume with data collection. This allows the surveyor to travel in any direction until the edge is relocated or end the survey if an edge cannot be located. The line produced between the point where the GPS unit was paused and then restarted would be deleted and considered un-surveyed during post processing.

The presence of Indistinct Boundaries or conditions that cause the ending of a survey must be annotated on the GPS data or explained in the field notes, including point coordinates. Examples would include dust storm, precipitation, lightning, mud, and channel with flowing water, pond, and time constraint or equipment malfunction.

### 4.2.4 Using Sand Flux Monitors to Map Source Area Boundaries

Dust source area boundaries can be delineated or refined using default cell boundaries represented by active sand flux monitors. The area represented by the active SFM site may be shaped to exclude known non-emissive areas, such as; DCM areas, wetlands, or areas with different soil texture where there is evidence that it is non-emissive.

## 4.3 Composite Dust Source Map Development

Data Processing will compile the cumulative mapping information from the visual observers and field inspections using the GPS into a GIS database for two periods each year, December through June and July through November. A new composite map will be developed for each period containing only those data collected during that period. Hand drawn observation maps will be scanned and translated into the GIS database. Observation maps will be compared with source area locations from other methods through the GIS generated layers. Overlays of the maps generated from sand flux monitors, video cameras, visual observers and GPS'd source areas will be compared qualitatively, considering the information may have been collected at different times.

## 5. Protocol for Determining K-factors and PM<sub>10</sub> Emission Rates from Sand Flux Data

### 5.1 Objective

The objective of this portion of the Dust ID Program is to estimate the PM<sub>10</sub> emission flux for each cell or source area using the relationship  $PM_{10} \text{ emission flux} = \text{sand flux} \times K\text{-factor}$ . PM<sub>10</sub> emissions for each area will be used with the CALPUFF modeling system or other USEPA approved model to determine if the PM<sub>10</sub> emissions will cause or contribute to a NAAQS violation at the shoreline.

### 5.2 Method for Determining PM<sub>10</sub> Emissions and New K-factors

#### 5.2.1 PM<sub>10</sub> Emission Flux = Sand Flux x K-factor

PM<sub>10</sub> emissions will be estimated using the sand flux for each area represented by a Sensit and CSC and an appropriate K-factor for the area and period. The sand flux values will come from

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the Sensit and CSC data as discussed in Section 2. New K-factors for each area and period will be developed as discussed in this section, and default K-factors will be used to model dust events unless newer K-factors are determined.

### 5.2.2 Default Temporal and Spatial Storm-average K-factors

PM<sub>10</sub> emissions may be estimated from default K-factors that were developed from previous dust events that occurred in the same area and the same range of calendar months in previous years.

The areas for K-factor groupings are shown in Figure 1.1: North Area, Central Area, Keeler dunes, and the South Area. Any new source area within the depicted boundaries will be associated with that area for the spatial grouping of new K-factor values. If a new source area and K-factor is developed for an area outside these boundaries, the area and default K-factor will be associated with the K-factor for an existing area with the most similar surface soil texture. The determination of the most similar existing area will be made by the Air Pollution Control Officer.

### 5.2.3 Method to Determine Sand Flux from Areas with Implemented Dust Control Measures (DCM)

Sand flux will be measured at sites within the shallow flood and managed vegetation DCM areas. Sensits and CSCs will be sited on dry areas within the shallow flood DCM to represent dry areas near the site. DCM areas covered with standing water will be assumed to have zero sand flux. For the Managed Vegetation DCM, sand flux sites will be placed in spatially representative areas and in areas within the DCM where wind blown dust may have been previously observed.

### 5.2.4 New K-factors Seasonal Cut-points

The APCO will review the K-factor data and propose seasonal cut-points to the LADWP. LADWP will respond to the proposed cut-points within 30 days. If no agreement can be reached within 60 days, the default periods will be used.

The two default periods to be used are: the winter/spring period that includes the months of December, January, February, March and April, and the summer/fall period that includes May through November. These same calendar months will be used to generate new temporal K-factors for each area and to generate new 75-percentile hourly K-factor values for modeling PM<sub>10</sub> emissions.

### 5.2.5 Using CALPUFF Modeling System to Generate New K-factors

New hourly K-factors can be inferred from the CALPUFF model by using hourly sand flux as a surrogate for PM<sub>10</sub> emissions. Modeled PM<sub>10</sub> predictions can then be compared to monitored concentrations at PM<sub>10</sub> monitor sites to determine the K-factor that would correctly predict the monitored concentration for each hour. More information on the modeling procedures is included in Section 6.

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A K-factor of  $5 \times 10^{-5}$  will be used initially to run the CALPUFF model and to generate concentration values that are close to the monitored concentrations. Hourly K-factor values will then be adjusted in a post-processing step to determine the K-factor value that would make the modeled concentration match the monitored concentration at the PM<sub>10</sub> monitor site. The initial K-factor will then be adjusted using Equation 5.2.

### Equation 5.2

$$K_f = K_i \left( \frac{C_{obs.} - C_{bac.}}{C_{mod.}} \right)$$

Where,

$K_i$  = Initial K-factor ( $5 \times 10^{-5}$ )

$C_{obs.}$  = Observed hourly PM<sub>10</sub> concentration. [ $\mu\text{g}/\text{m}^3$ ]

$C_{bac.}$  = Background PM<sub>10</sub> concentration

$C_{mod.}$  = Model-predicted hourly PM<sub>10</sub> concentration. [ $\mu\text{g}/\text{m}^3$ ]

### 5.2.6 Screening Hourly K-factors

K-factors will be calculated for every hour that has active sand flux in cells upwind from a PM<sub>10</sub> monitor. These hourly K-factors will be screened to remove hours that did not have strong source-receptor relationships between the active source area (target area) and the downwind PM<sub>10</sub> monitor. For example, the screening criteria will exclude hours when a PM<sub>10</sub> monitor site is located on the edge of a dust plume. Because the edge of a dust plume has a very high concentration gradient, a few degrees error in the plume direction could greatly affect the calculated K-factor.

The following criteria will be used to screen the hourly K-factors:

#### Initial K-factor Screen

- 1) Wind speed is greater than 5 m/s at 10 m height at any network site.
- 2) Hourly modeled and monitored PM<sub>10</sub> concentrations were both greater than  $150 \mu\text{g}/\text{m}^3$  at the same monitor-receptor site.
- 3) Hourly wind direction as listed in Table 5.1 for each monitor site.
- 4) The mean sand flux for all sites with non-zero sand flux is greater than  $0.5 \text{ g}/\text{cm}^2/\text{hr}$ .

#### Final K-factor Screen

- 5) At least one sand flux site located within the target area and within a 30-degree upwind cone has sand flux greater than  $2 \text{ g}/\text{cm}^2/\text{hr}$ .

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- 6) All sources are within a distance of 15 km of the receptor.
- 7) More than 65 percent of the PM<sub>10</sub> contribution at a monitor site came from the target source area (North Area, South Area, Central Area or Keeler dunes).
- 8) Eliminate hours when sand flux data are missing from one or more cells that are located within a 30-degree upwind cone and within 10 km of the shoreline monitor. For Olancha and Lone Pine, which are both located 5 to 10 km from the lake bed, the distance limitation is changed to 10 km upwind of the shoreline.

**Table 5.1 Wind Directions for the Initial K-factor Screen**

<b>PM<sub>10</sub> Monitor Site</b>	<b>From-the-Lake Wind Dir. (Deg.)</b>	<b>Met Tower</b>
Lone Pine	110≤WD≤190	Lone Pine
Keeler	130≤WD≤330	Keeler
Flat Rock	210≤WD≤360	Flat Rock
Shell Cut	WD≥210 or WD≤50	Shell Cut
Dirty Socks	WD≥220 or WD≤65	Dirty Socks
Olancha	WD≥320 or WD≤55	Olancha
Bill Stanley	50≤WD≤190	Bill Stanley
New Sites	TBD	TBD

The from-the-lake wind directions for the initial K-factor screening criterion 3) are shown in Table 5.1. From-the-lake wind directions for any new PM<sub>10</sub> sites will be determined by the APCO as needed for the initial K-factor screen. Note that 'From-the-Lake' wind directions for assessing the lake bed impacts at PM<sub>10</sub> monitor sites (see 2008 SIP) are different from these K-factor screening wind directions.

Hourly K-factors that pass through the screening criteria will be used to develop new event-specific spatial K-factors, and new 75-percentile hourly average temporal and spatial K-factors, if enough K-factors are available.

### 5.3 Temporal and Spatial Event-specific K-factors

#### 5.3.1 Event-Specific K-factors

Screened hourly K-factors will be used to generate event-specific K-factors for the active source areas. The event-specific K-factor will be calculated as the arithmetic average using all the hours when the hourly K-factor passes the screening criteria for the target area.

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### 5.3.2 Temporal & Spatial 75-Percentile K-factors

The statistical 75-percentile value will be determined from the distribution of the hourly K-factors that pass the screening criteria for that area and period, whenever there are nine or more hourly K-factors. The 75<sup>th</sup> percentile will be calculated using the Microsoft Excel PERCENTILE function. The Microsoft Excel PERCENTILE function works by sorting values from lowest to highest, then assigns the 0<sup>th</sup> percentile is the lowest value, the 100<sup>th</sup> percentile is the largest value, and the values in between as  $(k-1)/(n-1)$  where n is the number of data values in the list and k is index of the k<sup>th</sup> lowest value in the list. Thus, each value is placed  $1/(n-1)$  apart. If a requested percentile does not lie on a  $1/(n-1)$  step, then the PERCENTILE function linearly interpolates between the neighboring values.

### 5.3.3 Default K-factors

Table 5.2 shows the default K-factors for each of the K-factor areas and periods. These K-factors are derived for the temporal and spatial 75-percentile values from the screened hourly K-factors for the 30-month Dust ID period used for the RSIP. Each of the two temporal periods combines hourly K-factors from the same calendar periods for 2 or 3 years.

**Table 5.2 - Default Spatial and Temporal K-factors for the Dust ID Model**

AREA	K-factor Jan.– Apr. & Dec.	K-factor May-Nov.
Keeler Dunes	$7.4 \times 10^{-5}$	$6.0 \times 10^{-5}$
North Area	$3.9 \times 10^{-5}$	$1.5 \times 10^{-5}$
Central Area	$12. \times 10^{-5}$	$6.9 \times 10^{-5}$
South Area	$4.0 \times 10^{-5}$	$1.9 \times 10^{-5}$

## 6. Protocol For Dispersion Modeling

This section of the *Protocol* discusses the dispersion model methods planned for the simulation of wind blown dust at Owens Lake using data from the Dust ID Program. The modeling procedures follow the methods used in the RSIP, with refinements based on experience and modifications to support the provisions of the SCR. The modeling techniques will be used both diagnostically to infer emission rates for source areas and prognostically to predict PM<sub>10</sub> concentrations at the historic shoreline. Following an overview of the modeling approach, the remainder of this section discusses construction of the meteorological data set, dispersion model options, background concentrations and source area characterization.

### 6.1 Overview of Modeling Procedures and Rationale for Model Selection

The CALPUFF modeling system was used in the RSIP and has been selected for continuing studies in the Dust ID Program. CALPUFF is the USEPA recommended modeling approach for long-range transport studies and USEPA has proposed CALPUFF as a *Guideline Model* to be

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included in the *Guideline on Air Quality Models* (40 CFR Part 51, Appendix W). Recently the modeling system is also being applied to near-field dispersion problems where the three-dimensional qualities of the wind field are important and for stagnation episodes when pollutants remain within the modeling domain over periods of several hours or more. Dust events on Owen Lake are sometimes influenced by complex wind patterns, with plumes from the North Sand Sheet traveling in different directions than plumes from the South Sand Sheet.

The proposed model domain shown in Figure 6.1 includes a 34 km-by-48 km area centered on Owens Lake. The meteorological and computational grid will use a one-kilometer horizontal mesh size with ten vertical levels extending from the surface to four kilometers aloft. The extent of the model domain was selected to include the “data rich” Dust ID Program study area, terrain features that act to channel winds, and receptor areas of interest. This same model domain and mesh size were used in the simulations supporting the RSIP.

### 6.2 Meteorological Data Set Construction

Three-dimensional wind fields for CALPUFF will be constructed from surface and upper air observations using the CALMET meteorological preprocessor program and the procedures employed in the RSIP. CALMET combines surface observations, upper air observations, terrain elevations, and land use data into the format required by CALPUFF. Winds are adjusted objectively using combinations of both surface and upper air observations according to options specified by the user. In addition to specifying the three-dimensional wind field, CALMET also estimates the boundary layer parameters used to characterize diffusion and deposition by the CALPUFF dispersion model.

### 6.3 CALPUFF Options and Application

**Surface Observations.** The necessary surface meteorological data will come from the District’s network of ten-meter towers shown in Figure 1.1. The District may also install additional stations to better characterize winds near suspect source areas not currently near an existing site. Very few periods of missing data are typically contained in the District’s database. Periods of missing data will be flagged and CALMET will construct the wind fields using the data from the remaining stations. In addition to the District’s network, surface data from other field programs at Owens Lake will be used when available.

**Cloud Cover Data.** The current version of CALMET also requires cloud cover and ceiling height observations. Cloud cover is a variable used by CALMET to estimate the surface energy fluxes and, along with ceiling height, is used to calculate the Pasquill stability class. Hourly cloud cover and ceiling height observations are being collected from the surrounding surface airways observations at China Lake and Bishop Airport. During dust event conditions, the sensitivity of the CALPUFF modeling system to these variables is reduced, as the stability class becomes neutral under moderate to high winds. Algorithms within the modeling system that depend on the surface energy fluxes are dominated by the momentum flux and tend to be insensitive to cloud cover under high winds. For these reasons, the absence of local cloud cover and ceiling height measurements are not expected to significantly affect the results of the modeling study.

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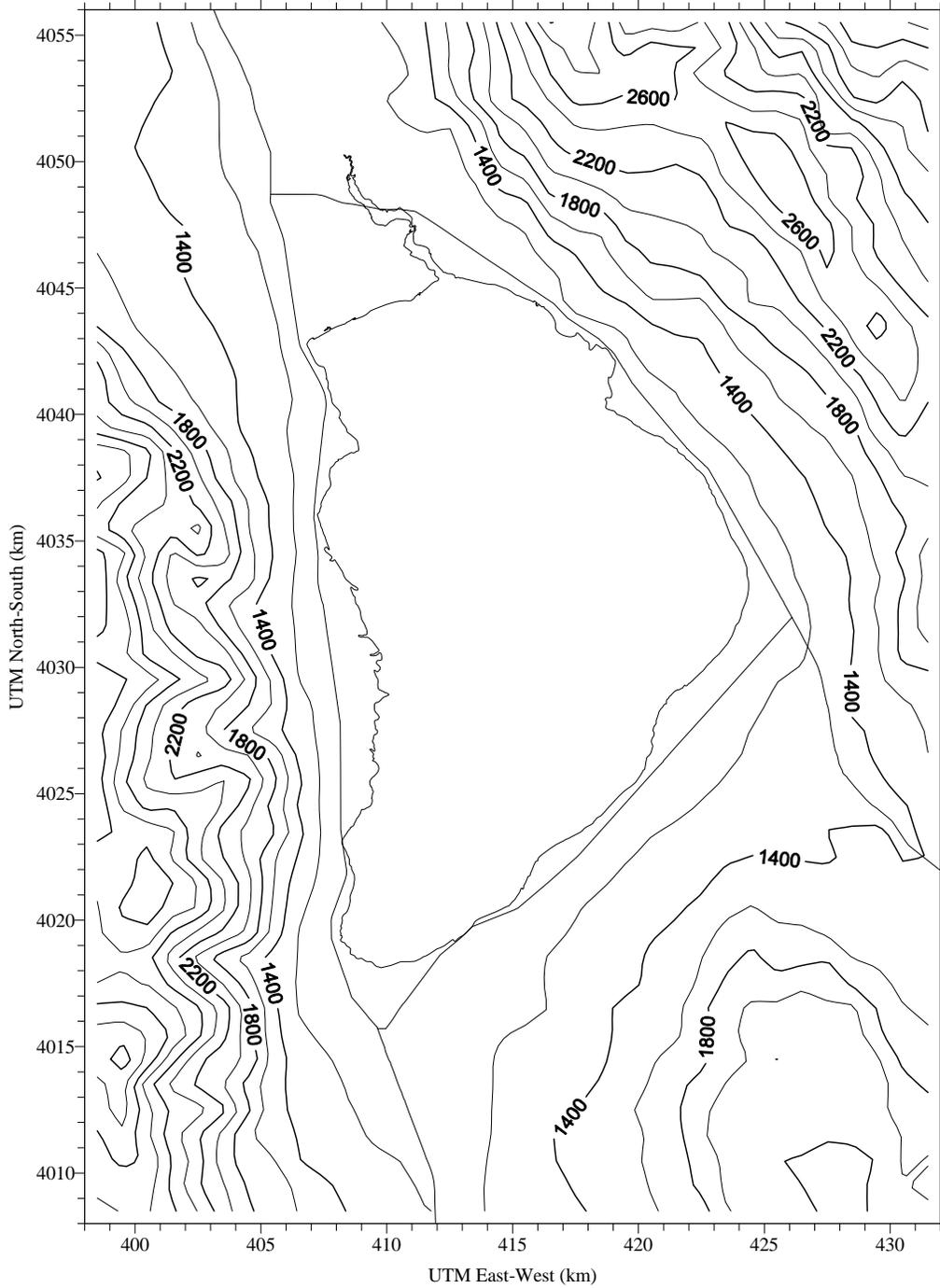


Figure 6.1 - Model Domain, elevation contours and UTM coordinates for the Dust ID Model

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**Surface Characteristics and Terrain.** The CALPUFF modeling system requires land use and terrain data. These data are used by CALMET to adjust the wind field and affect the calculations performed by the CALPUFF dispersion model. CALPUFF considers spatial changes in land use, including the surface roughness, and the input data are specified on a horizontal grid. The terrain data influence the constructed wind fields and plume trajectories in regions of sparse observations. Land use and terrain data have been obtained from the U.S. Geological Survey (USGS) data sets on the Internet. The resolution of these land use and terrain data sets are 200 m and about 30 m, respectively. The District has prepared these data sets using the pre-processing software provided with the CALPUFF modeling system. The resulting grids have been plotted and checked against data from the District's GIS database where the modeling domain overlaps the District's data. The 1-km mesh size terrain used by CALMET and CALPUFF is shown in Figure 6.1.

**Upper air data.** Upper air data will be collected from a number of different sources for construction of the wind fields and estimation of mixing heights with CALMET. In the RSIP, both local and regional data were collected as follows:

- A 915 MHz Radar Wind Profiler and Radio Acoustic Sounding System (RASS) were used to collect upper level wind and temperature measurements. The Wind Profiler was initially located at Dirty Socks then moved to the Mill Site during the 4<sup>th</sup> quarter of 2001. The District discontinued measurements with the Wind Profiler on June 30, 2003. The Wind Profiler with RASS samples wind and temperature from 100 m, up to 5000 m with a vertical resolution as low as 60 m depending on the clutter environment, atmospheric scattering conditions, and pulse length. Experience at Owens Lake indicates wind data recovery is sometimes poor above 1000 m due to the dry environment and the RASS data are limited to the lower levels during windy conditions.
- Regional twice-daily upper air soundings from Desert Rock Airport (Mercury, Nevada) and China Lake Naval Air Station.

During high wind events, observations from the Wind Profiler at both the Mill Site and Dirty Socks indicate very little wind speed or wind direction shear with height. Previous CALPUFF simulations suggest concentrations predicted at PM<sub>10</sub> monitoring sites and at the historical shoreline are not usually influenced by upper level winds because the sources are ground based. The highest impacts occur close to the source areas, and there is very little wind shear during high winds.

Following removal of the Wind Profiler, soundings from China Lake and Desert Rock will be used to construct the data set. The China Lake and Desert Rock sounding will primarily be used for upper level temperature lapse rates. Winds aloft will be based on extrapolation of the surface wind measurements. The default algorithms employed by CALMET based on Similarity Theory often adjust the winds in the wrong direction and predict too much increase in wind speed with height even for very small surface roughness lengths. As an alternative, wind speeds aloft will be adjusted using the empirical results suggested by the previous Wind Profiler measurements. No wind direction turning with height will be assumed except near the Wind Profiler site where the actual data will be used until this program is discontinued.

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**CALMET options.** The options employed for the application of CALMET to construct the wind fields were provided in the “Modeling Protocol” (MFG, 2001). The majority of the selected model options are based on the defaults incorporated in the code by the model author. Notable model options include:

- Ten vertical levels varying geometrically from the surface to 4000 m. The geometric spacing provides better resolution near the surface and the upper limit is high enough to be above the boundary layer height.
- Vertical extrapolation of surface winds aloft using the results of the Wind Profiler studies.
- Less than default smoothing of wind fields. LADWP contractors Air Sciences and Environ suggested less smoothing of the wind fields by CALMET after review of the *Owens Valley PM<sub>10</sub> Attainment Demonstration Modeling Protocol*.

Wind fields constructed with CALMET will be randomly checked by plotting the resultant fields and the surface observations on a base map. The CALDESK™ software package will also be used to view the CALMET wind fields.

The application of CALPUFF involves the selection of options controlling dispersion. Although the simulations are primarily driven by the meteorological data, emission fluxes, and source characterization, the dispersion options also affect predicted PM<sub>10</sub> concentrations. The model options used in the RSIP will continue to be used for the Dust ID Program. In this study, the following options will be used for the simulations:

- Dispersion according to the conventional Pasquill-Gifford dispersion curves. Sensitivity tests were also performed by applying CALPUFF with dispersion routines based on Similarity Theory and estimated surface energy fluxes. These tests did not indicate improved performance over the Pasquill-Gifford based simulations.
- Near-field puffs modeled as Gaussian puffs, not elongated “slugs.” CALPUFF contains a computation intensive “slug” algorithm for improved representation of plumes when wind directions vary rapidly in time. This option was tested, but did not significantly influence the CALPUFF predictions.
- Consideration of dry deposition and depletion of mass from the plume. The particle size data used will be based on measurements taken within dust plumes on Owens Lake as discussed below.

Dry deposition and subsequent depletion of mass from the dust plumes depend on the particle size distribution. Several field studies have collected particle size distributions within dust plumes at Owens Lake. Based on results from Niemeyer, *et al.* (1999), the CALPUFF simulations will assume a lognormal distribution with a geometric mean diameter of 3.5 μm and a geometric standard deviation of 2.2.

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### 6.4 Background PM<sub>10</sub> Concentrations

The dispersion model simulations include only wind blown emissions from the source areas with sand flux activity measurements. During high wind events other local and regional sources of fugitive dust can contribute to the PM<sub>10</sub> concentrations observed at the monitoring locations. In the RSIP a constant background concentration of 20 µg/m<sup>3</sup> was added to all predictions to account for background sources. The constant background was calculated from the average of the lowest observed PM<sub>10</sub> concentrations for each dust event when 24-hour PM<sub>10</sub> concentrations at any of the sites were above 150 µg/m<sup>3</sup>. To avoid including impacts from lake bed dust source areas in the background estimate, the procedures used a simple wind direction filter to exclude hours when the lake bed may have directly influenced observed PM<sub>10</sub> concentrations. Such hours were removed and daily average background concentrations were recalculated based on the remaining data.

Additional PM<sub>10</sub> monitors are proposed for installation at Owens Lake. These monitors can be used to measure hourly PM<sub>10</sub> concentrations upwind from lake bed source areas. Some of these monitors may be representative of regional PM<sub>10</sub> concentrations and others may be influenced by local sources that may indicate a higher PM<sub>10</sub> concentration than the regional background level. A method to calculate background concentrations based on upwind monitor concentrations for each modeled-event approved by both the APCO and the General Manager of the LADWP may be developed in the future. Meanwhile, a default background of 20 µg/m<sup>3</sup> will be added to the model prediction for each receptor location.

### 6.5 Area Source Characterization

CALPUFF simulations at Owens Lake are sensitive to source configuration. Emissions will be varied hourly according to the methods described in Section 6.6 and dust sources represented as rectangular area sources. CALPUFF contains an area source algorithm that provides numerically precise calculations within and near the area source location. The area source configuration used for the Dust ID model run for the period from July 2002 through June 2003 is shown in Figure 6.2. The paired Sensit and CSC measurements were assumed to be representative of the horizontal sand flux for irregularly shaped source areas near the sand flux site. Field observers determined the size and shape of the source areas based on GPS mapping after the storms, observation maps made during the storms, and physical surface characteristics. All source areas were represented by sand flux measured at a single site that was applied to a series of 250 m x 250 m cells that were configured to conform to the general shape of the source area represented by the sand flux site.

The following general rules are used to characterize and map source areas on the lake bed:

- Actual source boundaries will be used when available to delineate emission sources in the simulations. Actual source boundaries will be determined using a weight-of-evidence approach considering visual observations, GPS mapping, and surface erosive characteristics. Erosive characteristics that might be considered when defining a source boundary include properties of the soil, surface crusting, wetlands, and the proximity of the brine pool and existing DCMs.

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- Source boundaries will also be defined based on the DCM locations. For example, sand flux measurements outside the DCM will be assumed to apply up to the boundary of the DCM. Sand flux measurements inside the DCM will be assumed to apply to the area inside the DCM.
- All source areas will be represented by a series of 250 m x 250 m cells that generally conform to the shape of the source area and share the same hourly sand flux rates as the sand flux site representing that source area. Cells small than 250 m x 250 m may be used near the shoreline to better represent source areas where predicted concentrations are expected to be particularly sensitive to the source area configuration. (Figure 6.2)

### 6.6 Estimation of PM<sub>10</sub> Emissions

Hourly PM<sub>10</sub> emissions for each source area will be estimated using Dust ID sand flux data and K-factors following the procedures described in Section 5. See also SCR Section 1.2 and 2.1 regarding the order of priority for using K-factors for modeling.

### 6.7 Simulation of Shoreline Concentrations

Under the provisions of the SCR in the RSIP, CALPUFF simulations will be used to assess whether lake bed source areas cause or contribute to an exceedance of the PM<sub>10</sub> NAAQS in areas without PM<sub>10</sub> monitoring sites. Predictions will be obtained using the RSIP receptor network that contains more than 460 receptor locations placed at the historic shoreline (approximately at the 3600' elevation) of Owens Lake (see Figure 6.2). The receptor spacing along the historic shoreline ranges from 100 to 200 m. Note in several locations along the shoreline, receptors are very close to or even within potential source areas (see Figure 6.3).

## 7. Owens Lake Safety & Training Program

### 7.1 Objective

All field personnel that work at Owens Lake are required to complete special training courses to deal with the unique hazards and environmental precautions that must be considered when working on the lake bed. Training includes: first aid and CPR training, proper ATV use, respiratory protection and dust safety, lake bed access reporting, and snowy plover protection.

### 7.2 Safety Requirements

Safety is the first priority while working at Owens Lake. Training requirements are required for every worker at the lake for their own safety. Dust storms can start within minutes exposing workers to dust and sand. Lightning storms often occur in the summer. Winters have sub-freezing temperatures and summers have temperatures well above 100 degrees. Access is usually restricted to ATV's and can change often throughout each year. The objective of all the training requirements is to put safety as the highest priority at all times.

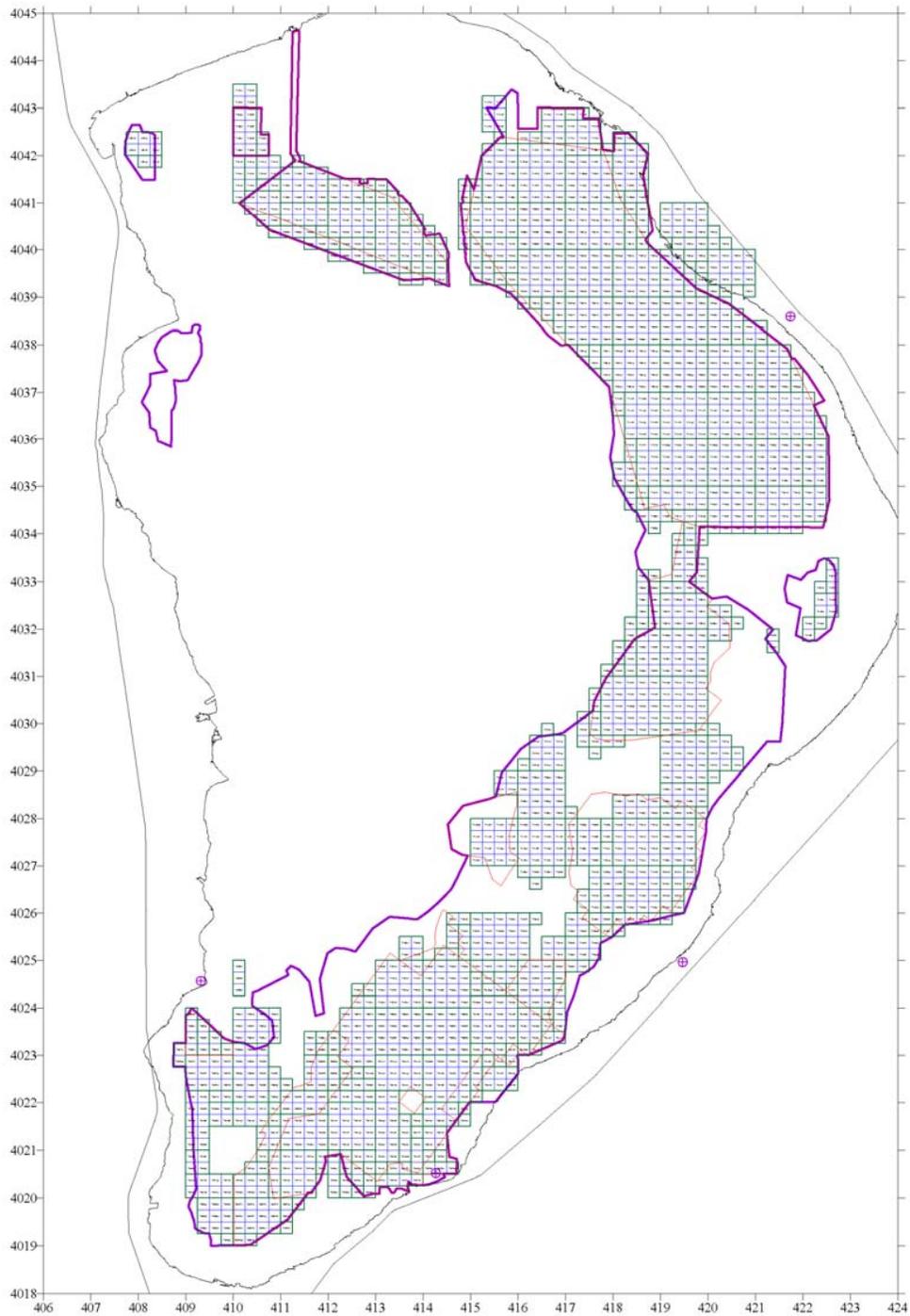
**Attachment C**

Figure 6.2 - Area source configuration using 250 m x 250 m cells for July 2002 through June 2003 Dust ID model run. Purple lines represent the control area boundary used with the Settlement Agreement.

# Attachment C

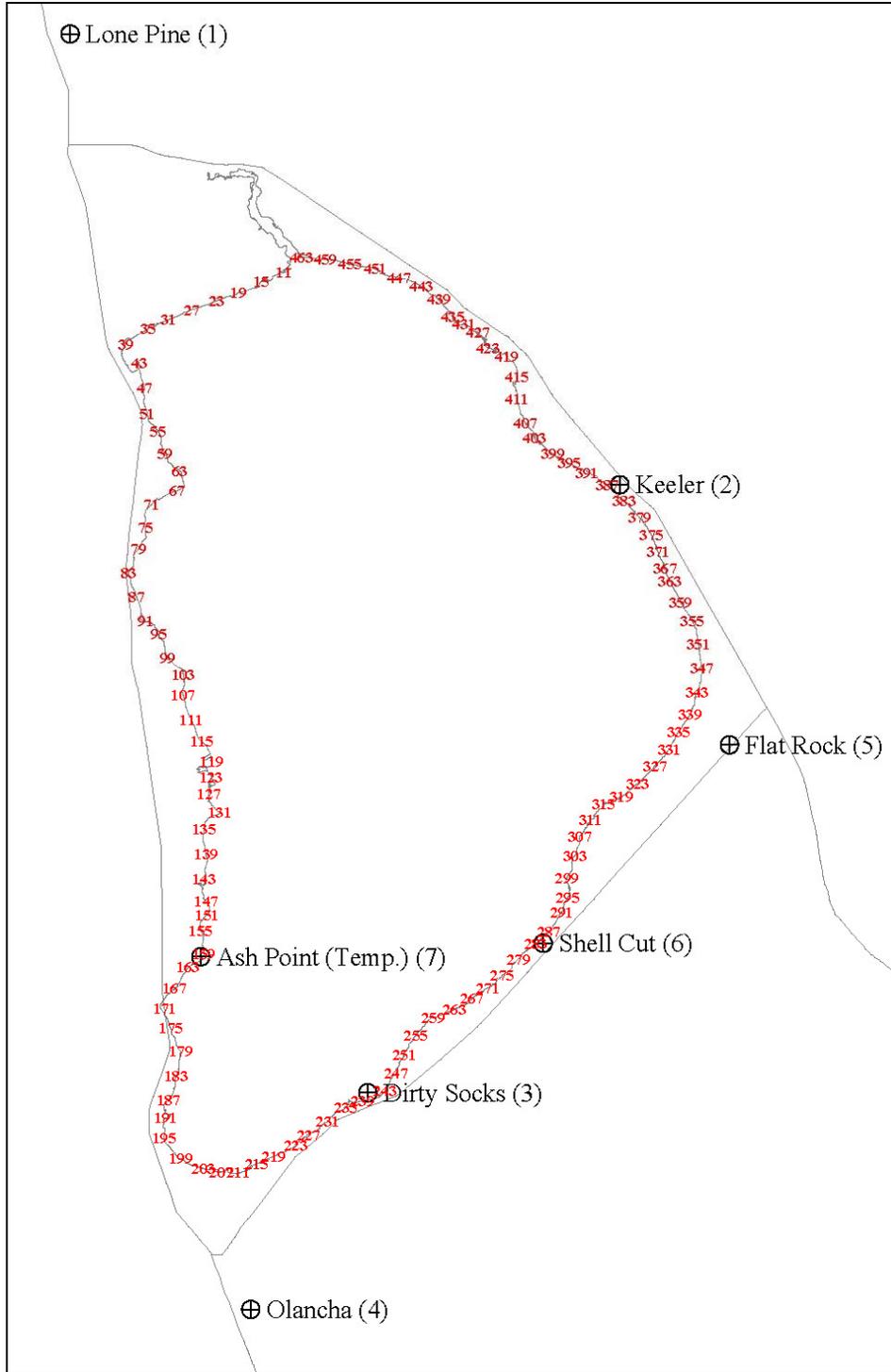


Figure 6.3 -The Dust ID model evaluates PM<sub>10</sub> impacts at over 460 receptor locations around Owens Lake.

## Attachment C

All personnel that are involved with any fieldwork under the Dust ID Program are required to complete all safety training before working on the lake. Everyone must report going onto and leaving the lake. Workers are required to stop work and leave the lake when a dust storm starts. Every field worker will be issued a respirator, goggles for eye protection and earplugs to be used when caught in a dust storm while leaving the lake. Workers are required to leave the Keeler office when the dust impacts Keeler and the TEOM monitor reading exceeds  $1000 \mu\text{g}/\text{m}^3$ . Respirator training and face fits will be completed annually. First Aid and CPR training and successful certification is required every three years. Snowy Plover training is required before any new worker can start work on the lake. Other safety issues that all workers will be informed of include the proper use of tools, special weather conditions such as temperature extremes, rain and lightning and training in the operation of ATVs.

### 7.3 Reporting Procedure for Working on the Lake and Contacts

1. Normal work hours on the Owens Lake are defined as sunrise to 4:45 PM, Monday through Friday. The lake is defined as any area below the 3600 ft. contour.
2. Every person or group must call the Bishop office and leave a message or speak to the Administrative Specialist (AS) to notify that they are working on the lake. They also must inform the AS what area of the lake they will be working. Examples: DIVIT, Dirty Socks sand sheet, "A" Met tower or any commonly used identifiable name of a site or area you will be working.
3. The AS will record the person's name (s) and area of the lake they are working on.
4. Every person or group working on the lake must notify the Bishop office before 4:45 PM on the same day; that they have left the lake OK. This must be done or a person will be sent out to look for you! False alerts will not be appreciated.
5. The AS will call the Director of Technical Services (DTS) in Keeler or one of the back up persons in order on the list below, and report the missing person if not notified before the specified time. An attempt will be first made to contact the missing person by phone and determine their situation. The DTS or an assigned person will begin a search for the missing person if the person cannot be contacted by phone. The search will continue until dark or unsafe conditions at which time the Inyo Sheriff will be notified for assistance.
6. Everyone may work outside normal work hours Monday through Friday at your own risk. However, they must call the Bishop office before the designated time and notify the AS that they will be working past 4:45 PM and call again and leave a message that they left the lake OK before 8:00 AM the next day.
7. The AS will check the messages every morning and record the information. The DTS will be notified if a person that worked after normal hours did not call and leave a message that they left the lake OK. The DTS or an assigned person will follow the procedure for a missing person outlined in step 5.

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8. Nobody may work on the lake after 4:45 PM on Friday, all day Saturday or Sunday unless they receive special permission from their direct supervisor. The supervisor will be responsible for making sure the worker left the lake OK and responding to an emergency or search if necessary. The worker must notify their supervisor when they leave the lake OK during these periods.

### **Emergency Assistance Reporting Contacts and Phone Numbers (Area Code 760):**

#### **Call 911 first if you have an emergency!**

Bishop Office AS	872-8211	
Bill Cox (DTS)	876-8103	Cell 937-2886
Earl Wilson	876-8104	Cell 937-1060
Nik Barbieri	876-1803	Cell 937-6696
Grace Holder	872-8211	Cell 937-2887
Guy Davis	876-8115	Cell 937-1766
Dan Johnson	876-4544	Cell 937-1715
Ted Schade	872-8211	Cell 937-3360

#### **7.4 Snowy Plover Training and Other Wildlife Protection Procedures**

Field technicians and other District personnel and contractors are required to take precautions to avoid disturbing western snowy plovers during the nesting and brooding season which is from March 15 through August 30 each year. All lake bed personnel must complete snowy plover awareness and avoidance training before venturing onto the lake bed during snowy plover season. A qualified biologist will provide training for all lake bed personnel. In addition to completing snowy plover training, the plover protection program requires the following:

- Report snowy plover sightings to the District's biological resources monitor for dissemination to all lake bed personnel and for scientific data collection purposes. The biological resources monitor will map and mark the sightings in the case of nesting pairs, and will map the last known locations of broods. Lake bed workers will be responsible for checking the latest maps before encroaching onto potential snowy plover use areas.
- If snowy plover nests are found within areas of potential conflict with Dust ID monitoring, they will be marked in the field with green stakes. Within the buffer area demarked by stakes, the maximum allowable time per visit is 10 minutes.
- Field personnel should use established ATV and 4WD vehicle trails to approach and depart monitoring sites. The maximum allowable speed on ATV and off-road 4WD on the lake bed is 15 mph during the snowy plover season.

All existing and new Dust ID monitoring installations will be fitted with raptor perching deterrent (eg., Nixalite) at potential perch sites with a height of greater than 60 inches above the

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playa surface. Maintenance of perching deterrents will be routinely performed. Any new construction that causes new ground disturbance during the snowy plover season will require a pre-construction survey for snowy plover use. A qualified biologist will perform the survey within 1 week prior to the start of construction.

Monitoring will be performed on site in a manner that is least disturbing to wildlife and plant resources as possible. Potentially affected upland resources (those located outside the playa) that could be disturbed during any new ground-disturbing construction activities were identified during District environmental analyses. The animals that use upland areas vary seasonally, with nesting and foraging birds, mammals, reptiles, and invertebrates occurring during the period of dust monitoring. No special training is required to work in upland areas during the dust monitoring season, however pre-construction wildlife and rare plant surveys are required if placement of new facilities at any time of year will cause new ground disturbance.

**Attachment D****Board Order 080128-01  
Attachment D****2008 Procedure for  
Modifying Best Available Control Measures (BACM)  
for the Owens Valley Planning Area**

The City may transition from one approved BACM to another provided that the performance standard of one or the other BACM is met at all times during the transition, and that the City makes a complete and technically well-supported written demonstration of that performance, with a built-in margin of safety, to the satisfaction of the APCO in advance of any actions by the City to transition. There are three circumstances under which temporary modifications may be allowed to the BACM identified in this SIP, if certain conditions are met. The circumstances are:

1. Adjustments to existing BACM. Research to demonstrate that sufficient PM<sub>10</sub> control efficiency during the dust season can be achieved and the NAAQS can be attained everywhere on or above the historic shoreline with a different performance standard for an existing BACM.
2. Research on new BACM
3. Transition from one BACM to another that requires a time period where neither BACM's performance standards can be met.

The City may make an application for any of these modifications in writing to the APCO. The complete application must include all necessary data and other technical information to support the application. Except for the specific limitations set forth below for BACM adjustments to Shallow Flooding, the APCO shall have full and sole discretion to accept, reject or condition the City's application for modifications to BACM on Owens Lake, to require additional technical information, and/or to independently monitor the results of the project, and shall provide her/his decision in writing. This same discretion shall apply to the APCO's consideration of each of the other applications that the City may make as further described below. The APCO will consider and respond to comments made by the City regarding any decision by the APCO to reject, condition or modify an application. Failure by the City to comply with any condition of the project approval may result in the APCO revoking the project approval and directing closure procedures be implemented for the project.

The flexible BACM description under the terms of the Order preclude the application of the U.S. Environmental Protection Agency's Natural Events Policy for monitoring data used to make the determinations in this Attachment. All monitored PM<sub>10</sub> concentrations that meet the EPA quality-assurance requirements contained in 40 CFR Part 58 and are measured at stations located at or no more than 3 kilometers above the historic shoreline (shoreline monitors) will be used in the analysis. The monitored values will be used as measured, and will not be adjusted for from-the-lake and non-lake wind directions as they are for the Supplemental Control Requirements.

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The modeling for the determinations will be performed in accordance with the 2008 Owens Lake Dust Source Identification Program Protocol (Board Order 080128-01, Attachment C).

### 1. ADJUSTMENTS TO EXISTING BACM

#### A. BACM Adjustments to Shallow Flooding

1. After approval of the 2008 SIP, the City shall have the option to conduct field testing to refine the wetness cover requirement to achieve 99 percent control efficiency in Shallow Flood areas within the boundaries of the 2003 Dust Control Area (Shallow Flood Cover Test).
  - A. The Shallow Flood Cover Test shall occur on one or more areas totaling not more than 1.5-square-miles, to be selected by the City and approved by the APCO, which approval shall not be unreasonably withheld, from within the TDCA areas requiring 99 percent control.
  - B. The Shallow Flood Cover Test design shall be prepared by the City and approved by the APCO, which approval shall not be unreasonably withheld, prior to implementation. Based on that design, the APCO will reasonably determine wetness cover requirements for the Shallow Flood Cover Test.
  - C. The City will be CEQA lead agency for the Shallow Flood Cover Test and shall secure all required responsible agency approvals, permits and leases.
2. If the APCO reasonably determines in writing that the PM<sub>10</sub> Dust Control Measures in the 2008 Total Dust Control Area (TDCA) have been operational for one continuous year (defined as 365 consecutive days) with no exceedance of the federal standard at monitors located at or above the historic shoreline caused solely by sources within the 2008 TDCA, the City shall be permitted to reduce the wetness cover by an average of 10 percent over those Shallow Flood areas requiring 99 percent control efficiency, excluding areas identified in Section A.2.C, below, provided that:
  - A. Application of the 10 percent reduction in wetness cover during the May 16 through June 30 Shallow Flood areal wetness cover reductions provided for in Paragraphs 15.A.ii and 15.B.ii of Board order 080128-01 shall result in the lower of:
    - i. The areal cover resulting from a 10 percent reduction; or
    - ii. The areal cover required in Paragraphs 15.A.ii and 15.B.ii of Board Order 080128-01.
  - B. To implement the reductions set out in this Section, the City shall be required to first submit a written Wetness Cover Plan to the District for reducing the wetness cover on the eligible areas. The Wetness Cover Plan shall take into account:

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- i. The results of testing carried out pursuant to Section A.1, if conducted; and
    - ii. The results of fall and spring Shallow Flood wetness cover reduction operations carried out pursuant to Paragraphs 15.A.ii and 15.B.ii of Board Order 080128-01.
  - C. If, in any year, the Wetness Cover Plan proposes reductions in wetness cover greater than 10 percent in any portion of the Shallow Flood areas covered by the Plan (consistent with the 10 percent limit on the overall average reduction), the City shall obtain the additional written approval of the APCO, which approval shall not be unreasonably withheld.
  - D. In the event shoreline monitors show an exceedance of the federal standard, whether that exceedance is caused by sources within, outside, or both within and outside of the 2008 TDCA, no further reductions in wetness cover shall be permitted for any Shallow Flood area that has contributed to the exceedance, as determined by the methodology in the “2008 Owens Valley Planning Area Supplemental Control Requirements Procedure” (Attachment B) and subject to the provisions of Section A.4, below.
  - E. Except as provided in Section A.4, below, the City may continue to operate using reductions of wetness cover pursuant to a previously approved Wetness Cover Plan.
3. For each Dust Control Season (October 1 of each year through June 30 of the next year) that wetness cover reductions have taken place under the provisions of Section A.2, the City shall prepare and submit to the District a written report summarizing the results of the wetness cover reductions within 90 days after conclusion of the corresponding Dust Control Season. The report shall document the percentage of wetness cover for Shallow Flood areas and the effect(s) of wetness cover reductions on PM<sub>10</sub> concentrations at the historic shoreline.
4. Any areas for which wetness cover has been reduced pursuant to Section A.2 and that cause or contribute to an exceedance of the federal standard at the historic shoreline shall be remediated by the City under the Remedial Action Plan prepared pursuant to the requirements of Attachment B.
  - A. Subject to APCO written approval, which approval shall not be unreasonably withheld, the City may further reduce the wetness cover beyond that allowed in Section A.2 provided that:
    - i. The maximum 24-hour PM<sub>10</sub> shoreline monitor values for at least 365 consecutive days of operation following initiation of the last approved Wetness Cover Plan does not exceed 130 µg/m<sup>3</sup>; and
    - ii. The City demonstrates to the reasonable satisfaction of the APCO that the modeled contributions from the lake bed for the same time period set forth in

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Section A.4.A.(i) plus the background of  $20 \mu\text{g}/\text{m}^3$  do not exceed  $120 \mu\text{g}/\text{m}^3$  at the historic shoreline.

- B. If the monitored values at the historic shoreline exceed  $130 \mu\text{g}/\text{m}^3$ , and it is determined that non-lake bed sources are contributing greater than  $20 \mu\text{g}/\text{m}^3$ , then the District will expeditiously seek to identify and require control of those non-lake bed sources so that the City may continue to implement efficient DCMs on the lake bed.
- C. If the City is entitled to further reduce wetness cover pursuant to this Section, the City shall prepare and submit an updated Wetness Cover Plan to the District to describe the wetness cover proposed for the subsequent, applicable Dust Control Season. The updated Wetness Cover Plan shall include:
  - i. A map that depicts the eligible Shallow Flood areas;
  - ii. The proposed amount of wetness cover for each eligible Shallow Flood area; and
  - iii. The method for determining effectiveness of the proposed wetness cover.
- D. The Wetness Cover Plan shall be subject to approval of the APCO, which approval shall not be unreasonably withheld.

### **B. BACM Adjustment to Measures Other than Shallow Flooding within Existing Dust Control Areas**

#### Requirements to Begin the Process

At least once per calendar year after May 1, 2010, the District's APCO will make a written determination as to whether the Owens Lake bed will require additional  $\text{PM}_{10}$  controls in order to attain or maintain the federal 24-hour  $\text{PM}_{10}$  NAAQS. The APCO will use the procedure forth in Board Order 080128-01 to make the determination.

If the APCO determines that there were no monitored or modeled exceedances of the  $\text{PM}_{10}$  NAAQS as described above for the previous calendar year, each calendar year the APCO will do the following:

- 1) determine from the modeling if there are shoreline receptors where the model shows the combined predicted yearly maximum 24-hour contribution from all source areas on the lake bed contributing to those receptors plus background (24-hour average of  $20 \mu\text{g}/\text{m}^3$ ) is less than  $120 \mu\text{g}/\text{m}^3$ , and
- 2) determine that there were no concentrations greater than  $120 \mu\text{g}/\text{m}^3$  measured at any shoreline or near-shore monitoring site in the area of those receptors.

The City may perform an independent assessment using the data and methods of the Dust ID Protocol in order to confirm the APCO's findings. The APCO will consider and respond to the

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City's assessment before making his/her final determination. The APCO has full and sole discretion to make this determination.

### First Step on Test Areas

If there are receptors that meet the requirements described above, and provided that the City is in compliance with SIP control requirements on all areas of the lake bed, the APCO will inform the City that they may submit an application to reduce the level of control within a 1 to 2-square-mile test area of an existing Shallow Flooding Dust Control Measure (DCM) area or within a 160 to 320 acre test area of an existing Managed Vegetation DCM area that the modeling shows contributes to, and only to, the shoreline receptors described above where the yearly maximum 24-hour contribution from the lake bed plus background is less than  $120 \mu\text{g}/\text{m}^3$ . Application may be made for more than one area to be tested simultaneously provided the test areas do not impact any of the same modeled shoreline receptors or monitors (no overlapping impacts). The above limitations on test area size and location do not apply outside the boundaries of existing Dust Control Areas.

For the Managed Vegetation DCM, the cover may be reduced by no more than 5%, e.g. 50% to 45%, (one step). For other BACM or changes to compliance averaging areas (e.g., one acre for Managed Vegetation), the APCO will determine the permitted test area size, averaging area, test location and step amount. An area with a non-zero contribution to a receptor will be considered not to contribute to a receptor if the contribution from that area is less than  $5 \mu\text{g}/\text{m}^3$  and the yearly maximum 24-hour contribution from the lake bed plus background ( $20 \mu\text{g}/\text{m}^3$ ) to that receptor is less than  $140 \mu\text{g}/\text{m}^3$ . (A "zero contribution" is defined by the accuracy of the instruments used to collect the data, but in no case shall it be greater than  $1 \mu\text{g}/\text{m}^3$ .) The City may also satisfy the requirements of a BACM test for Managed Vegetation with documentation of a site-specific BACM test, along with written justification for more general application of the results of this test.

The City's application to reduce the level of control over any area within the boundaries of existing Dust Control Areas must be accompanied by a modeling analysis that demonstrates that increasing  $\text{PM}_{10}$  emissions within the test area will not cause the predicted yearly maximum 24-hour concentrations along the shoreline to exceed  $120 \mu\text{g}/\text{m}^3$ , including background ( $20 \mu\text{g}/\text{m}^3$ ).

The application must also include, but is not limited to:

- 1) a project description,
- 2) site plan,
- 3) any necessary environmental documentation, responsible agency approvals, permits and leases,
- 4) a protocol to measure  $\text{PM}_{10}$  emissions and performance standards,
- 5) a time frame for project milestones and completion,
- 6) plans to control  $\text{PM}_{10}$  emissions if they exceed project limits,
- 7) project closure procedures if the project is discontinued,
- 8) soil texture information, soil chemistry, groundwater chemistry and applied water chemistry, and

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- 9) a protocol to evaluate control effectiveness, estimate emissions and determine whether the results are transferable to other areas of the lake bed.

For BACM other than Shallow Flooding, the City will submit a relationship between control efficiency and performance standards based upon research results. The APCO has full and sole discretion to accept, reject, or modify that relationship. All modeling will be done according to the Dust ID Protocol.

Rectified aerial or satellite images of the area of adjusted BACM, or any other method approved by the APCO, will be used by the APCO to determine the performance standards for the adjusted BACM for this step and all subsequent steps.

All raw data must be shared with the APCO, and all data screening criteria must be approved (or disapproved) in writing by the APCO. The APCO may terminate the test at any time if modeling or monitoring show that modeled (including background of  $20 \mu\text{g}/\text{m}^3$ ) or monitored emissions are increasing above trigger levels set by the APCO based upon a  $140 \mu\text{g}/\text{m}^3$  modeled or monitored  $\text{PM}_{10}$  concentration at the shoreline, or if the City is not following the APCO-approved protocol. The APCO has full and sole discretion to determine whether these conditions have been met.

The APCO has full and sole discretion to approve or reject the City's application or require conditions. The APCO will take action and notify the City in writing within 90 days of receipt of the written application. No changes may be made to BACM in advance of the APCO's approval. Any adjustments to BACM will be reported to EPA by the APCO within 60 days of the APCO's approval.

### Subsequent Steps on Test Areas

The adjusted BACM shall be maintained by the City for one year. No other adjustments to BACM may be made during that year that impact any of the same set of model shoreline receptors. At the end of the year, the City may submit a new application to the APCO to reduce the level of control in the test area by another step provided:

- 1) the modeled yearly maximum 24-hour contribution at all of the shoreline receptors identified above from all lake bed sources including the test area, plus background ( $20 \mu\text{g}/\text{m}^3$ ), during the test period is less than  $120 \mu\text{g}/\text{m}^3$ , and
- 2) no concentrations greater than  $120 \mu\text{g}/\text{m}^3$  were measured at any shoreline monitor in the area of those receptors during the test period.

The new application must contain all the same elements as the original application, and all the data and modeling from the first step of the test.

The APCO has full and sole discretion to approve or reject the City's application, or to require conditions. Subsequent steps may be made in the same manner. The APCO will take action and notify the City in writing within 90 days of receipt of the written application.

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### Requirement to Increase Controls on Test Areas

If, at the end of the year or any subsequent year before the SIP Revision to adjust BACM is approved by USEPA, the predicted yearly maximum 24-hour contribution from all lake bed sources including the test area plus background ( $20 \mu\text{g}/\text{m}^3$ ) exceeds  $140 \mu\text{g}/\text{m}^3$  at any of the shoreline receptors identified above, and/or concentrations greater than  $140 \mu\text{g}/\text{m}^3$  were measured at a shoreline monitor in the area of the identified receptors, then the City must increase the control efficiency on the test area to the last step that achieved concentrations below the  $140\text{-}\mu\text{g}/\text{m}^3$  threshold. For Managed Vegetation, this action must be taken within 12 months of the written determination by the APCO that the requirements for adjusting BACM were not met. For all other  $\text{PM}_{10}$  control measures, this action must be taken within 60 days of the written determination by the APCO that the requirements for adjusting BACM were not met. The APCO has full and sole discretion to make that determination. The APCO will determine the time scale for compliance for other BACM as part of the approval of the application.

### SIP Revision for BACM for the Test Area

After three consecutive years of successful operation of the adjusted-BACM test area (modeled and monitored concentrations less than  $140 \mu\text{g}/\text{m}^3$  as described above), the City may apply to the District for a SIP Revision to redefine BACM for that test area on the Owens Lake bed provided:

- 1) the predicted yearly maximum 24-hour  $\text{PM}_{10}$  contribution for each year of the test from the test area plus background ( $20 \mu\text{g}/\text{m}^3$ ) at all shoreline receptors is  $140 \mu\text{g}/\text{m}^3$  or less, and
- 2) no  $\text{PM}_{10}$  concentrations greater than  $140 \mu\text{g}/\text{m}^3$  were measured at any shoreline monitor during the three years of the test.

The APCO has full and sole discretion to determine whether these conditions have been met. After public notice and comment and a public hearing, the District Board has full and sole discretion to determine whether to adopt the SIP revision.

### Lake-Wide SIP Revision for BACM for a Soil Type

If, after three consecutive years of successful operation of the adjusted-BACM test area, the predicted yearly maximum 24-hour contribution from the test area and all source areas on the lake bed plus background ( $20 \mu\text{g}/\text{m}^3$ ) at all shoreline receptors for all three years of the test is  $140 \mu\text{g}/\text{m}^3$  or less and no concentrations greater than  $140 \mu\text{g}/\text{m}^3$  were measured at any shoreline monitor during the three years of the test, the research conducted on these test areas can be used to determine the relationship between the  $\text{PM}_{10}$  emissions, control efficiency and DCM performance standards. After the relationship has been identified, the City will use the research results in an updated modeling analysis that applies the test results to other areas on the lake bed with the same general soil type (sand-dominated, silt-dominated or clay-dominated) and under the same range of evaluated emissions or control efficiencies and performance standards as the test. The modeling will cover the entire test period, and will be done in accordance with the Dust ID Protocol. A DCM control map (map) will be prepared of lake bed control efficiencies (with corresponding DCM performance standards) that would be required to achieve the  $\text{PM}_{10}$  NAAQS everywhere along the historic shoreline with that DCM in the same general soil type

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(sand-dominated, silt dominated or clay-dominated) as the test area and under the same range of control efficiencies, emissions, and performance standards evaluated in the test.

The City will then submit this draft map to the APCO for approval. The submittal must contain all the data from the test area and the modeling that produced the map. The APCO has full and sole discretion to approve, disapprove, or modify the draft map.

If the APCO approves the map, the City may apply to the District Board for a SIP Revision to redefine that BACM for that mapped area on the Owens Lake bed. After public notice and comment and a public hearing, the District Board has full and sole discretion to determine whether to adopt the SIP Revision. If a SIP Revision identifying a redefined BACM for Owens Lake is adopted by the District Board and approved by USEPA, the redefined BACM may be implemented anywhere designated by the new DCM control map. If the City has implemented a different DCM in the mapped area, the requirements of the following section below titled "Transitioning From One BACM to Another BACM After 2010" must also be met. If any modeled or monitored exceedance of the PM<sub>10</sub> NAAQS results from these adjustments to BACM, the requirements of Board Order 080128-01, Paragraphs 10 and 11, will automatically apply to increase controls on these extreme violators to restore attainment of the NAAQS.

As many of the existing and potential dust control areas on the Owens Lake bed fall under the jurisdiction of the California State Lands Commission and other responsible agencies, the City must secure the appropriate approvals, leases and permits prior to implementing adjustments to existing BACM. However, nothing in this section is intended to give any responsible agency any authority beyond their authority under law.

### **2. RESEARCH ON POTENTIAL NEW BACM INCLUDING MOAT ROW**

The City may test new dust control measures at any time on areas of the lake bed that are emissive, except within the 43.0 square-mile 2008 Total Dust Control Area footprint where BACM (or on up to 3.5 square miles, the non-BACM dust control known as Moat & Row) must be implemented by April 1, 2010 or within any Supplemental Control Area where existing BACM has been implemented or is scheduled for implementation. This testing area exclusion does not apply to Moat & Row PM<sub>10</sub> controls constructed within the 12.7 square-mile 2006 Supplemental Dust Control Area (SDCA). The City may test up to 3.5 square miles of Moat & Row within the SDCA. If the City has tested a new control measure for three years in this manner, it may apply in writing to the APCO for a SIP Revision to designate the new dust control measure as BACM. The application must meet all USEPA requirements for BACM designation and demonstrate to the APCO's satisfaction that the new control measure is sufficient to achieve the required PM<sub>10</sub> emission reductions or control efficiency during the dust season and attain the NAAQS everywhere on the shoreline. The APCO has full and sole discretion to determine whether these conditions have been met.

The application shall include, but not be limited to:

- 1) a description of the new dust control measure

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- 2) a description of the test site and the meteorological conditions under which it was tested
- 3) the measured PM<sub>10</sub> emissions during the test
- 4) the test time frame
- 5) all raw data collected during the test
- 6) all data screening criteria and final data sets
- 7) data supporting the conclusion that the required control efficiency was achieved
- 8) a performance standard that the new dust control measure must meet in order to achieve the required emission reductions or control efficiency
- 9) an analysis of any environmental impacts of the dust control measure
- 10) the appropriate responsible agency approvals, permits and leases

The application must include modeling that demonstrates that the required PM<sub>10</sub> emission reductions or control efficiency can be achieved during the dust season anywhere this control measure may be implemented on Owens Lake, and the NAAQS can be met at all times everywhere along the historic shoreline.

If the APCO determines that the application is complete and the above conditions have been met, he/she will have full discretion to select or approve a method of determining compliance of the proposed new BACM with its performance standard and include that method in the description of the proposed BACM for the SIP Revision. The District Governing Board has full and sole discretion to determine whether to adopt a SIP Revision for approval of any new BACM.

Upon adoption by the District Board, approval by CARB, and submission to USEPA of a SIP Revision that identifies a new BACM for Owens Lake, the City may implement only this one new control measure on one-half square mile of the next area to be identified as needing control under the 2003 SIP Revision Supplemental Control Requirements until EPA approves this new measure as BACM. No other new control measures may be implemented on areas identified as needing control under the 2003 SIP Revision Supplemental Control Requirements until EPA approves this new measure as BACM. The District Governing Board may limit the new BACM to specific circumstances, for example, distance of the new dust control measure from the shoreline or approval in a specific general soil type. Upon approval by USEPA, the new BACM may be implemented per the requirements described in the following section, "Transitioning From One BACM to Another BACM After 2010," or on any subsequent areas requiring control under the "2008 Owens Valley Planning Area Supplemental Control Requirements Procedure" (Board Order 080128-01, Attachment B), subject to any limitation to specific circumstances.

As many of the existing and potential dust control areas on the Owens Lake bed fall under the jurisdiction of the California State Lands Commission and other responsible agencies, the City must secure the appropriate approvals, leases and permits prior to implementing any BACM test or new BACM. However, nothing in this section is intended to give any responsible agency any authority beyond their authority under law.

## Attachment D

### **3. TRANSITIONING FROM ONE BACM TO ANOTHER BACM AFTER 2010**

If the City wishes to transition from one existing BACM to another existing BACM without meeting the performance standard of one or the other BACM at all times, it may submit an application to the APCO in writing for permission to do so after April 1, 2010. The APCO has full and sole discretion to accept, reject or condition the City's application. The transition may be done on no more than one and one-half (1.5) square miles lake-wide for any BACM except Managed Vegetation, or 320 acres lake-wide if the transition is to Managed Vegetation, at one time. The City shall not begin the transition in advance of the APCO's written approval.

The application shall include, but not be limited to:

- 1) a protocol that includes a project description
- 2) a site plan
- 3) a plan to measure PM<sub>10</sub> emissions
- 4) a time frame for project milestones and completion
- 5) plans to control PM<sub>10</sub> if emissions exceed any trigger value set by the APCO based upon a 140µg/m<sup>3</sup> modeled (including background of 20µg/m<sup>3</sup>) or monitored PM<sub>10</sub> concentration at the shoreline
- 6) data supporting the assumption that the transition can be completed and the BACM performance standards can be achieved within three years of the start-up of construction
- 7) project closure procedures if the project is discontinued for any reason or if the PM<sub>10</sub> trigger value is exceeded
- 8) any necessary environmental documentation, responsible agency approvals, permits and leases

The protocol must include modeling in accordance with the Dust ID Protocol that predicts that the NAAQS will be met at all times everywhere on the shoreline during the transition period, and must include a method to monitor emissions continuously throughout the transition period. The transition must be complete, and the new BACM performance standard achieved, within three years of written notification from the City to the APCO that they are no longer maintaining the performance standard for the existing BACM, and are beginning the transition.

All raw data must be shared with the APCO, and all data screening criteria must be approved (or disapproved) in writing by the APCO. The APCO may terminate the transition at any time if modeling or monitoring show that emissions are increasing above any pre-set trigger level described in 5) above, or if the City is not following the APCO-approved protocol. The APCO has full and sole discretion to determine whether these conditions have been met.

If the data show to the APCO's satisfaction that the transition has been accomplished while attaining the NAAQS everywhere at the shoreline, the City may submit an application to the APCO to allow another area to be transitioned. The APCO has full and sole discretion to accept, reject or condition the City's application. The same procedures outlined above will apply.

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As many of the existing and potential dust control areas on the Owens Lake bed fall under the jurisdiction of the California State Lands Commission and other responsible agencies, the City must secure the appropriate approvals, leases and permits prior to BACM transitions. However, nothing in this section is intended to give any responsible agency any authority beyond their authority under law.