MEETING OF THE BOARD OF DIRECTORS OF THE
MUNICIPAL WATER DISTRICT OF ORANGE COUNTY
Jointly with the
PLANNING & OPERATIONS COMMITTEE
December 5, 2016, 8:30 a.m.
MWDOC Conference Room 101

P&O Committee:
Director L. Dick, Chair
Director J. Finnegan
Vacant

Staff: R. Hunter, K. Seckel, J. Berg,
H. De La Torre, K. Davanaugh

Ex Officio Member: W. Osborne

MWDOC Committee meetings are noticed and held as joint meetings of the Committee and the entire Board of Directors and all members of the Board of Directors may attend and participate in the discussion. Each Committee has designated Committee members, and other members of the Board are designated alternate committee members. If less than a quorum of the full Board is in attendance, the Board meeting will be adjourned for lack of a quorum and the meeting will proceed as a meeting of the Committee with those Committee members and alternate members in attendance acting as the Committee.

PUBLIC COMMENTS - Public comments on agenda items and items under the jurisdiction of the Committee should be made at this time.

ITEMS RECEIVED TOO LATE TO BE AGENDIZED - Determine there is a need to take immediate action on item(s) and that the need for action came to the attention of the District subsequent to the posting of the Agenda. (Requires a unanimous vote of the Committee)

ITEMS DISTRIBUTED TO THE BOARD LESS THAN 72 HOURS PRIOR TO MEETING -- Pursuant to Government Code section 54957.5, non-exempt public records that relate to open session agenda items and are distributed to a majority of the Board less than seventy-two (72) hours prior to the meeting will be available for public inspection in the lobby of the District's business office located at 18700 Ward Street, Fountain Valley, California 92708, during regular business hours. When practical, these public records will also be made available on the District's Internet Web site, accessible at http://www.mwdoc.com.

BOARD ACTION ITEM (The MWDOC Board will convene as a full Board and may take action as a Board on the following item):

1. ENVIRONMENTAL LEADERS DELTA MEETING

Recommendation: *Authorize the expenditure of funds up to $3,000 for non-budgeted transportation and meeting expenses for speakers and participants at the December 8, 2016 Environmental Leaders Delta Workshop.*

(Reconvene as Planning & Operations Committee)

ACTION ITEMS

2. AWARD CONTRACT FOR DESALINATION SLANT WELL DECOMMISSIONING PROJECT

DISCUSSION

3. STATUS REPORT ON THE POSEIDON HUNTINGTON BEACH PROJECT

4. HIGH LEVEL DRAFT BRIEFING DOCUMENT FOR THE OC WATER RELIABILITY STUDY

5. MWDOC TURF REMOVAL REBATE PROGRAM AUDIT
   a. MET's (verbal report)
   b. MWDOC's

INFORMATION ITEMS (The following items are for informational purposes only – background information is included in the packet. Discussion is not necessary unless a Director requests.)

6. OC FLOOD CONTROL DISTRICT PROPOSAL ON ENCROACHMENT PERMITS

7. WATER LOSS CONTROL YEAR TWO TECHNICAL ASSISTANCE CONTRACT WITH WATER SYSTEMS OPTIMIZATION, INC.

8. STATUS REPORTS
   a. Ongoing MWDOC Reliability and Engineering/Planning Projects
   b. WEROC
   c. Water Use Efficiency Projects
   d. Water Use Efficiency Programs Savings and Implementation Report

9. REVIEW OF ISSUES RELATED TO CONSTRUCTION PROGRAMS, WATER USE EFFICIENCY, FACILITY AND EQUIPMENT MAINTENANCE, WATER STORAGE, WATER QUALITY, CONJUNCTIVE USE PROGRAMS, EDUCATION, DISTRICT FACILITIES, and MEMBER-AGENCY RELATIONS

ADJOURNMENT

NOTE: At the discretion of the Committee, all items appearing on this agenda, whether or not expressly listed for action, may be deliberated, and may be subject to action by the Committee. On those items designated for Board action, the Committee reviews the items and makes a recommendation for final action to the full Board of Directors; final action will be taken by the Board of Directors. Agendas for Committee and Board meetings may be obtained from the District Secretary. Members of the public are advised that the Board consideration process includes consideration of each agenda item by one or more Committees indicated on the Board Action Sheet. Attendance at Committee meetings and the Board meeting considering an item consequently is advised.

Accommodations for the Disabled. Any person may make a request for a disability-related modification or accommodation needed for that person to be able to participate in the public

meeting by telephoning Maribeth Goldsby, District Secretary, at (714) 963-3058, or writing to Municipal Water District of Orange County at P.O. Box 20895, Fountain Valley, CA 92728. Requests must specify the nature of the disability and the type of accommodation requested. A telephone number or other contact information should be included so that District staff may discuss appropriate arrangements. Persons requesting a disability-related accommodation should make the request with adequate time before the meeting for the District to provide the requested accommodation.

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Item No. 1

ACTION ITEM
December 5, 2016

TO: Board of Directors

FROM: **Robert J. Hunter, General Manager**

Staff Contact: Karl Seckel

SUBJECT: **ENVIRONMENTAL LEADERS DELTA WORKSHOP**

STAFF RECOMMENDATION

Staff recommends the Board of Directors authorize the expenditure of funds up to $3,000 for non-budgeted transportation and meeting expenses for speakers and participants at the December 8, 2016 Environmental Leaders Delta Workshop.

SUMMARY

In September 2016 MWDOC in conjunction with the OC CoastKeeper and the Metropolitan Water District of Southern California (MET) organized a Delta trip for environmental leaders that focused on the science of habitat restoration, drivers and limiting factors for fish populations, and sustainability in the Delta. 14 environmental leaders attended, 6 speakers or presenters and 8 staff participants (MWDOC, MET, USGS). The two day event included a day-long boat tour of the Delta and a second day of presentations and discussion. Progress was made in opening communication channels regarding the need for sustainable changes in the Delta.

The Environmental Leaders Delta Workshop is a continuation of that dialogue focused on the scientific based examination of Delta issues. The workshop is planned for December 8, 2016. Total attendance is being limited to approximately 30 people, including environmental representatives, speakers, and staff. A primary focus of the workshop will be Dr. Peter Moyle's background on workable and sustainable solutions to "reconcile" the different uses and demands on the Delta. The financial request is for half of the meeting and sponsored transportation costs for the event. MET will sponsor over half of the costs. Transportation will be provided for a limited number of speakers and environmental leaders.

Budgeted (Y/N): N	Budgeted amount:	Core _X_	Choice __
Action item amount: $3,000	Line item:		
Fiscal Impact (explain if unbudgeted): Negligible fiscal impact anticipated based on relatively small dollar amount. Funding will be utilized from Cost Center 21 - account 7670.			

DETAILED REPORT

A dialogue between the environmental and water communities was successfully initiated during a two-day Delta tour and workshop held in September 2016. Common goals and concerns were identified and discussed amongst the participants and speakers including the understanding that current conditions in the Delta are not sustainable, the status quo is not working, and that the improved health of the fish communities is fundamentally linked to the ability to maintain water exports. The focus of that meeting was the science-based analysis of current conditions, ongoing habitat restoration efforts, and potential future actions and funding to improve conditions in the Delta.

The proposed December meeting is intended to continue these discussions and ultimately develop an action plan for joint, future actions regarding Delta improvements. The agenda for the December workshop is attached. Again the discussions will be science-based with a progression in the presentations from reconciling the Delta demands with realistic habitat restoration options, to the impacts of both habitat and flow, to future hydrodynamic conditions and fisheries recovery, to the Eco-Restore program, to potential funding in a 2018 bond issue. The afternoon will include a facilitated, roundtable discussion and the development of a group action plan. While the focus of the first meeting was primarily on habitat restoration, the environmental leaders brought the discussion to California Water Fix and the twin tunnels on multiple occasions. These discussions included the improved environmental conditions associated with moving the point of water intake from the south Delta to the Sacramento River in the north Delta. It is anticipated that the discussion of habitat restoration and flow volumes will again encompass aspects of the California Water Fix.

Funding is required for transportation of some of the speakers and environmental leaders as well as the meeting expenses. It is proposed that MWDOC and MET split these direct costs with each having an estimated share of $3,000.

Agenda
Environmental Leaders Workshop

Delta Restoration Imperatives and Opportunities: A workshop with the environmental and water community

Overview/Mission/Purpose

The purpose of this workshop is to continue with open, constructive dialog regarding a scientific based examination of Delta issues, what "reconciliation" of the Delta is and how it can move forward. The end-vision is a list of "next steps action items" that can be supported to productively move towards the future Delta. The Delta is a pivotal location where rivers, tidal influences, water supply, infrastructure, endangered species, hazard risks, subsidence and farming come together. This workshop will build from the September tour of Delta restoration areas to discuss key topics that underpin restoration opportunities. We must consider existing and future threats to the Delta ecosystem and no longer delay acting on measures that are vital to native species and overall ecosystem health. We know enough now to accelerate ecosystem restoration. The workshop will combine talks on key topics with group discussions on concrete actions the environmental and water community can take to accelerate Delta restoration opportunities.

Presentations and discussion topics:

9:30 am Purpose and Introduction. *Garry Brown, OC CoastKeeper*

9:45 am Reconciling the Delta. *Dr. Peter Moyle, UC Davis Center for Watershed Science.* Peter is one of the co-authors of the Public Policy Institute of California paper "Where the Wild Things Aren't – Making the Delta a Better Place for Native Species", June 2012, among hundreds of other publications. His research interests include conservation of aquatic species, habitats, and ecosystems, including salmon; ecology of fishes of the San Francisco Estuary; ecology of California stream fishes; impact of introduced aquatic organisms; and use of floodplains by fish. Peter has been asked to speak on:

- *Reconciliation ecology, novel ecosystems, & the Delta*
- *"Where the wild things aren't"- old and new*
    - o *Constraints on bringing back the natives*
    - o *Realistic habitat options*
- *Accommodating sea level rise, climate change, and increased water demand*

10:25 am A vision for Salmonid recovery: Interactions between flows, habitat, life history, and the working landscape. *Dr. Rene Henery, California Science Director for Trout Unlimited (TU), and Assistant Research Professor at the University of Nevada, Reno (UNR).* Rene is an Ecologist and Ecogeographer who completed his

B.A. at Reed College in Portland Oregon and his PhD at the University of California, Davis. His dissertation investigated opportunities to recover Pacific salmon through the restoration of connectivity, with an emphasis on Central Valley Chinook salmon and floodplain restoration. Rene's work with TU is focused on the development of science based strategies and tools for the conservation and recovery of California's fish and aquatic systems. Rene also serves on both the Technical Advisory Committee for the San Joaquin River Restoration Program and the Yuba River Management Team. Rene has been asked to speak on:

- *What's needed for the fisheries health and recovery?*
- *What's needed upstream of the Delta*
- *What is the significance of unimpaired flows?*
- *What is the future vision for recovery/restoration?*
- *How is sea level rise accommodated?*

11:05 am How understanding juvenile salmon tracking and survival rates informs restoration actions. *Jon Burau*, *Project Chief U.S. Geological Survey.* Jon Burau has a Master of Science in Civil Engineering and Environmental Fluid Mechanics from Stanford and a Bachelor of Science in Civil Engineering from Davis. He is an expert in hydrodynamics, flow and transport within the Delta and has studied change in the timing and magnitude of river inputs and changes in geometry and expenditure of tidal energy as it affects salinity and primary production within the Delta. Jon has been asked to speak on:

- *How understanding juvenile salmon tracking and survival rates informs restoration actions?*
- *What does the future Delta look like and how will it function from a hydrodynamic perspective?*
- *What are the implications for fisheries recovery?*
- *How is sea level rise accommodated?*
- *What is the significance of unimpaired flows?*

11:30 am to 12:00 pm LUNCH BREAK

12:00 pm What is Eco-Restore and how is it doing? *David Okita, California Natural Resources Agency, Director of Ecosystem Restoration.* California EcoRestore is a state initiative aimed at advancing critical habitat restoration in the Sacramento-San Joaquin Delta. Through the program, the state plans to pursue a broad range of habitat restoration projects across at least 30,000 acres of land in the Delta. California EcoRestore aims to address the legacy impacts of historical human intervention in the Delta, as well as ongoing impacts from operation of the State Water Project and Central Valley Project. The initial goal of California EcoRestore is to advance 25,000 acres associated with existing habitat restoration requirements, pursuant to federal biological

opinions, and 5,000 acres of habitat enhancements. David has been asked to speak on:

- How does EcoRestore work?
- What is the status and schedule for implementation?
- What is the funding status and future needs?

12:25 pm The 2018 Bond Issue – what will be included? *Dr. Jerry Meral, Natural Heritage Institute (NHI), Director of NHI's California Water Program.* Jerry represents NHI on California water issues and water quality related to transportation projects. He represented NHI on the Bay Delta Conservation Plan steering committee in 2010. From 2011 to 2013 Dr. Meral served as Deputy Secretary of the California Natural Resources Agency, in charge of the Bay Delta Conservation Plan. Previously, he served as Executive Director of the Planning and Conservation League, a California statewide conservation group, from 1983-2003. He developed a variety of statewide conservation and health measures which produced more than $20 billion in new statewide programs, and directed the League's program of conservation legislation. Jerry has been asked to speak on:

- What are the major initiatives for the 2018 Bond Issue?
- What can be added to support fisheries improvements within the Delta?
- What are the next steps?

12:50 pm Roundtable Facilitated Discussion. *Garry Brown as Facilitator, all present to participate.*

Group Discussion – Sample Topics:

- What are the key next steps in Reconciling the Delta?
- What does "reconciliation" mean?
- Will improving fisheries health allow water management for reliability?
- How to attract more funding for science/enhanced monitoring and habitat projects?
- How to streamline/expedite permitting?
- What collaboration is needed within the Delta?
- What does the California WaterFix bring to the table?
- How is export of water from the Delta handled?

Develop Group Action Plan:

(To be developed at the meeting)

2:30 pm END OF WORKSHOP

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Item No. 2

ACTION ITEM
December 21, 2016

TO: Board of Directors

FROM: **Planning & Operations Committee**
(Directors Dick, Finnegan)

Robert Hunter
General Manager

Staff Contacts: Karl Seckel
Charles Busslinger

SUBJECT: **Award Contract for Desalination Slant Well Decommissioning Project**

STAFF RECOMMENDATION

It is recommended that the Board of Directors approve entering into the subject agreements for removal of the desalination test well at Doheny Beach:

- Award Jensen Drilling Company "MWDOC Desalination Slant Well Decommissioning Project" construction contract in the amount of $297,777.00, contingent upon receiving concurrence from the Doheny Participants in moving forward with the Project.
- Authorize a one-time donation to California State Parks as an in-lieu payment for the cost of site restoration in the amount of $45,000.
- Authorize the General Manager to enter into an agreement with Michael Baker International to lease the Mobile Test Facility.

The work is being funded from the 2008 Doheny Desal Project funds, plus additional funds that will be requested from the Participants.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

Budgeted (Y/N): Y	Budgeted amount: $358,000 less $185,122 previously awarded = $172,878 of funds available.	Core __	Choice ✓
Action item amount: $356,878	Line item: 2008 Doheny Desal		
Fiscal Impact (explain if unbudgeted): Excess funds needed in the amount of $184,000 to be reimbursed by Project Participating Agencies (approximately $37,000 each). This does not account for any potential salvage value.			

SUMMARY

Staff is seeking Board authorization to proceed with desalination test well decommissioning work at Doheny Beach through award of the construction contract to the low bidder, authorization of a one-time donation to State Parks in-lieu of the lease site restoration requirements, and authorization for the General Manager to enter into an agreement with Michael Baker International to lease the Mobile Test Facility to help offset project costs.

DETAILED REPORT

Decommissioning Work

MWDOC staff met with the five Doheny Desal participants (South Coast WD, City of San Clemente, Laguna Beach CWD, City of San Juan Capistrano and Moulton Niguel WD) in December 2015 and obtained concurrence to close out the Doheny Desal Project which MWDOC has been managing since 2008 under the Project Participation Agreement. Funding for decommissioning the slant well and Mobile Test Facility (MTF) would come from existing retained Project funding. Staff completed an estimate of the costs for the decommissioning work and arrived at a retention amount of $356,000 to complete the work. MWDOC agreed to notify the five Doheny Desal agencies of proposed contract costs prior to initiating or awarding any contracts because they are paying for the work through the retained deposit. MWDOC advised the agencies that we would attempt to secure the work for $356,000, but that if the costs came in higher than the retention amount, a request for additional contributions from the agencies would be made. Approximately $2,000 in additional funds remain from the Doheny project, bringing the total current retention to $358,000.

In March 2016, MWDOC conducted several meetings with the Doheny Participants to plan out the decommissioning work and discuss the award of a contract to Geoscience Support Services for preparation of plans and specifications for the construction contract to be bid at a later date. In these discussions, it was noted that the retention of $358,000 was intended to cover:

- Engineering/Geotechnical services (typically we have considered well destruction as Geotechnical and Engineering as everything else)
- Permitting (MWDOC's estimates did not include a full time environmental monitor during construction on the beach)
- Construction Inspection (periodic)
- Construction & construction inspection for the well destruction, monitoring well destruction, relocation of the mobile test facility, park site restoration, beach piping & diffuser removal, and beach site restoration
- Project Management

With Richard Bell's retirement, MWDOC elected to put all the work out for professional proposals, including the permitting and project management work which had typically been completed by Richard on prior project phases while he was working at MWDOC.

On April 20, 2016 the Board authorized the General Manager to contract with Geoscience Support Services in the amount of $185,122 for the Doheny Desalination Slant Well and MTF decommissioning work. In discussions with the Participants, estimates of the breakdown provided below were developed prior to the completion of plans and specifications and bidding of the work. MWDOC indicated to the Participants that the $358,000 in retention set aside for this work, including engineering, permitting, observation, and construction did not appear sufficient to cover the estimated costs.

Project Bidding

The plans and specifications were completed by Geoscience Support Services for the Doheny Decommissioning work. The job was advertised for bidding, a pre-bid meeting was held at the site, and formal bids were received from two bidders on November 28. The apparent low bidder was Jensen Drilling Company. Staff is in the process of checking references and paperwork for the bid packages and should be fully completed by the time of the P&O Committee.

Project Financing

Now that the bids have been received, it appears the amount of additional funds needed beyond the original retention amount is approximately $184,000 (excluding consideration of any potential future revenue from salvage or lease of equipment). The shortfall will be divided between each of the five Participants equally as part of the close-out of the Doheny Desal Pilot Plant Project. The table below provides a summary of the financial position of the Project.

Financial Summary

- The overall Project Cost is estimated at $542,000.
- The amount of funds available from the Doheny Participants is $358,000 (assumes MWDOC receives the $150,000 in retention owed by DWR).
- The net additional amount to be collected from the Participants is $184,000 (about $37,000 per agency).
- The details are provided below.

Doheny Decommissioning Project Cost Estimate		
Cost Item	**Prior Estimate for Developing the Retention Amount(1)**	**Actual bids plus Geoscience Cost Proposal**
1. Professional Services – Well Destruction + Inspection	$29k	$77k
2. Professional Services – Removal of Mobile Test Facility (MTF), Beach Vault piping and Diffuser + Inspection	$25k	
3. Site Restoration & Relocation of MTF	$40k	$89.5k(5)
4. Beach Facilities Removal and Site Restoration (vault, piping and diffuser removal(5)	$125k	$172.1k
5. Test Slant Well Pump Removal and Well Destruction	$57k	$81k
6. Monitoring Well Destruction	$11k	---
Subtotal	$287	---
Contingency 10%	$29	---
Project Management & Permitting	$42k(2)	$107k(3,6)
Well Destruction & Salvage Report	Salvage Report Not Anticipated	$15k
Total	$358k	$542k

(1) Put together over a number of years from different proposals and discussions; last estimate in 2013; $2k in other funds added to the retention.

(2) Assumed MWDOC permitting & management at reduced costs; permitting & related support work now required by consultants with Richard Bell's retirement.

(3) Permitting delegated to consultant & includes providing a field biomonitor for 160 hrs

(4) Beach diffuser **not** to be removed; South Coast will assume responsibility

(5) Includes $45,000 in-lieu payment to State Parks

(6) Includes MWDOC Project Management charges

Comments on Decommissioning Costs

The actual projected costs, based on the bids and professional services as estimated, are about $184,000 higher than the decommissioning costs estimated several years ago. Suggested impacts causing higher costs included:

- The prior estimate is at least three years old and was not necessarily based on bid conditions
- The permitting work was originally estimated to be done by MWDOC staff at reduced rates and now is being done by a consultant

- The costs for removing the slant well increased due to the requirements of having the blank portion of the casing perforated prior to filling with a cement slurry. This resulted in a change in design for the project to cut-off the blank casing and remove it from the ground.
- The salvage value report was not originally anticipated, but based on its usefulness in securing a lease of the facility, these extra costs should be covered via the lease revenue.
- The budget includes a biomonitor on-site for up to 160 hours; this level of work on the beach was not anticipated and may not be entirely needed.
- Based on the cost estimate above, MWDOC will seek concurrence from the Doheny Participants to move forward with the project.

Salvage Value of Equipment

While planning the decommissioning work, MWDOC received a request from Michael Baker International (MBI) to lease the Mobile Test Facility (MTF) for a year. Based on the assessment of the MTF completed by Geoscience and the original manufacturer of the facility, Intuitech, MWDOC negotiated a 12-month operational lease with MBI. MWDOC was in the process of completing the lease agreement when MBI notified us that their project had been delayed by permitting issues and their need for the MTF would be postponed for about a year, but they are still interested in leasing the facility at the terms negotiated. Under the terms of the lease, MBI is responsible for transport of the facility, but with the delay they have nowhere to store the facility so now MWDOC's contractor will have to move the MTF to a South Coast WD site to store it until the lease can start. The lease is estimated to generate $30,000 to $40,000 in revenue. The staff recommendation includes an authorization to enter into a lease with MBI in accordance with the terms of the lease agreement that have been negotiated.

Once the lease has ended, South Coast Water District indicated a willingness to purchase the residual equipment at the salvage value of about $25,000.

The other salvage value to be considered is for the high performance submersible pump used in the slant well. The decommissioning work will remove the pump. At South Coast Water District's cost, the pump is to be shipped to the manufacturer's representative and inspected, disassembled for detailed inspection in preparation of a materials analysis for the future design of the project pumps. The manufacturer's representative will recondition and reassemble the pump and it will be offered for salvage. The Monterey Project is potentially interested in the pump. A salvage value has not been developed at this time.

Assuming a salvage value of $15,000 for the pump, total salvage or lease revenue could amount to $70,000. This would ultimately reduce the costs to the Doheny Participants, but the actual value of the pump will not be known for some time.

Other Financing Issues

Part of the $358,000 retained by MWDOC includes the 10% retention from a State Department of Water Resources (DWR) grant of $1.5 M for the operation of the pilot plant. The work was completed several years ago and submitted to DWR. DWR complimented the reports and did not request any revisions; however, they have been sitting on the request for retention release for about a year now. Repeated calls and emails have not resulted in a release of the funds. Other grant recipients have reported the same issues. This means that $150,000 of the actual funds on hand are in the form of accounts receivable rather than cash on hand. From a cash-flow perspective, MWDOC should not have any problems fronting the costs. Staff will keep the Board informed on the progress of recovering the costs.

One of the lease requirements from State Parks was that the site occupied by the Mobile Test Facility had to be restored to its previous condition. Discussions with State Parks indicated that they would prefer that the site restoration be provided in the form of a concrete pad for siting of a future building to be constructed by State Parks. The SDG&E power supply would also be transferred over to State Parks. Staff considered the request and estimated that the costs of the site restoration, grading, replacement of turf, replacement of the irrigation system and getting the site reestablished, along with other considerations provided by State Parks was a reasonable trade-off. However, during the permitting of the decommissioning work through the City of Dana Point, issues arose with the construction of the concrete pad. In lieu of actually constructing the concrete pad, staff and State Parks have agreed to a “one-time donation” of $45,000 based on the engineer’s cost estimate for the concrete pad. This will allow State Parks to permit construction of the pad and the building at a later date when they are ready to proceed. The staff recommendation includes authorization to enter into such an agreement with State Parks.

DISCUSSION ITEM
December 5, 2016

TO: **Planning & Operations Committee**
(Directors Dick, Finnegan)

FROM: Robert Hunter
General Manager

Staff Contacts: Karl Seckel
Charles Busslinger

SUBJECT: **Status Report on the Poseidon Huntington Beach Project**

STAFF RECOMMENDATION

It is recommended that the Committee receives and files the report and provides direction to staff.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

DETAILED REPORT

The following status report will provide a summary of recent work by:

- Poseidon Resources on the permitting of their project at Huntington Beach
- Work by OCWD staff in evaluating integration options
- Work by MWDOC staff in evaluating integration options

Poseidon Resources Permitting Process
Poseidon Resources has applications pending before:

1. The California State Lands Commission (SLC)
2. The Santa Ana Regional Water Quality Control Board (SARWQCB), and
3. The California Coastal Commission (CCC)

Budgeted (Y/N): n/a	Budgeted amount: n/a	Core ✓	Choice __
Action item amount: n/a	Line item:		
Fiscal Impact (explain if unbudgeted):			

On Oct 3, 2016 Poseidon entered into an agreement with all three regulatory entities to streamline the permitting process. The agreement provides that the permitting process will be coordinated and sequential with cooperation among the three entities such that the permits will be processed in the following timeframes:

- The SLC process will consider the application for a lease amendment to the 2010 lease to be completed by June 30, 2017 including any additional environmental analysis to address Poseidon's proposed seawater intake and discharge technology modifications to the project.

- The SARWQCB will consider the renewal of the 2012 NPDES Permit along with the Ocean Plan intake compliance including any new additional environmental information and analysis of the OCWD groundwater injection system plans if they include desalinated ocean water within 90 days of the earlier of:
    - When the SARWQCB determines that a "completed application" has been made
    - Final approval by the SLC of the amended lease
    - Approval or certification of any and all CEQA documents

- The CCC will schedule a hearing on the earlier of:
    - 90-days from the public release of the SARWQCB Tentative Order, or
    - The first Southern California CCC Hearing following the public release of the Tentative Order by the SARWQCB provided there are at least 21 days between the SARWQCB staff's action and the first mailing date for the CCC meetings.

The process is expected to produce the final permitting for the project by late 2017.

OCWD Integration Analyses

OCWD has noted that the proposed Poseidon Resources Huntington Beach Ocean Desalination plant offers OCWD an opportunity to reduce the OCWD groundwater basin's need for imported water. OCWD and Poseidon Resources have negotiated a Term Sheet to further consider and potentially develop the proposed 50 million gallons per day (MGD) Huntington Beach Ocean Desalination Facility. Under the Term Sheet, Poseidon Resources is responsible for constructing the project treatment plant and OCWD is responsible for distributing the water.

In February and March 2016 OCWD Board workshops were held at which time staff presented eight distribution options for the Poseidon water (Options 1A, 1B, 1C, 1D, 2A, 2B, 3 and 4) for distributing 50 million gallons per day (mgd). Five of those options were removed from further consideration over the course of the two meetings. Staff subsequently discussed a new Option #5 and a new Option #6. The Board directed OCWD staff to pursue the new Option #6, which is a combination/hybrid of the distribution options 1A and 5 for a more detailed review. A summary of all options is provided below:

Table 1 – Desalinated Water Distribution Options Considered by OCWD	
Option	**Summary**
1A	OCWD recharges all 50 mgd of the desalinated water - 26 new injection wells are required for recharge including, pipelines, and a pump station in Fountain Valley
1B	OCWD recharges all 50 mgd of the desalinated water - 16 new injection wells are required for recharge, including pipelines, and two pump stations in Fountain Valley and Santa Ana
1C	OCWD recharges all 50 mgd of the desalinated water – New 20-acre recharge basin in Anaheim is required for recharge including 16-mile pipeline and a new pump station in Huntington Beach
1D	OCWD recharges all 50 mgd of the desalinated water - 4 new injection wells are required for recharge, including two pump stations in Fountain Valley and Anaheim. *This options uses recharge facilities originally set aside for the GWRS Final Expansion Project.*
2A	OCWD recharges 42 mgd of desalinated water –Pipelines, turnouts and pump stations in Fountain Valley and Anaheim. The remaining 8 mgd of desalinated water is sold directly to Newport Beach (NB) and Huntington Beach (HB) in-lieu of taking MWD water. *This option uses recharge facilities originally set aside for the GWRS Final Expansion Project.*
2B	OCWD recharges 15 mgd of desalinated water – New pump station, pipelines and turnouts are required for distribution. The remaining 35 mgd of desalinated water is sold to NB, HB, Westminster, Garden Grove (GG), Golden State Water Company (GSWC) and Seal Beach in-lieu of taking MWD water.
3	OCWD recharges 15 mgd of desalinated water – New pump station, pipelines and turnouts are required for distribution. The first 25 mgd of desalinated water is sold to NB, HB, Westminster, GG, GSWC and Seal Beach in-lieu of taking MWD water. The remaining 10 mgd of desalinated water is sold to South Orange County.
4	No desalinated water is recharged by OCWD - All desalinated water is distributed to Producers and South Orange County to replace MWD water. *This is the original proposal from Poseidon.*
5 - New	No desalinated water is recharged by OCWD – New pipelines and turnout facilities are required for distribution. The desalinated water is directly distributed to coastal Producers in-lieu of groundwater pumping, and inland Producers increase their annual groundwater pumping.
6 - New	Combination of Option 1A and 5

A summary of the distribution options still being considered by OCWD are:

- Option 1A = 26 new injection wells plus the existing injection wells along the coast to inject the full 50 mgd of supply into the groundwater basin; this option requires a capital cost of about $305M. OCWD is also examining the costs of additional wells

and pipelines by the groundwater producers to pump the water out of the groundwater basin.

- Option #5 = Some coastal producers discontinue taking groundwater and replace it with Poseidon Water
    - City of Huntington Beach
    - Mesa Water
    - City of Newport Beach
    - 16 remaining Producers to pump additional groundwater in inland areas
    - It essentially works like a large permanent Coastal Pumping Transfer Program (CPTP) using Poseidon Water instead of MET water
    - OCWD would sell Poseidon water to the 3 coastal producers at the variable cost of Groundwater – Producer is kept financially whole
        - Replenishment Assessment - $402/af plus
        - Avoided well energy cost - $80/af
        - OCWD absorbs the cost differential between Poseidon water and what the coastal producer pays to OCWD
        - OCWD increases the RA to cover their costs
    - BPP for remaining 16 Producers would be higher
    - OCWD has not estimated the cost of this option; they are currently working with the three coastal producers to see how much Poseidon water they can take. In addition, OCWD is working with all 19 producers to see what level of capital costs are required to extract the additional water recharged into the groundwater basin.

- Option #6 = Combination of Option #1A and Option #5.

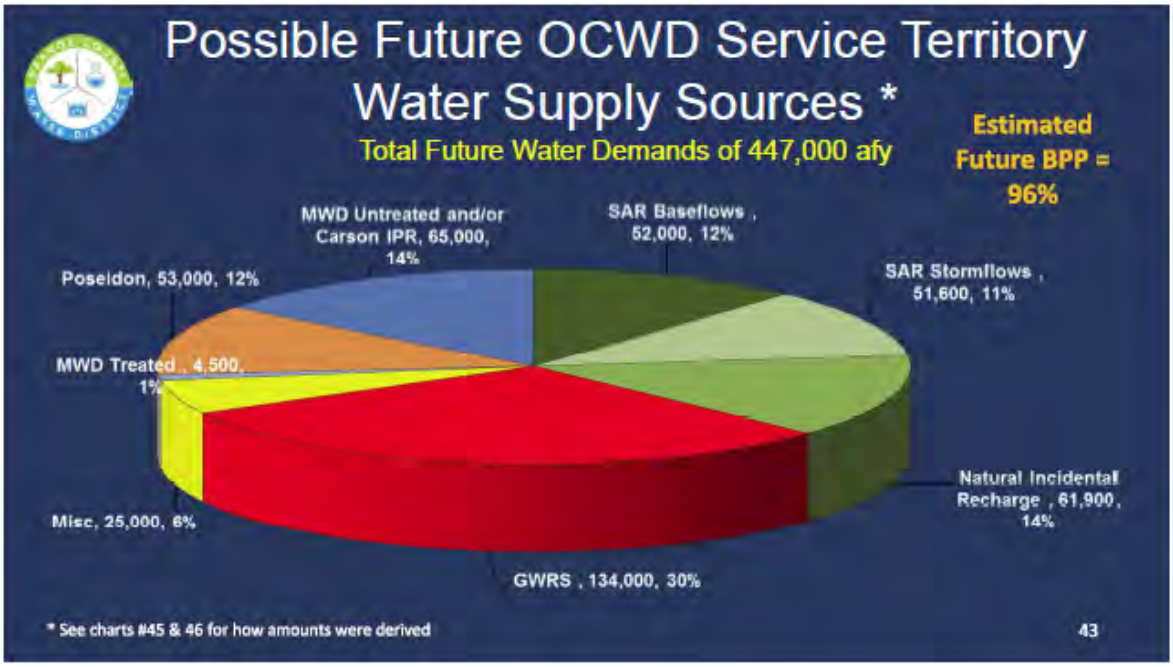
The advantages of Option#6 are:

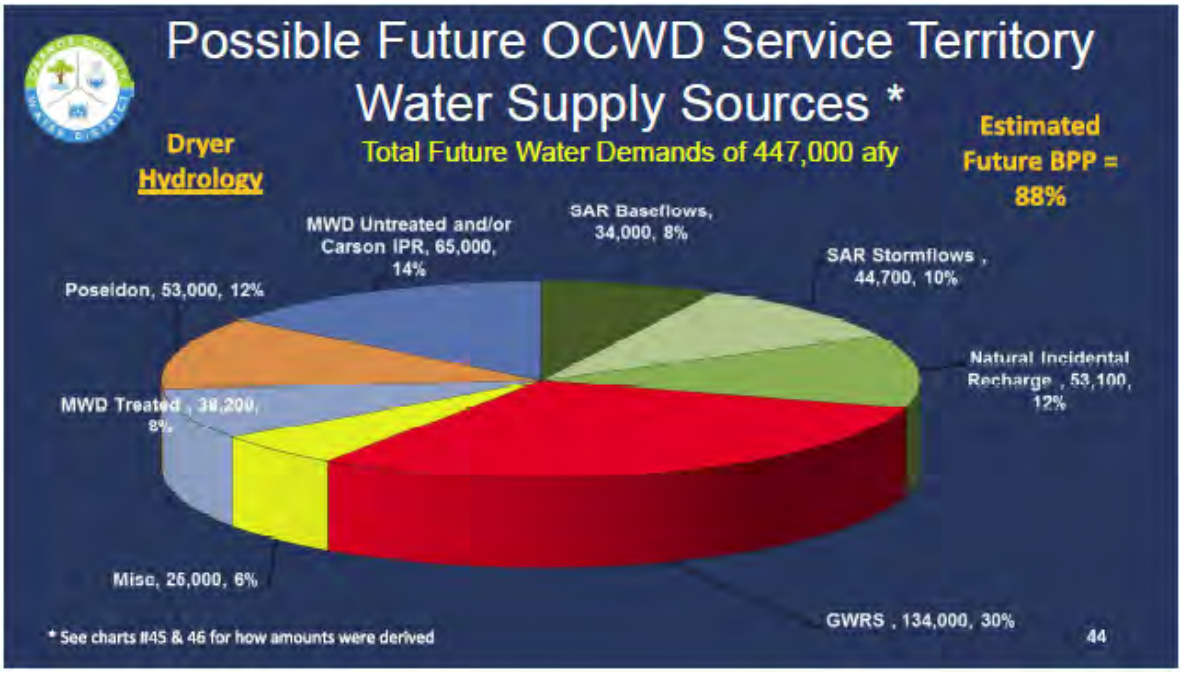
- Reduces coastal groundwater pumping
- Will help effort in preventing seawater intrusion
- OCWD may avoid the cost of future seawater barrier projects
- Less facilities needed to distribute Poseidon water
- Poseidon project being used to help manage the groundwater basin

Issues identified with these alternatives:

- Requires HB and NB City councils & the Mesa Board to enter into long-term contracts to take Poseidon water in-lieu of GW
    - This could also impact the transfer of GW from NB to Laguna Beach CWD
- Possibility for coastal GW levels to become too high potentially creating issues – especially during years when the groundwater basin is relatively full
- Need to model how much additional groundwater the remaining 16 Producers can pump above the normal BPP?

- Possible 100% BPP in an average year for the remaining 16 OCWD Producers
    - Few OCWD Producers can pump up to the higher BPP
    - FY07-08; 80% BPP; 8 Producers achieved
- Will have two groups of Producers
    - Those pumping lower percentage
    - Those pumping higher percentage
- The remaining 16 Producers need to preserve 22,000 afy of excess pumping capacity to respond to MWD CUP storage program request to extract stored supplies?
- Change in operations for the three coastal Producers – would be blending groundwater, imported water and Poseidon Water
- Can Poseidon deliver water that matches the three Producers seasonal and daily water demands? May need to build in greater flexibility into the Poseidon system.
- It may be problematic to ask three Producers to not utilize groundwater production infrastructure they have constructed over the years
- With higher coastal water levels, OCWD may not be able to inject as much GWRS water into the Talbert Barrier
- Concerns have been raised regarding low flows in the MET system providing imported water to the OCWD service area. The charts below by OCWD staff indicates in the future, assuming the MET Carson Project is on line along with the GWRS expansion and the Poseidon Project, the future BPP for OCWD would be 96% and the groundwater producers would only be importing 4,500 AF per year of full service treated imported water.
- The second chart shows under drier conditions, the import water may be as high as 38,000 AF with a BPP of 88%. MWDOC staff are seeking information from MET to examine the future projected flows through various pipelines in OC with these local projects in place. The analysis under these types of conditions will provide a better understanding of the residence time (length of time the water is in the pipelines). This is important because a longer time spent in the pipeline system will result in a lower chlorine residual and potentially a poorer quality of water.





- Assuming these projects come to fruition, the other issue is reduced demands and stranded assets at the MET level for the Diemer Plant. The table below shows the range of flows over the past year in cubic feet per second; it should be noted that the Diemer Plant supplies portions of all of Orange County plus portions of LA County. Implementation of the Poseidon Project and the GWRS expansion would take an additional 84 mgd or 132 cfs of capacity off of the Diemer Filtration Plant; it is unclear at this time exactly how MET will operate Diemer under these conditions,

but it should be investigated. The Diemer Plant can treat a peak capacity of about 800 cfs.

Diemer Plant Flows in 2016 Cubic feet per second (cfs)		
	Winter Flows	Summer Flows
Peak Flows	300	600
Average Flows	250	500
Low Flows	100	375
Assuming GWRS Expansion and the Poseidon Plant Come on Line(1)		
Peak Flows	170	470
Average Flows	120	370
Low Flows	0	245

(1) Assumes current demands less 130 cfs on average for all periods

- IRWD has continued to voice their concerns toward the implementation of the Poseidon Project based on the following positions:
    - They believe OCWD should work to purchase additional MET water rather than building the Poseidon Project to develop new water supplies that cost substantially more than MET water. If necessary, additional replenishment basins could be constructed to enable higher replenishment deliveries from MET or replenishment can be accomplished by in-lieu means.
    - They believe direct deliveries of the Poseidon water or injection of the Poseidon water into the groundwater basin will result in a quality of water that makes it difficult to meet their basin plan objectives for levels of chloride ions.
    - IRWD has raised proposition 218 and proposition 26 issues with the financing of the Poseidon project via the Basin Replenishment Assessment.

OCWD Integration Work

OCWD staff are working to refine the distribution Option #6; the work includes:

- Begin to locate injection wells
- Determine use of OCSD property
- Determine pipeline alignments in streets
- Meet with three coastal producers – how much water can they take?
- Model groundwater basin with higher recharge amounts
- Assess each Producers ability to pump up to higher BPP
- Update cost estimate
- Complete necessary CEQA work

CEQA Work on the Poseidon Project by OCWD

Furthermore, the OCWD Board authorized staff to begin CEQA for the integration portion of the Poseidon project and authorized a CEQA reimbursement agreement with Poseidon Resources. While Poseidon is responsible for completing the final CEQA work for the basic treatment plant and portions of the integration system, OCWD is working on the CEQA documentation for the requirements of distributing the Poseidon water into the groundwater basin and for pumping it out of the groundwater basin.

MWDOC Work on the Poseidon Project

MWDOC staff have been involved in two aspects of the project, assisting in seeking the LRP funds from MET for the project and also providing assistance with certain aspects of the integration options, more specifically involving the potential use of the EOCF#2 for purposes of delivering the Poseidon water to South Orange County (SOC).

The LRP Application was submitted to MET several years ago; MET cannot complete its review of the application and take it to their Board for consideration until the permitting and CEQA have been completed. This will be a future action for consideration by the MET Board.

In the past, MWDOC facilitated a Poseidon "workgroup" process as a Choice activity for a number of years to examine the terms and conditions for the project and to develop an approach for the system integration issues. Over the past three years, OCWD has picked up the effort to more closely examine the project and how it would fit into the plans and operations at the retail level within the OCWD service area. MWDOC has continued providing support to OCWD and more specifically to examine how to move the water to SOC by using the East Orange County Feeder No. 2 (EOCF#2).

The most recent work completed by MWDOC more closely examined use of the EOCF#2 for conveying Poseidon water to SOC. MET has expressed an opinion of concern regarding the impact on the quality of water flowing in the pipeline, but other water quality experts do not envision a problem if the water is properly treated, conditioned and 5 or 6 hours of chlorine contact time are provided before the water is put out into the distribution system. Other areas of concern expressed by MET have to do with any unintended impacts on end-user plumbing systems until the change in water quality has stabilized with the plumbing in the households.

MWDOC recently conducted work with Black & Veatch Engineers on potential options for integrating the Poseidon water into the EOCF#2. Based on the concern over water quality issues and potentially difficult operational control strategies of pumping the water into the 4th reach of the EOCF#2 the work completed resulted in an initial recommendation that an improved solution would be to connect the Poseidon Project to the 3rd reach of the EOCF#2. The 4th reach of the EOCF#2 has daily variable flows and would be virtually 100% Poseidon water if the connection is made to the 4th reach. In addition, reach 4 also connects to MET's Irvine Cross Feeder and the Orange County Feeder and MET has indicated issues with the Poseidon water flowing in other pipelines they own. This option may be a bit more expensive in pipeline costs, but solves the following problems:

- Consistently provides a higher blend of Poseidon/MET water in the EOCF#2 in reaches 3 and 4
- Limits the amount of Poseidon reaching reach 4, the Irvine Cross Feeder and the Orange County Feeder
- Simplifies the operating strategy of the interconnect facilities

The details of the new pipeline and interconnect facilities have not been designed or reviewed with MET, but a conceptual cost for a pipeline starting at a point along the OC-44 pipeline and interconnecting into the 3rd reach of the EOCF#2 was estimated at about $35M for a pipeline, pump station, pressure control station and interconnect facilities. These facilities were sized to provide a peak emergency capacity of 35 cfs to allow more water to flow to SOC during emergency situations even though the base loaded capacity for SOC would be significantly less, more on the order of 10 to 15 cfs.

Other Comments by MWDOC Staff

While MWDOC has not completed detailed work, we believe there are other issues that need to be addressed in the analysis of the Poseidon Project:

- The OC Water Reliability Study indicated that with the recommended Planning Scenario B, which did **not** include the California WaterFix, but did include the expansion of the GWRS and the Carson IPR project at 100 mgd, shortages within the OCWD basin could be handled by way of a 10% demand curtailment by consumers about once every 5 years. This would reduce the levels of shortages to manageable levels. If the California WaterFix moves forward, the OCWD basin would be more reliable. A similar finding was made for the Brea and La Habra areas. The shortages for South Orange County, even with 10% demand curtailment from time to time, had remaining shortages that require mitigation through development of water supply projects.
- The OC Water Reliability Study also suggested an “adaptive management” approach to see where each of the “high impact issues” would fall-out over the next several years before making decisions on new water supply projects. The high impact issues included:
    - A periodic re-assessment of water demands and supplies
    - Progress on NEW water supply projects at MET, by the MET member agencies and in Orange County
    - Progress on the development of the California WaterFix
    - Progress on the development of the Carson IPR Project
    - What happens when shortage conditions are reached on the Colorado River
    - Policy and financial issues at MET
    - Potential impact regulations may have on water supplies i.e. Endangered Species Act
- Several summaries have been provided on the reliability improvements within Orange County based on implementation of the Poseidon Project, but a detailed

analysis of who pays and who benefits from implementation of the Project has never been developed.

- Furthermore, the more recent work completed by OCWD that forecasts the OCWD groundwater basin operating at a BPP of between 88% and 96% has not been fully evaluated. OCWD is still in the process of estimating the costs for pumping this much water out of the basin by the major producers. Also, operating the basin at elevated BPP conditions may not leave sufficient capacity to fully utilize both the Carson water and the Poseidon water under wet hydrologies. Capturing free storm water provided by Mother Nature is a top priority. It may be beneficial to consider lower Poseidon production levels in certain wet years to develop operating strategies to account for local water, the Carson IRP water and the Poseidon water.

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Item No. 4

DISCUSSION ITEM
December 5, 2016

TO: **Planning & Operations Committee**
(Directors Dick, Finnegan)

FROM: Robert Hunter
General Manager

Staff Contacts: Karl Seckel
Charles Busslinger

SUBJECT: **High Level DRAFT Briefing Document for the OC Water Reliability Study**

STAFF RECOMMENDATION

It is recommended that the Committee receives and files the report and provides direction to staff.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

DETAILED REPORT

Staff is in the process of completing the documents for the OC Water Reliability Study. The only outstanding DRAFT document not yet provided to the Board is the high level briefing piece. Attached is a DRAFT of the document for input and review by the Board prior to circulating to the member agencies. The high level briefing piece has an intended audience of:

- Elected Board of directors and city council members
- Legislative offices
- Board of supervisors
- Other general public audiences

Several drafts have been prepared and input has been solicited from a number of staff members. A short, concise, meaningful summary has not been easy to produce.

Attached please find a generalized briefing piece without any graphics. In addition, an infographic briefing piece is also attached.

Once the Board had provided input, the briefing piece will be circulated for additional comments.

Budgeted (Y/N): n/a	Budgeted amount: n/a	Core ✓	Choice __
Action item amount: n/a	Line item:		
Fiscal Impact (explain if unbudgeted):			

THE 2016 ORANGE COUNTY RELIABILITY STUDY – HIGH LEVEL OVERVIEW

The Orange County Reliability Study reveals the County faces water shortages in eight of 10 years by the year 2040 unless the California WaterFix* is permitted and constructed or unless significant other new water supply investments are made to serve Southern California.

In 2015, the Municipal Water District of Orange County launched the first comprehensive study of Orange County's long-term water reliability, with the participation by water managers from all across Orange County. The Orange County Water Reliability Study (the Study) was not intended to provide support for specific projects, but instead, was structured to provide valuable information for decision makers to resolve future reliability issues.

Collectively, Orange County depends on imported supplies from Northern California and the Colorado River for about 50 percent of our water needs, although the need for imported water varies from a low of about 10 percent to a high of about 95 percent depending on which portion of the County is being served. Because of the large variation in imported water dependence, three portions of the county were analyzed independently (Brea/La Habra, the Orange County Water District area, and South Orange County (SOC)).

Orange County's future reliability is influenced by water demand and supply projects throughout the Metropolitan Water District of Southern California (MET). Imported and local supplies are influenced by 93 years of historical climate records in three different watersheds (Northern California, Colorado River Basin and the local climate). Forecasts were included of how climate variability may influence supplies and demands in the future. These factors plus demographic projections served as the basis for conducting the Orange County Water Reliability Study.

"Reliability" is defined as supplying anticipated water demands under many climatic scenarios without mandatory conservation

Orange County's population will grow by about 10 percent, or 317,000 people, by 2040 while water use will remain fairly level or will slightly decline as our use of water becomes more and more efficient. By then, under various scenarios considered, water shortages could be as low as 4,800 acre-feet per year (a 1 percent average shortage) or as high as 126,000 acre-feet per year (a 21 percent average shortage) depending on the level of demand, the development of other supplies, climate scenarios and whether or not the California WaterFix is implemented. Orange County's 2040 water demand is estimated at about 579,000 acre-feet. An acre-foot of water can supply about two and half families for a year.

A key finding in the Study shows that the California WaterFix is the single most cost-effective project to vastly improving water supply reliability by about the year 2030 when the project can first become operational. The California WaterFix would ensure reliability and consistency in water supplies from Northern California and would result in an improvement in supplies by approximately 440,000 acre-feet compared to not implementing the project.

Without the California WaterFix, Southern California's water reliability can still be achieved though it would take substantial regional projects such as the MET's proposed Carson Indirect Potable Reuse Project along with over 300,000 acre-feet of other new water transfers and/or additional water supply investments such as recycled water, ocean desalination and water transfers. Substantial investments in water use efficiency are also being counted on to greatly improve reliability.

North Orange County has more local groundwater supplies and a lower dependence on imported supplies. Thus, the study concluded that water shortage impacts could be substantial to South Orange County due to its heavy dependence on imported supplies. Without new regional and local investments, shortages will become significant by 2030 and even more extreme in later years. The study identified the need for new supply investments in SOC to improve future reliability.

In evaluating future challenges and risks, the study recommended a planning scenario developed by the OC water managers that included "adaptive management". Adaptive management calls for a periodic re-assessment of water demand and supplies, charting progress on new water supply projects in Southern California and for the California WaterFix and the Carson IPR Projects, analyzing the impacts of reaching shortage conditions on the Colorado River with declines in Lake Mead storage levels, and tracking policy and financial issues at MET, and the potential impact regulations may have on water supplies i.e. new Endangered Species Act listings.

The next 18 months are key for the California WaterFix, which faces multiple permits, decisions on how to share project costs, and the end-of-term for a supportive Governor. Recognizing the challenges, the Study identifies the year 2020 as the "decision point" for the California WaterFix and whether to move forward on a 'Plan B' should the WaterFix fail to materialize, focusing on more regional and local water supply investments.

Another portion of the study evaluated the emergency aspects earthquakes pose to meeting water demands while water systems are restored. The State Water Project crosses the San Andreas Fault at a dozen locations, while the Colorado River Aqueduct crosses it a number of times exposing these conveyance systems to extended outages of six months or more. The two conveyance systems supply 25 percent of the water in North Orange County and 95 percent of the water in South OC – this results in an emergency exposure for SOC. In addition, it was discovered that the majority of the wells in North Orange County would survive an earthquake and continue to supply water. However, SOC needs more emergency storage or supplies that can withstand an earthquake to meet reduced consumer demands for up to 60 days following earthquakes.

MORE ABOUT THE CALIFORNIA WATERFIX AND OC RELIABILITY

- The California WaterFix is the most cost-effective large-scale reliability investment. It is estimated to cost approximately $17 billion and will be paid for by water users.

Wholesale water rates will increase by 1.5 percent to 2.0 percent per year for 10 years to pay for the project.

- Without the California WaterFix and without any new local investments in Southern California, OC will face water shortages in eight of 10 years – the shortages will be excessive in all parts of Southern California and Orange County.

- Without the California WaterFix a high degree of reliability can still be achieved; until reliability is achieved, water shortages will always be much greater in South Orange County compared to North Orange County. Therefore, whether the California WaterFix proceeds ahead or not, additional supply and emergency investments are required in South Orange County.

** The California WaterFix is a plan to construct two tunnels up to 150 feet below ground, designed to protect California's water supply from the north, improve public safety, and enhance the environment by moving water underneath the Sacramento-San Joaquin Delta rather than through it.* [*www.californiawaterfix.com*](http://www.californiawaterfix.com)

Appropriate graphics to be added.

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY (MWDOC)

OC WATER RELIABILITY STUDY (THE STUDY)

A COMPREHENSIVE STUDY OF ORANGE COUNTY'S LONG TERM WATER RELIABILITY PROVIDES VALUABLE INFORMATION TO KEY DECISION MAKERS

Where Southern California Gets Water

ABOUT 50% OF ALL ORANGE COUNTY'S WATER SUPPLY IS IMPORTED

Nearly half of all Orange County's water supply comes from an underground aquifer that is augmented by Orange County Water District's Groundwater Replenishment System project. The remaining half is imported from the Colorado River, and through the State Water Project from northern California. South Orange County is nearly **100%** dependent on imported water.

THE STUDY: KEY FACTORS CONSIDERED

- Reliability of imported water supplies from The Metropolitan Water District of Southern California (MET) given more extreme weather in the future
- Population Growth
- Water demands and water conservation efforts
- Climate variability (using **93 YEARS** of historical data to predict impacts of future climate fluctuation)
- Success of the California WaterFix and a major MET water-recycling initiative
- Development of local projects in California

25 YEAR PROJECTION

A comprehensive study of Orange County's water supply reliability through the year 2040 was necessary because of ongoing drought conditions, environmental challenges in completing new projects, and uncertainty in reliable imported supplies from outside of Orange County. The Study is not intended to provide support for specific projects, but instead, to provide valuable information for key decision makers.

OVER 18 MONTHS AND 25+ MEETINGS

The Study was conducted under the guidance of water managers from MWDOC member agencies, the Orange County Water District, and the cities of Anaheim, Fullerton, and Santa Ana.

The Study focused on water **supply** and **system** reliability gaps under both hydrologic and seismic events for three areas of Orange County: The Orange County Basin, Brea/La Habra, and South Orange County.

Supply Reliability involves having sufficient supplies and storage, allowing demands to be met while facing historical and future extreme weather; **System Reliability** is planning for how to meet reduced demands after a serious event.

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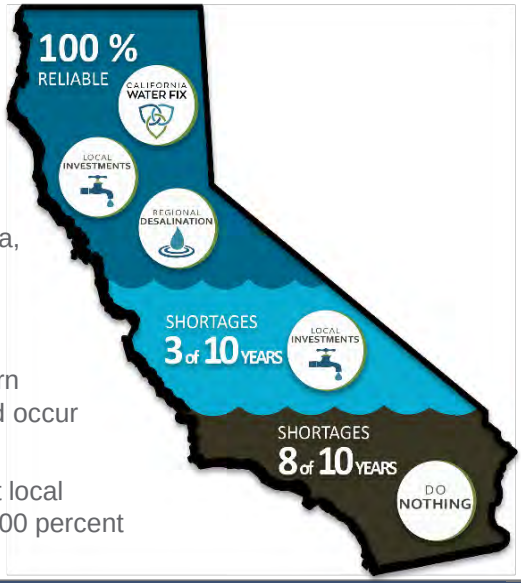
Mailing Address: P.O. Box 20895, Fountain Valley CA 92728
Main Phone: (714) 963-3058 • *Main Fax:* (714) 964-9389
Website: www.mwdoc.com

THE STUDY: KEY FINDINGS

- The WaterFix is the most cost-effective large-scale reliability investment and should be vigorously supported.
- Without the California WaterFix and any new local investments in southern California, Orange County will face water shortages in eight of 10 years.
- Without the WaterFix, but with significant investments in southern California water, shortages would occur three of 10 years.
- With the WaterFix and significant local investments, Orange County is 100 percent reliable.



EMERGENCY WATER SUPPLY

For emergency outages such as earthquakes or other catastrophes, the Study set a planning benchmark to meet demands for up to 60-days without receiving imported water from MET. Brea and North County cities served by the Orange County Water District basin need only to add emergency generators to meet that standard. South Orange County however, will need new local supplies and/or new emergency supplies.

CALIFORNIA WATER FIX
RELIABLE. CLEAN. WATER.

www.californiawaterfix.com

The California WaterFix is a **$15 BILLION** plan to construct two tunnels up to 150 feet below ground, designed to protect California's water supply from the north, improve public safety, and enhance the environment by moving water around the Sacramento-San Joaquin Delta rather than through it.

PLAN A AND PLAN B

The next 18 months are key for the California WaterFix ('Plan A'), which faces regulatory hurdles, decisions on how to share project costs, and the end-of-term for a supportive Governor. Recognizing the challenges, the Study looked at the year 2020 as a go/no go year for the WaterFix and developed a 'Plan B' should the WaterFix fail to materialize.

The Study concluded that other paths to achieving reliability not contingent on the WaterFix are viable ('Plan B'). This would include projects such as MET's proposed Carson (CA) Indirect Potable Reuse Project which would recycle water to replenish aquifers, additional water transfers, various local projects, and large scale ocean desalination.

SOUND PLANNING CALIFORNIA WATERFIX
WATER SUPPLY DEVELOPMENT RELIABILITY
APPROPRIATE INVESTMENTS LOCAL PROJECTS
EMERGENCY SUPPLY & STORAGE TRANSFERS
CONSERVATION OCEAN DESALINATION
REGIONAL PROJECTS RECYCLED WATER

OBSERVATIONS FOR SOUTH ORANGE COUNTY (SOC)

- SOC reliability depends on local and regional investments. Without new local investments, shortages projected for 2020 appear manageable only if conservation efforts by consumers continue.
- Under the recommended planning scenario and without new local investments, shortages get worse by 2030, and further deteriorate by 2040.
- In the event of a seismic or other catastrophic outage, SOC will need more designated local or emergency supplies to meet a minimum **60-DAY** demand.
- A number of significant issues, such as the WaterFix, will be resolved in the next several years. SOC should develop an investment strategy aimed at the recommendations established in the Study, but also use adaptive management methods to adjust for these events.

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Item No. 5

DISCUSSION ITEM
December 5, 2016

TO: Board of Directors

FROM: **Planning & Operations Committee**
(Directors Dick, Finnegan)

Robert Hunter
General Manager

J. Berg
Director of Water Use Efficiency

SUBJECT: **MWDOC Turf Removal Rebate Program Audit**

STAFF RECOMMENDATION

Staff recommends the Board of Directors receive and discuss the MWDOC Turf Removal Rebate Program Audit.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

SUMMARY

MWDOC has offered a Turf Removal Rebate Program since 2007. This water saving program provides consumers with rebate incentives to remove turf grass and install California Friendly landscaping. In Orange County, turf grass needs more than four feet of water per year; conversely, California Friendly landscaping needs less than two feet of water per year. To date, in the MWDOC service area more than 21 million square feet of high-water-use turf grass has been replaced with California Friendly Landscaping resulting in an estimated water savings of more than 2,940 acre feet per year.

During Metropolitan's biennial budget for the fiscal years 2014-15 and 2015-16, more than $252 million was appropriated to Turf Removal projects. Of that, $27.6 million was implemented within the MWDOC service area. Due to the magnitude of investment, Metropolitan's Internal Auditor initiated an audit of the program in early 2016. Although Metropolitan's audit is still underway, so far it has revealed that three sites within the MWDOC program were overpaid. Metropolitan and MWDOC immediately sought, and received, reimbursement of these overpayments totaling $107,200.

MWDOC staff initiated its planned Turf Removal Rebate Program evaluation in April 2016 with an emphasis on auditing the area measurements and rebate payments made to program participants. Simultaneously, staff also initiated the planned impact evaluation, in

Budgeted (Y/N): N/A	Budgeted amount: Not Applicable	Core __	Choice _X_
Action item amount: $0.00	Line item: N/A		
Fiscal Impact (explain if unbudgeted): N/A			

partnership with Metropolitan, to quantify water savings for the program. This water savings evaluation is just getting underway and will be reported back to the Board once complete in spring of 2017. The purpose of this staff report is to share with the Board the findings of the MWDOC Turf Removal Rebate Program evaluation of area measurements and rebate payments.

DETAILED REPORT

Turf Removal Rebate Program Participation Process

The Turf Removal Rebate Program is implemented in partnership with member agencies. MWDOC provides the day-to-day rebate program administration, and member agencies conduct the mandatory on-site pre- and post-installation verification inspections and area measurements. Unlike Metropolitan's regional program, MWDOC's program requires that all participants undergo mandatory field inspection to verify program eligibility and measure the turf grass area removed as the basis of the rebate.

Program participants currently apply for the rebate through MWDOC's Droplet rebate processing software. MWDOC staff review the applications for eligibility and completeness, and a pre-retrofit inspection work order is sent to the appropriate member agency to facilitate the first inspection. The results of the pre-retrofit inspection, including an area measurement, are then sent back to MWDOC. MWDOC utilizes that area measurement to establish a rebate reservation of the maximum potential rebate amount and sends a Notice to Proceed to the program participant. From the Notice to Proceed, the participant is given 60 days to complete their project. Upon completion, the participant notifies MWDOC, and a post-retrofit inspection work order is sent to the member agency. The post-inspection verifies turf grass was removed and re-measures the final turf removal area. The results of the post-inspection are reported back to MWDOC, and the customer's rebate is then processed.

The final rebate is paid based on the area measurement obtained at the post-retrofit inspection, but does not exceed the initial rebate reservation or the total project cost, as verified by purchase receipts collected during the post inspection.

Turf Removal Program Evaluation of Area Measurements and Rebate Payments

In April 2016, MWDOC initiated an evaluation of its Turf Removal Rebate Program, with an emphasis on auditing the area measurements and rebate payments made to program participants. The Audit included independent field inspections and turf removal area measurement verifications of 94 commercial and 94 residential properties. These properties were selected randomly within repetitive trait categories such as agency, size of project and landscape contractor. The commercial site sample represented 19 percent of the commercial applicants but 63 percent of the turf grass removed by commercial program participants. The residential site sample represented one percent of residential applicants and one percent of the residential turf grass removed.

These field inspections were performed in all MWDOC member agency service areas by Mission Resource Conservation District and Water Wise Consulting, who specialize in installation verification inspections and area measurements. MWDOC staff attended many of these inspections and provided supplemental information when needed. MWDOC's Turf Removal Rebate Program Audit Report is provided as Attachment A.

No fraud was detected within the MWDOC audit; however, the audit did find $325,600 in overpayments to 33 program participants in 13 retail water agency service areas. Overpayments were the result of inaccurate area measurements performed during the post-retrofit inspections. Of that amount, $107,200 (33%) has already been recovered from three participants within one retail water agency. The balance of $218,400 is currently in the process of being recovered. Staff informed the member agency managers and conservation coordinators of these overpayments and needed refunds during their respective November and December meetings. Letters summarizing the overpayments, including a request for reimbursement, were sent to agencies on December 1, 2016. Staff will be meeting with each agency to present our findings in detail and to answer any questions they may have.

Any site with a deviation of greater than 10% measurement error and an over-payment greater than the established thresholds of $500 for commercial sites and $150 for residential sites was flagged for reimbursement.

Inspection and Verification Procedures Manual
In an effort to provide better clarity of inspection and verification procedures, MWDOC developed an Inspection and Verification Procedures manual, which has been incorporated by reference into the MWDOC-member agency Water Conservation Participation Agreement. The purpose of the manual is to establish a clear set of inspection procedures to be followed by MWDOC and member agencies when conducting pre- and post-retrofit installation verification and area measurement inspections for all water conservation devices. The manual also defines appropriate area measurement methodologies and suitable area measurement equipment to be used. MWDOC continues to require that 100 percent of all turf removal rebate applicants receive on-site pre- and post-retrofit inspections.

Staff will continue to provide area measurement training to member agency staff. This training will include a variety of practical hands-on measurement methodologies and the proper use of measurement equipment. Staff will also provide training on documentation of inspection results using the pre- and post-inspection work order forms to ensure adequate documentation.

Inspect the Inspector
MWDOC staff has also instituted an “inspect the inspector” feature into the program. This includes quality control reviews by MWDOC staff of inspection work orders and field verification of eligibility and area measurement accuracy. These inspections will be performed prior to cutting a rebate check to allow for adjustments, if needed. When adjustments are needed, MWDOC staff will retrain retail agency staff to maintain a high level of program quality control and accuracy.

The quality control effort will be employed on a random sample of applicants and when inspection work order content is unclear or incomplete. We anticipate that five to ten percent of applications will undergo an “inspect the inspector” evaluation.

Attachment A: MWDOC Turf Removal Rebate Program Audit Report

MWDOC TURF REMOVAL REBATE PROGRAM
AUDIT REPORT

EXECUTIVE SUMMARY

The Municipal Water District of Orange County (MWDOC) implements a Turf Removal Rebate Program (Program) to incentivize property owners to remove turfgrass and install less water-intensive permeable landscaping material. This program appeals to homeowners and property managers looking for water savings and drought relief within their landscapes. Application activity is influenced by both marketing and rebate level. During the last two fiscal years, the influx of funding resulted in greatly enhanced Program promotion and participation.

As MWDOC is a member agency of the Metropolitan Water District of Southern California (Metropolitan), the base rebate for the MWDOC Program is funded through the Metropolitan budget. In response to the unprecedented and continuing drought, during Metropolitan's biennial budget for the fiscal years 2014-15 and 2015-16, $369 million dollars were designated to conservation related programs. Of that, $252 million dollars were appropriated to turf removal projects, and $27.6 million (11%) was implemented within the MWDOC service area.

The drought remained a headline and media outlets promoted the unprecedented conservation budget and the "new California landscape." Local businesses further promoted the Program as a way to garner business of their own. Within Orange County, the MWDOC Program benefitted from increased promotion as a cross-market (television, radio, newspapers, etc. are within a joint market with the greater Los Angeles region).

In order to ensure public funds are appropriately utilized, MWDOC regularly reviews its rebate programs for their efficiency, effectiveness, and accuracy. These reviews occur during normal program pauses, typically coinciding with the end of a funding or grant award term. This allows for an adaptive approach to implement lessons learned prior to the reinstatement of a program. This audit of the MWDOC Turf Removal Rebate Program seeks to verify the areas of the Program's implementation process that may result in less than desired amounts of turf removed, which could have resulted in over-payment.

On-site landscape measurement (i.e. turf area in square feet) can be achieved through a number of techniques. To determine what constitutes a measurement error that is reasonably acceptable, MWDOC's Audit conducted an analysis of measurement differences between multiple auditors. Through this analysis, at the same single measurement area, with measurements conducted on-site by independent auditors utilizing different measurement techniques, a square footage difference up to 10% is within the limit accuracy.

Audit measurement findings are categorized as satisfactory, under-measured, and over-measured. Satisfactory audit measurements are within 10% of the recorded Program post-conversion measurement. Under-measurement findings occur when the audit re-measurement is greater than the Program post-

conversion measurement. Conversely, over-measurement occurs when the audit re-measurement is less than the Program post-conversion measurement. It is possible for a site to result in an over-measurement finding without over-payment; within the MWDOC Program, rebates are limited by the total project costs.

Overall, the MWDOC Audit revealed more under-measurement than over-measurement (positive net measurement variance). In total, 76% of the sites had either satisfactory or under-measurements where more turf was removed than was recorded during the Program. Further, greater number of sites and square footage resulted in under-measurement as compared to over-measurement. The additional benefits attained through the ancillary landscape conversion from under-measurement is an indication of a successful rebate program. Nonetheless, the Audit resulted in a somewhat bell-shaped distribution. Therefore, over-measurement (and over-payment) remains a concern when implementing an area measurement-based rebate program.

The over-measurement results highlighted a number of issues related to measurement practices. To assist in the elimination of measurement issues, MWDOC has developed and implemented comprehensive inspection and verification procedures.

As part of this Audit process, it was identified that MWDOC's existing inspection procedures resulted in too much ambiguity for the inspection process. Therefore, to standardize the protocol, MWDOC updated its inspection and verification procedure with specific details. Additional quality control efforts recommended for MWDOC Program implementation include semi-annual inspections measurement training, such as ride-along training/observation of both agency staff and contractor inspections.

Any site with a deviation of greater than 10% measurement error and an over-payment greater than the established thresholds ($500 for commercial sites and $150 for residential sites) was flagged for reimbursement. No fraud was detected within the MWDOC audit; however, the audit did find $325,600 in overpayments were made to 33 program participants in 13 retail water agency service areas. MWDOC has requested reimbursement from retail agencies totaling nearly $325,600 of Metropolitan funds. Reimbursement has been completed at all three of the Metropolitan Audit sites, which has already resulted in the return of $107,200 of Metropolitan funds. The balance of $218,400 is currently in the process of being recovered.

CONTENTS

INTRODUCTION

The Municipal Water District of Orange County (MWDOC) has implemented a Turf Removal Rebate Program (Program) since 2007. The purpose of the Program is to incentivize property owners to remove turfgrass and install less water-intensive permeable landscaping material. This program appeals to homeowners and property managers looking for water savings and drought relief within their landscapes, and California Friendly sustainable landscapes are becoming mainstream in landscape design.

MWDOC's 2015 Water Use Efficiency Master Plan estimated that approximately 50% of MWDOC's water demand is attributed to outdoor landscape purposes, and turfgrass is a staple in the Orange County landscape. Per square foot, turfgrass is the single highest water consuming common landscape plant in Southern California. On average, removing one square foot of turfgrass is estimated to save approximately 45.6 gallons of water per year. Further, removal of turfgrass, when replaced with a permeable landscape, has been linked to a reduction in dry-weather runoff. Since the inception of the Turf Removal Program and prior to fiscal year (FY) 2014-15, activity within the Program remained steady, with an average of $1 million of annual funding within MWDOC's Program. However, in the last two years, activity surged as a result of an influx of funding and more intense marketing. In response to the unprecedented and continuing drought, during Metropolitan's biennial budget for the fiscal years of FY 2014-15 and FY 2015-16, $369 million dollars were designated to conservation-related programs. Of that, $252 million dollars were appropriated to turf removal projects, and $27.6 million (11%) was implemented within the MWDOC service area. Figure 1 illustrates the rebate activity by MWDOC Divisions during that time period.

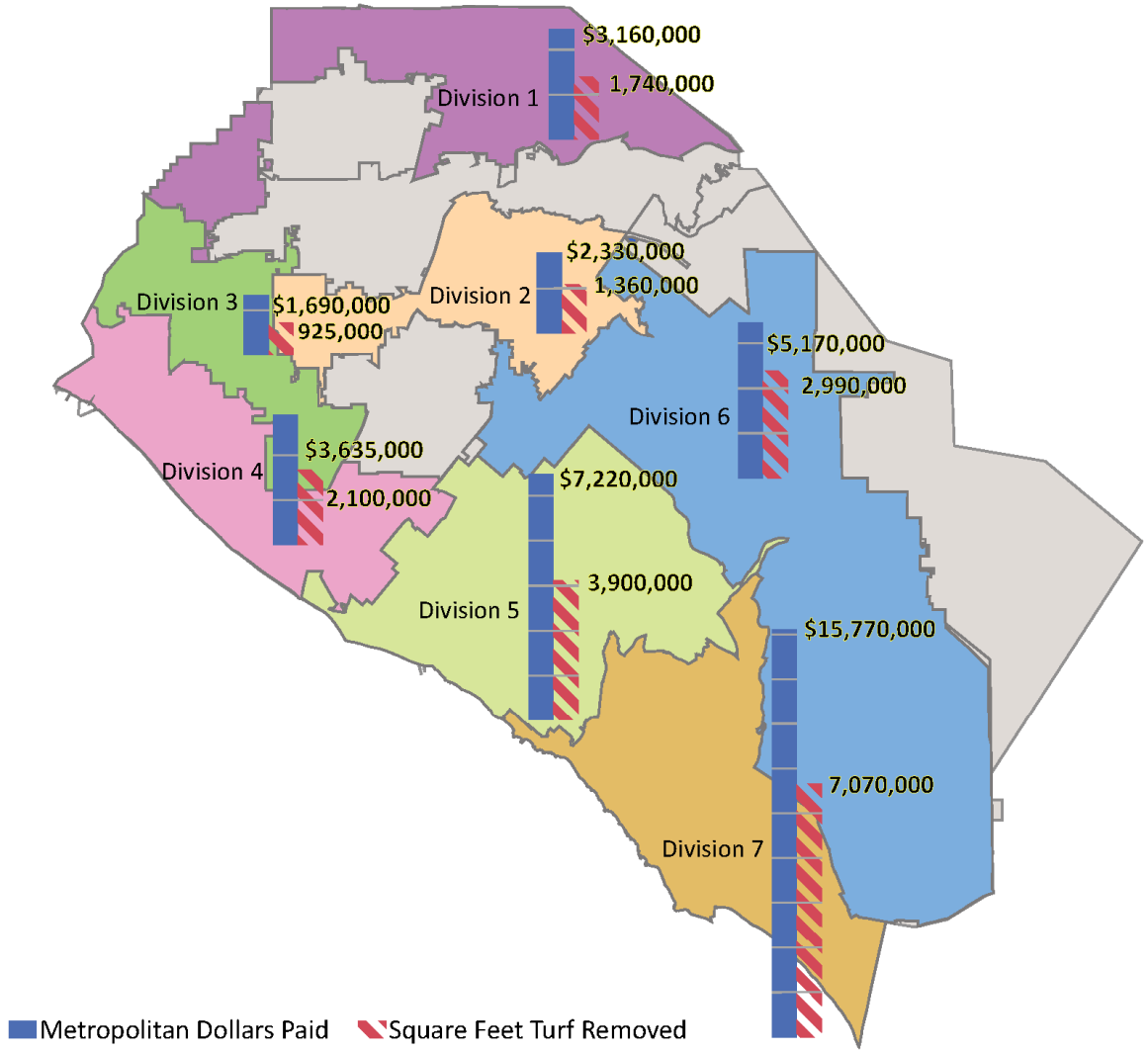

FIGURE 1. PROGRAM ACTIVITY BY DIRECTOR DIVISION.

PROGRAM ACTIVITY GROWTH

Both marketing and rebate level influence application activity. During the last two fiscal years, the influx of funding resulted in increased Program recognition beyond agencies promoting the Program as a landscape drought-relief conservation tool. As the drought remained a headline, media outlets promoted the unprecedented conservation budget and the "new California landscape." Local businesses further promoted the Program as a way to garner business of their own. Within Orange County, the MWDOC Program benefitted from increased promotion as a cross-market (television, radio, newspapers, etc.) within the greater Los Angeles region.

MWDOC's Turf Removal Rebate Program has gone through various iterations since its 2007 inception. Over the years, Metropolitan has provided rebate levels as low as \$0.30 per square foot (ft^2) and up to \$2.00 per ft^2. Thirty cents per square foot is the calculated cost effective program rate, meaning that \$0.30 per ft^2 is the water savings equivalent to \$195 per acre-foot (the Metropolitan avoided cost rate utilized for conservation programs). However, it has also been identified that the turf removal rebate level should be at least \$1.00 per ft^2 to garner a meaningful level of Program participation activity. Higher rebate levels will result in even higher participation rates. Further, within the MWDOC and Metropolitan Program, retail agencies have the ability to provide supplemental funding. During the MWDOC Audit time period, the maximum level of supplemental funding provided by a retail agency within the MWDOC Program was \$3.00 per square foot[1].

In response to the drought and to encourage program participation, in May 2014 the Metropolitan Board increased the base rebate from \$1.00 to \$2.00 per square foot. This enhanced rebate level and increased media presence resulted in an exponential surge in activity, a growth of approximately 2,000% within one year. In May 2015, to help sustain the allocated funding, as well as curb the amount of funding any single site could receive, Metropolitan instituted per-site funding caps based on program sector: \$6,000 residential, \$25,000 commercial, and \$50,000 public agency. Figure 2 illustrates MWDOC Program activity, based on application date. In this graph, a number of Program factors are observed.

Key points in time: The moderate slope increase during early 2014 occurred immediately following the Governor's drought declaration, as compared to 2013 activity, and the steeper slope began following the rebate level increase to \$2.00 per square foot in May 2014. There is a small dip during late 2014, which concurs with natural program behavior of lesser activities during the winter months. The steep decline in activity occurred following the July 2016 program pause.

Large Project Effect: The divergence between the lines (data lines being out of sync) highlights large commercial projects (e.g. few projects, but large areas removed). Conversely, the convergence of the data line in early summer 2015 illustrates the implementation of the caps.

[1] The highest level of incentive was provided by the Moulton Niguel Water District, where a site could receive, on top of the \$2.00 per square foot of Metropolitan funding, an additional \$1.50 per square foot for turf removal plus \$1.50 per square foot when installing synthetic grass.

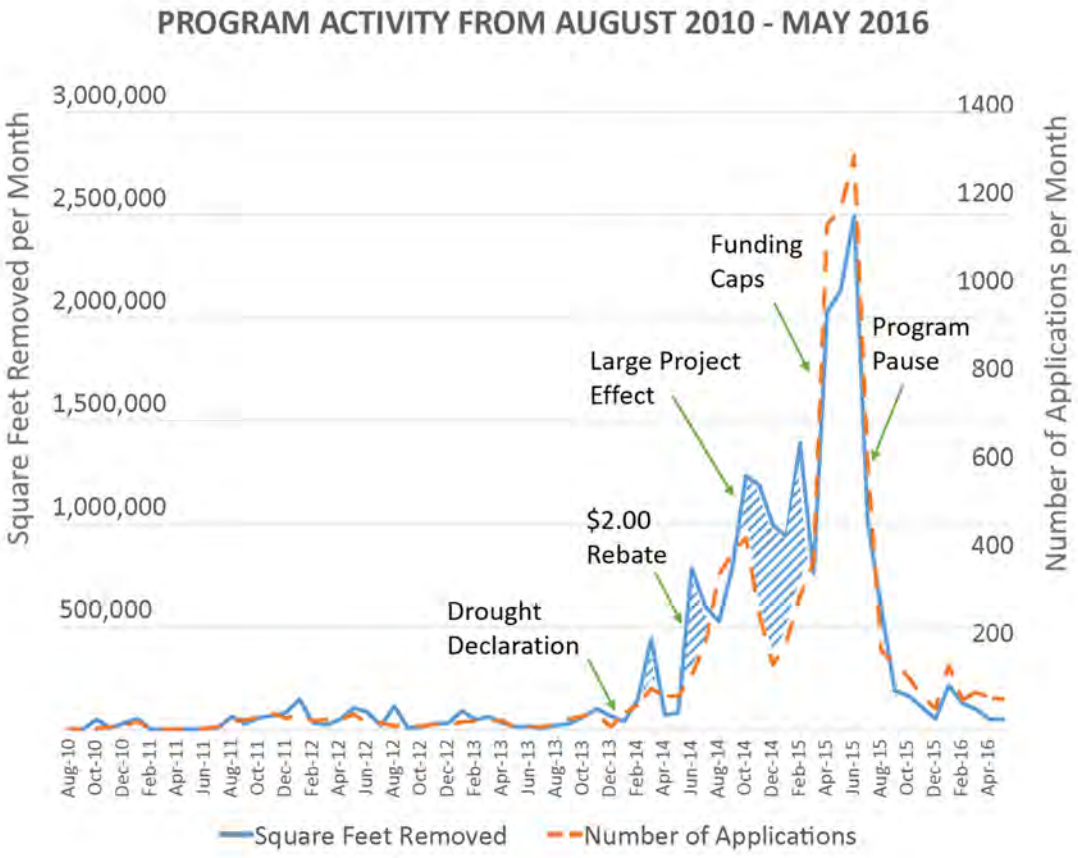

FIGURE 2. PROGRAM ACTIVITY OVER TIME FOR THE FY 2014-15 AND FY 2015-16 PERIOD.

TURF REMOVAL REBATE PROGRAM PROCESS

The MWDOC Program is considered a sub-program of the regional Turf Removal Program funded by the Metropolitan Water District of Southern California (Metropolitan). Sub-programs, such as the MWDOC Program, are referred to as Metropolitan-funded Member Agency-Administered programs because the member agency (e.g. MWDOC) assumes the administrative burden of the participation process, rather than relying on the contractor utilized by Metropolitan for rebate program administration.

PROGRAM PROCESS

Table 1 outlines the basic steps within the MWDOC Program. The MWDOC Program varies from the Metropolitan Program process. The MWDOC Program meets or exceeds all requirements for implementing Metropolitan-funded Member Agency-Administered programs. A number of the quality control efforts that MWDOC implements are more easily managed at a local level.

TABLE 1. BASIC TURF REMOVAL PROGRAM STEPS.

Program Step	Metropolitan Requirement	MWDOC Process
1. Participant applies	✓	✓
2. Application reviewed for site/project eligibility	✓	✓
3. On-site pre-landscape conversion inspection, site/project eligibility verification, and measurement of project area	Large sites only	All sites
4. Letter to proceed provided to participant	✓	✓
5. On-site post-landscape conversion inspection, site/project eligibility verification, and measurement of project area	Large sites only	All sites
6. Review of project invoices/receipts	----------	All sites
7. Multi-level internal review of project package	✓	✓
8. Rebate issued to participant	✓	✓

As illustrated in Table 1, the MWDOC Program requires an inspection before a participant begins a project. This confirms the existence of turf and that the project meets the minimum eligible area for turf removal. After the project has been completed, the project area is measured and inspected to determine the eligible square footage of turf removed, and receipts are submitted to determine eligible costs for reimbursement. Within the MWDOC Program, the rebate paid cannot exceed the eligible project costs. For both pre-landscape conversion inspection and post-landscape conversion inspection measurements, agencies either utilize their own staff, utilize Mission Resource Conservation District through MWDOC, or hire their own contractor. Results are then submitted to MWDOC via a standardized form.

The MWDOC Program includes a number of project requirements in order to achieve eligibility. These requirements are provided to each participant through the Program Application Terms and Conditions

document. MWDOC implements three specific requirements to ensure the maximum level of benefit is achieved through the Program:

- Bare soil identified during the pre-landscape conversion inspection is not rebate eligible (bare soil areas are subtracted from the pre-landscape conversion inspection measurement)
- Completed project area must include efficient irrigation equipment or the complete removal of the irrigation system
- Project rebate cannot exceed project costs (identified through collection and review of project related receipts)

WHY AUDITS ARE CONDUCTED

In order to ensure public funds are utilized appropriately, MWDOC regularly reviews its rebate programs for efficiency, effectiveness, and accuracy. These reviews occur during normal program pauses, typically coinciding with the end of a funding or grant award term. This allows for an adaptive approach to implement lessons learned prior to the reinstatement of a program.

PURPOSE OF THIS AUDIT

This audit of the MWDOC Turf Removal Rebate Program (MWDOC Audit) seeks to identify the areas of the Program's implementation process that may result in over-measurement with over-payment. To identify the difference between over-measured projects and measurement-error, this evaluation will also assess the inherent measurement error between inspectors. Any proficiencies or deficiencies in the method of managing the program, as well as associated solutions, are identified within the last section of this document.

OVER-MEASURED VS. OVER-PAYMENT

Over-measurement refers to an inaccurate measurement where the square footage recorded during the Program is greater than what was actually removed as observed during the Audit re-measurement. Based on Metropolitan funding rule caps and MWDOC Program criteria that prohibit the rebate to exceed the total project cost, it is possible for a site to receive over-measurement without over-payment.

Concurrently, the Metropolitan Internal Auditor is conducting an independent audit of the regional Turf Removal program (Metropolitan Audit). The Metropolitan Audit is comprehensive as it includes both the program administered by Metropolitan on behalf of member-agencies participating in the regional rebate program, as well as sub-programs implemented by member-agencies (e.g. MWDOC's Program). Within the Metropolitan Audit, turf removal sites of particular concern have been identified and re-measured for accuracy. Any sites within the Metropolitan Audit that also fell within the MWDOC service area were included within the MWDOC Audit.

How the Audit was Conducted

The MWDOC Audit sample was composed of a stratified sample set of 188 sites, from both commercial and residential sectors. The Audit re-measurement occurred at a time period after the rebate check had been issued. These sample sets were identified to achieve a statistically valid sample size[2]. The actual number of sites selected within each retail agency was proportional to their level of activity.

How Audit Sites were Selected

Sites were selected using a stratified random approach, with the number of sites selected within each agency based on the proportionate level of Program activity (i.e. agencies with more sites within the Program had more sites selected within the Audit). The categories or strata included distribution of repetitive traits within the dataset, such as rebate amount, project area (square footage), and multiple sites with the same landscape contractor. Table 2 identifies the audit sample in relation to the Program in total. For example, the MWDOC Audit sample of commercial sites represented 14% of the applications, but 63% of the turf removed and 68% of MWDOC's Metropolitan funding within that sector.

TABLE 2. AUDIT SAMPLE DISTRIBUTION BY SECTOR.

Audit Sample	Total Program Applications (FYs 14-16)	Percentage of Applications	Percentage Turf (ft^2)	Percentage of Funding
Commercial Sector	650	14% (n=94)	63%	68%
Residential Sector	7,400	1% (n=94)	1%	1%

Two inspection contractor companies were selected to perform MWDOC's in-field Audit inspections. Careful consideration was taken to ensure that the inspection contractor performing the audit measurement did not perform the original in-program inspections. MWDOC provided training and quality control monitoring of these inspectors as described below.

Quality Control Measures within the Audit

To ensure the quality of the MWDOC Audit measurements, staff implemented the following control procedures:

- On-site training by qualified MWDOC staff on landscape auditing measurement techniques
- On-site observation by MWDOC staff at 5% of the MWDOC Audit sites, resulting in approximately 10% of the re-measured square footage

Results of the MWDOC Audit measurements conducted by the Audit inspectors were submitted to MWDOC via a standardized form. To address quality assurance concerns regarding sub-areas and project boundaries, sites were revisited following communication with site personnel to assist in project area recognition.

[2] The sample size had a confidence level of 95% and a 10% margin of error.

Sites with multiple applications or phases were closely examined. Effort was taken to ensure that the audit results were not skewed by including other areas which may have been included on a separate application.

Additionally, MWDOC Audit measurements resulting in an over-measurement in excess of 25% were reviewed, and a re-measurement of the site was conducted by MWDOC staff to verify the Audit inspector's measurement.

WHAT IS A "GOOD ENOUGH" MEASUREMENT?

On-site landscape measurements can be achieved through a number of techniques. Differences in measurement techniques include:

- Equipment - such as measuring tape versus wheel
- Methodology - such as geometry utilized to measure irregularly shaped areas

Measuring equipment examples

At the onset of MWDOC's Audit, analysis was performed to determine the difference between measurements of replicated sites by multiple auditors. This means the same single measurement area was measured by different people a number of times to establish an acceptable measurement difference.

In total, three large commercial sites (large-sites) were broken into 140 smaller single measurement areas. The measurements were replicated by three independent auditors (Auditors A, B, and C), from three different agencies, with a variety of appropriate equipment and measurement techniques. Breaking a large-site into single measurement areas is a common and often necessary practice. The 140 single measurement areas ranged from approximately 65 ft^2 to 27,000 ft^2, with an average project area of 2,400 ft^2. The single measurement areas were indicative of the average residential and commercial project sizes.

Two factors were considered during this analysis:

- Are the deviations in the measurement areas at each of the three large-sites considered statistically significant?
    - This tells us if there was something different at one of the large-site locations that may have influenced the measurements there, thereby resulting in a difference
- Are deviations in the auditors' single measurement area measurements considered statistically significant?
    - This tells us if there was something that one of the auditors may have been doing that makes their measurements different

Upon analysis of the large-sites, if there was a statistical difference between the three large-sites, then the analysis of the single measurement areas would need to be performed for each large-site independently. As the three large-sites were found to have no measurement difference at the 95% confidence level, the 140 single measurement areas can all be analyzed together.

The measurements by Auditors A and B were not found to be statistically different, meaning that while there could be a percentage difference found between these two Auditors, they are actually considered to be the same based on a 95% confidence level. The measurements by Auditor C was found to be statistically different and therefore excluded from the rest of the analysis.

Taking the sample set of the two agencies that are statistically the same and excluding all outliers (any measurement deviations with points outside of the Box-Plot whiskers[3]) resulted in a difference between area measurements with a mean of 11% and a median of 9%. This means at the same single measurement area, with measurements conducted on-site by two independent auditors utilizing varied[4] measurement techniques, a square footage difference of up to approximately 10% could be expected.

Additionally, a monetary value was set, below which the deviation in measurement was deemed inconsequential. These levels correspond to approximately 10% of the median rebate received by sector. This over-payment threshold was set at $500 for commercial sites and $150 for residential sites.

Therefore, a square foot measurement difference of up to 10% will be considered an acceptable Audit re-measurement error. However, any site with a deviation of greater than a 10% measurement error and an over-payment greater than the established thresholds was flagged for reimbursement.

CONCLUSIONS

HOW TO UNDERSTAND THE FINDINGS

The MWDOC Audit looked at the measurement of sites following the completion of the project. The focus of the results are on determining satisfactory measurements and levels of over-measurement. The balance between over-measurement and under-measurement will also be observed to note the comprehensive Program benefits.

KEY FINDINGS

To understand the results, measurements of each site were categorized as either satisfactory, over-measured, or under-measured.

Satisfactory results are Audit measurements within 10% of the project post-landscape conversion inspection measurement value. The analysis of acceptable error is detailed in the section above.

Over-measurement refers to an inaccurate measurement where the square footage recorded during the Program is greater than what was removed (with a difference greater than 10%), as

[3] The box-plot (a.k.a. box and whisker diagram) is a standardized way of displaying the distribution of data based on the five number summary: minimum, first quartile, median, third quartile, and maximum, with the whiskers indicating the minimum and maximum.

[4] While the specific measurement techniques are selected for use at the discretion of the Auditor, all were considered appropriate for the geometry of the area.

observed during the Audit measurement. Based on Metropolitan funding rule caps and MWDOC Program criteria, which precludes the rebate from superseding the total project cost, it is possible for a site to result in over-measurement without over-payment.

Under-measurement refers to an inaccurate measurement where the square footage recorded during the Program is less than what was removed (with a difference greater than 10%), as observed during the Audit measurement. Under-measurement may result from additional landscape conversion occurring beyond what was originally planned and included in the pre-landscape conversion inspection. In fact, the purpose of this, and all rebate programs, is the carry-over effect where, as a result of a rebate, the promoted activity continues without additional incentive, yielding ancillary benefits.

VARIABLES OF INTEREST
Inspector type (agency staff versus contractor) and project size (large versus small) are two variables of interest. These variables were examined to see if they influenced the results.

VARIABLES OF INTEREST

To gain insight into the MWDOC Audit results, analysis was performed to identify interactions between satisfactory measurement values and variables of interest. The variables of interest include inspector type (agency staff versus contractor) and project size (large versus small). These variables were examined to see if they influenced the results. Correlation was found between Audit results and program inspector type only at commercial sites. This means at commercial sites the inspector type who performed the measurement (either agency staff versus inspection contractor) had a statistical influence on whether the Audit measurement more often resulted in satisfactory findings. There was no influencing relationship between inspector type found at residential sites.

Further, a statistical difference was observed when considering project size and Audit results for small and large sites. The smallest (commercial and residential) sites were more likely to yield a satisfactory result, whereas the large sites were more likely to result in unsatisfactory measurements. However, for mid-sized projects (commercial and residential), the project size does not affect the likelihood of satisfactory result.

OVERALL CONCLUSIONS

Overall, the MWDOC Audit resulted in a positive net measurement variance, meaning that more turf was removed than recorded during the Program and incentivized through rebates. In total, 76% of the sites had either satisfactory or under-measurements with ancillary landscape conversion. Further, a greater number of sites and square footage resulted in under-measurement as compared to over-measurement. The additional benefits attained through the ancillary landscape conversion from under-measurement is an indication of a successful rebate program.

The relatively bell-shaped curve in Figures 3 and 4 illustrates the somewhat even occurrences of both over- and under-measurements. Nonetheless, over-measurement remains a concern when implementing a rebate program. The over-measurement results (24% of total Audited sites) highlighted a number of issues related to measurement practices:

- Difference in measurement equipment
- Difference in measurement methodology (geometry)
- Difficulty in delineating exact project areas over time (due to mulching and plant growth, etc.)
- Potential missed or added project areas may result in inaccurate re-measurement
- Due to time passing and staff changes, some site contacts could not recall the specific project areas
- Difference in inspection technique by inspector type (agency versus inspection contractor)

Many of these issues deal with the concept of single measurement areas or sub-areas that makeup the total project area. Large projects are commonly composed of many single measurement areas. This is especially of concern when the project area was adjacent to non-turfgrass landscape material prior to the landscape conversion (for example, areas within a Homeowners Association greenbelt). No fraud was detected within the MWDOC audit; however, the audit did find $325,600 in overpayments were made to 33 program participants in 13 retail water agency service areas.

Commercial Site Results

The MWDOC Audit of commercial sites resulted in 26% of non-satisfactory over-measurement. While the over-measurement difference between Program and MWDOC Audit measurements resulted in nearly 575,000 square feet, the over-payment resulted in approximately $317,200 of Metropolitan funding. Over-payment is less than over-measurement due to MWDOC's criteria of limiting rebates up to the project costs. The under-measurements resulted in nearly $548,000 of unrebated conversion and more than 380,000 square feet, providing an ancillary water savings of 53 acre-feet per year.

FIGURE 2. COMMERCIAL SITE RESULTS OF PERCENT DIFFERENCE BETWEEN PROGRAM AND AUDIT MEASUREMENTS.

MWDOC's Metropolitan Audit Sites

Three of MWDOC's Commercial sites were also included in the concurrent Metropolitan Audit. The landscape conversions at these sites were all performed within the same single retail agency service area and by the same single contractor. To note, this contractor was responsible for the greatest proportion of turf removal within the MWDOC Program.

While the findings of these three sites were encompassed within the MWDOC Audit, when isolating these three sites the results highlight over-measurement. It is notable that two of the three site are categorized as extremely large, and the third is mid-sized. Therefore, the findings of the larger sites are consistent with the statistical correlation trend observed (that larger sites will more likely result in over-measurement).

Residential Site Results

The MWDOC Audit of residential sites resulted in 22% of non-satisfactory over-measurement. While the over-measurement difference between Program and Audit measurements resulted in nearly 4,400 square feet, the total over-payment resulted in approximately $8,400 of Metropolitan funding. To note, for residential sites resulting in over-measurement and over-payment, the average amount is $400 per site.

Here, too, the over-payment liability is imbalanced with the over-measurement and primarily limited by the Metropolitan funding caps. The under-measurements resulted in more than 31,500 square feet of turfgrass removed and, therefore, an ancillary water savings of 4.4 acre-feet per year. For residential sites, which mostly occur in the small size range, a greater percentage of under-measurement occurred than over-measurement.

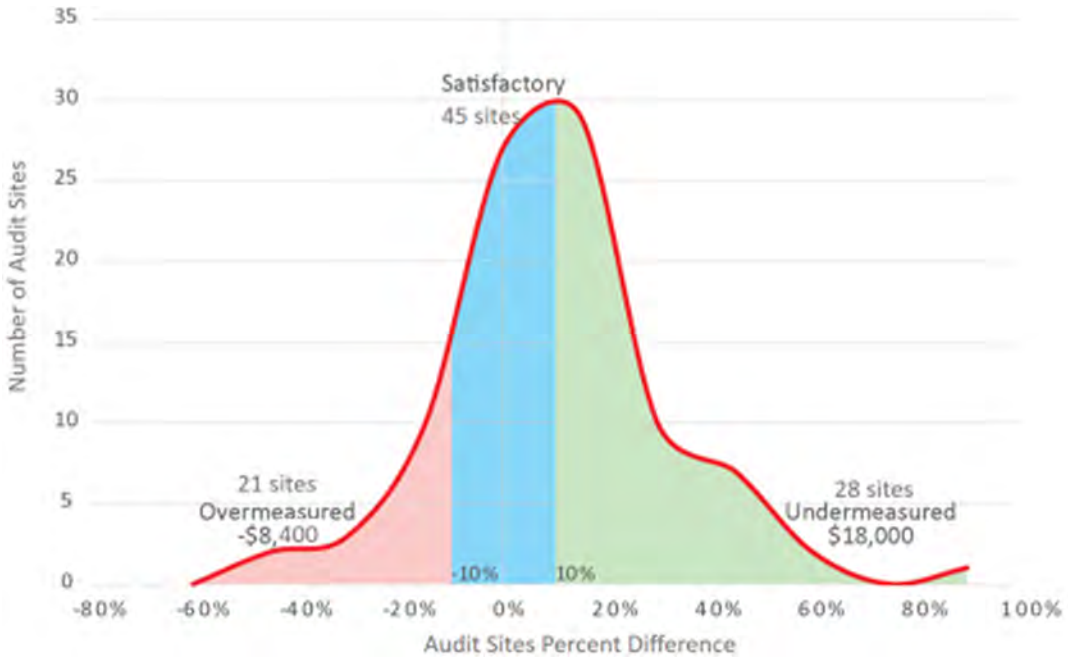

FIGURE 3. RESIDENTIAL SITE RESULTS OF PERCENT DIFFERENCE BETWEEN PROGRAM AND AUDIT MEASUREMENTS.

LESSONS LEARNED AND IMPLEMENTED CHANGES

Inspection and Process gaps resulted in non-satisfactory measurement. These gaps primarily resulted from non-specific inspection procedures. Results imply retail agency staff may not have performed on-site measurement at all sections of all sites during both the pre-landscape conversion inspection and the post-landscape conversion inspection. Additionally, MWDOC allowed retail agencies to define their own inspection and measurement methods, and did not provide retail agencies with detailed inspection procedures that clearly defined minimum requirements for post-landscape conversion inspections and documentation.

To assist in the elimination of measurement issues, MWDOC has developed and implemented comprehensive inspection and verification procedures as part of the current Water Conservation Participation Agreement between MWDOC and its service area retail agencies. The modifications to the inspection and verification process for MWDOC's Turf Removal Program remain in compliance with all new Metropolitan-funded Member Agency-Administered program requirements as stated within Addendums 17-B to the Residential and Commercial Water Conservation Funding Agreements between Metropolitan and MWDOC.

As part of this Audit process, it was identified that the MWDOC's existing inspection procedures resulted in too much ambiguity within the inspection process. Therefore, to standardize the protocol, MWDOC's updated inspection and verification procedures now specifically detail:

- On-site inspections protocols for area-based rebates
- Conditions of turf at pre-landscape conversion inspections and conditions of project at post-landscape conversion inspections
- Measurement techniques for non-uniform shaped areas
- How to handle case-specific issues
    - Multiple applications under same site
    - Modifications to initial project area
    - Project extensions

Further, within the Water Conservation Participation Agreement between MWDOC and the retail agencies, a retail agency shall refund to MWDOC any amounts paid for landscape conversion that MWDOC or Metropolitan establishes as not converted. This includes specific language relating to retail agency staff signature authority; responsibility for checking of work and approving the recorded measurements, whether the data is entered by agency staff or their inspection contractor; and reimbursement protocol, when applicable. Additional quality control efforts recommended for MWDOC Program implementation include:

- Semi-annual inspections measurement training
- Ride-along training/observation of both agency staff and contractor inspections
- "Inspect the Inspector" re-measurements confirming no more than 10% acceptable error at a time near the post inspection (this will help alleviate area identification barriers)

To attain data quality assurance, questionable sites should be verified through correspondence with the inspector, and some cases may require re-measurement by MWDOC staff. Measurements that may indicate concern include:

- Commercial sites where pre-landscape conversion inspection and post-landscape conversion inspection measurements are the same
- Large sites where invoice total matches the exact calculated rebate amount
- Sites where measurements are the same as the caps
- Very even, round numbers (e.g. 4,000 ft^2)

NEXT STEPS

REIMBURSEMENT OF FUNDS

Commercial and residential sites identified through the MWDOC Audit process to have over-measurement resulting in over-payment ($500 for commercial sites and $150 for residential sites) yields a reimbursement request as the site is not in compliance with the program terms for that area. In accordance with the Water Conservation Participation Agreement between MWDOC and its service area retail agencies, MWDOC has requested reimbursement from 13 retail agencies totaling nearly $325,600 of Metropolitan funds (Table 3). Reimbursement has been completed at all three of the Metropolitan Audit sites, which has already resulted in the return of $107,200 of Metropolitan funds.

WATER-SAVINGS BENEFIT ANALYSIS

Simultaneously, MWDOC is in the process of completing its planned Program impact evaluation in cooperation with Metropolitan. An impact evaluation explicitly focuses on the realized benefits of the Program (e.g. water savings). This analysis will verify or update the Southern California industry accepted water savings rate for landscape conversion. MWDOC has also requested that the water savings metric for Orange County be specifically identified.

TABLE 3. APPROXIMATE REIMBURSEMENT AMOUNT BY RETAIL AGENCY FOR OVER-MEASURED SITES RESULTING IN OVER-PAYMENT.

Sector	Retail Agency	Rebate Total Paid (FYs 14-16)	Average Difference per Site (ft^2)	Average Difference per Site (%)	Total Reimbursement Amount*
Commercial $317,200	El Toro Water District	$718,000	1,073	-15%	$3,800
	Golden State Water Company	$513,000	8,340	-26%	$700
	Huntington Beach, City of	$552,000	16,782	-15%	$33,600
	Irvine Ranch Water District	$5,283,000	29,131	-17%	$210,700
	Moulton Niguel Water District	$6,087,000	4,134	-16%	$8,300
	Newport Beach, City of	$690,000	17,239	-49%	$7,100
	Santa Margarita Water District	$1,727,000	12,744	-24%	$13,500
	South Coast Water District	$498,000	17,657	-12%	$35,300
	Westminster, City of	$94,000	4,231	-38%	$4,200
Residential $8,400	El Toro Water District	$181,000	211	-30%	$400
	Golden State Water Company	$900,000	17	-14%	$200
	Huntington Beach, City of	$927,000	171	-24%	$1,300
	Irvine Ranch Water District	$2,013,000	49	-17%	$400
	Laguna Beach Co. Water District	$169,000	523	-59%	$1,000
	Mesa Water District	$702,000	187	-14%	$200
	Moulton Niguel Water District	$4,582,000	201	-18%	$1,900
	Newport Beach, City of	$225,000	135	-30%	$300
	San Clemente, City of	$579,000	297	-33%	$1,600
	Santa Margarita Water District	$1,353,000	251	-32%	$500
	Yorba Linda Water District	$956,000	298	-27%	$600
				Total	**$325,600****

* Values rounded to the nearest $100, actual reimbursement will be based on non-rounded values.

** Of this amount, $107,200 has already been reimbursed to Metropolitan.

INFORMATION ITEM
December 5, 2016

TO: **Planning & Operations Committee**
(Directors Dick, Finnegan)

FROM: **Robert Hunter, General Manager**

Staff Contact: Karl Seckel

SUBJECT: **OC Flood Control District Proposal on Encroachment Permits**

STAFF RECOMMENDATION

Staff recommends the Planning & Operations Committee receives and files the report.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

OVERVIEW

MWDOC continued coordinating with a number of our member agencies and conducted meetings and letter and email campaigns to the Board of Supervisors leading up to the November 22 Board of Supervisors meeting where the Encroachment Permit issue was to be considered. Staff was informed the previous night that the item would be continued by the Board of Sups apparently due to the concerns raised by a number of agencies.

Staff and Legal Counsel will continue working on this issue in anticipation of the January 10 Board of Supervisors meeting. Our position has not changed on the legal authority for OC Flood to impose such a charge on us or our agencies. OC Flood has indicated the current encroachment permit process “costs them money” they would like to recover, but they have not developed a reasonable and understandable nexus as yet.

Budgeted (Y/N): n/a	Budgeted amount:	Core __	Choice __
Action item amount:	Line item:		
Fiscal Impact (explain if unbudgeted):			

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Item No. 7

INFORMATION ITEM
December 5, 2016

TO: **Planning & Operations Committee**
(Directors Dick, Finnegan)

FROM: **Robert Hunter, General Manager**

Staff Contact: J. Berg, Director of Water Use Efficiency

SUBJECT: **Water Loss Control Year Two Technical Assistance Contract with Water Systems Optimization, Inc.**

STAFF RECOMMENDATION

Staff recommends the Planning & Operations Committee receive and file this report.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

SUMMARY

A recent addition to the Urban Water Management Planning Act, SB 1420, requires water agencies to complete and report a distribution system water balance in their Urban Water Management Plans. The water balance must utilize the American Water Works Association/International Water Association (AWWA/IWA) water balance methodology as defined in the AWWA M36 manual.

Additionally, during the last legislative cycle the Governor signed SB 555 (Wolk) into law requiring water agencies to submit a validated distribution system water balance to DWR annually beginning October 1, 2017. While "validated" has not yet been defined, the Department of Water Resources is indicating that a technical expert must be used to confirm the basis of all data used in the water balance and to characterize the quality of the data in the water balance.

Budgeted (Y/N): Yes	Budgeted amount: $33,000	Core _X_	Choice __
Action item amount: $33,000	Line item: 35-7040		
Fiscal Impact (explain if unbudgeted): Year-two of the technical assistance for the Water Loss Control Committee is budgeted at $33,000.			

DETAILED REPORT

In October 2015, to assist our member agencies to get ahead of the curve in responding to this legislation, the Board authorized the General Manager to enter into a professional services contract, to be renewed annually for up to three years, with Water Systems Optimization, Inc. to:

- Provide technical assistance to member agencies for water loss control, water balances, component analysis, and leak detection, and
- Establish an Orange County Water Loss Control Committee for member agencies as a MWDOC Core Program at an annual cost not to exceed $55,000.

At the September 2016 Planning & Operations Committee meeting staff provided the Board with a detailed progress report of year-one activities. Staff is now transitioning to year-two of this three-year effort by processing a professional services agreement with Water Systems Optimization, Inc., at a cost not to exceed $33,000, to assist with coordination of the OC Water Loss Control Committee by offering a combination of in-person and webinar meetings to enhance participation by member agencies. These meetings will include coordination of shared services for water loss control, case studies, technical learning sessions, networking among agencies, and problem solving discussions.

Status of Ongoing MWDOC Reliability and Engineering and Planning Projects

November 29, 2016

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
Baker Treatment Plant or Expansion of Baker Water Treatment Plant	IRWD, MNWD, SMWD, ETWD Trabuco CWD		On line date is Oct 2016	The plant is scheduled to go on line in December.
Doheny Desalination Project	South Coast Water District, Laguna Beach CWD			South Coast Water District is continuing to move the project forward and to look for potential partners and grant funding as they initiate the CEQA process. MWDOC is working on the decommissioning and removal of the test facilities at Doheny State Park. Plans, specifications, permitting and coordination with State Parks for the decommissioning work have been completed, plans and specifications have been prepared. Bids were received on November 28; a report and recommendation are included in the P&O Packet for Dec 5.
Poseidon Resources Ocean Desalination Project in Huntington Beach				OCWD is currently working on preparation of the CEQA documentation for the Poseidon Project. Work continues on the project integration into the water supplies for OC. Poseidon is continuing to work on permitting issues which are estimated to be completed by the end of 2017. A status report is included in the Dec 5 P&O packet.

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
Orange County Reliability Study				Staff is working on drafting a short Elected Officials briefing summary for review by the MWDOC Board. It is included in the Dec 5th P&O Packet.
OC-28 Flow Metering Issue with MET				MWDOC and OCWD are awaiting MET's analysis of the metering issue. A plan to re-test the meter under a controlled delivery is anticipated for early December to help evaluate the issues.
Service Connection CM-1 Cost Issues with MET				In September, Laguna Beach CWD began receiving groundwater from Newport Beach; this operation necessitated a shutdown of service connection CM-1 which is at the end of MET's Orange County Feeder. Shutting off the flows results in water getting stagnant and losing its chlorine residual making it undeliverable to customers. Since September, Kevin, Karl, and Keith have coordinated between MET, Newport Beach and Laguna Beach CWD for periodic "flushing" of the line prior to the water quality getting too bad for delivery. Discussions have been initiated with MET on level of the proposed costs and the responsibility for such. Based on the November 28 meeting, the costs of making changes at the CM-1 meter location could reach as high as $150k to $200k. Based ont the discussions, Laguna Beach CWD and Newport Beach are studying another alternative.
Other				

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
Meetings/Work				
				Karl Seckel, Heather Baez and John Lewis have continued to pursue opposition to the terms and conditions proposed by the OC Flood Control District for NEW encroachment permits for crossing of Flood Control property. Flood control is proposing a fee based on current market real estate values, a 7% return and 35 year agreements. This is one of a number of County Initiatives to raise revenue. On November 22, the items was continued by the Board of Supervisors to January 10, 2017. Staff will continue to work on this issue.
				Karl Seckel and Director Susan Hinman attended the South Coast Water District Board meeting to honor retiring director Richard Dietmeier.
				Karl Seckel and Director Brett Barbre attended the City of Buena Park Council meeting where Director Barbre provided a 10-minute update on the California WaterFix and the Colorado River Shortage negotiations. The Council was appreciative of the update.
				Charles Busslinger attended the Southern California Salinity Management Summit on November 17. The summit opened with a presentation about a disconnect between current water quality requirements regarding Total Dissolved Solids (TDS)/salts and conservations efforts; leading to a need to revisit water quality

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
				policies which have been around since the early 1970s. California's population is forecasted to increase by half a million residents per year for the next several decades. Demand increases have been met through conservation efforts, but conservation efforts have salt implications. The governor's 25% reduction in water use caused a larger increase in salts than the previous 15 years combined. The Southern California Salinity Coalition is working on a new study to look at conservation, cyclic effects of drought, and consumer behavior specifically: • Per capita consumption • Long term Baseline Trends in TDS • Update increment of use estimates • Cyclic fluctuations in Water Supply Quality • Drought related changes in TDS "We have to do more recycled water & conservation and it can't be illegal to do so." **Bureau of Reclamation's Colorado River Basin Salinity Control Programs** Historically 9 million tons of salt have passed Lees Ferry every year; of which 47% occurs naturally and 53% is human-caused. Multiple sources of salt are being addressed through programs by Bureau of Reclamation, US Department of Agriculture, and Bureau of Land Management. Efforts now control 1.3 million tons of salt annually with another 374,000 tons controlled by 2035. **Panel Discussion on Current and Emerging Technologies for**

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<tr><th>Description</th><th>Lead Agency</th><th>Status % Complete</th><th>Scheduled Completion Date</th><th>Comments</th></tr>
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Concentrate Management
Emerging technologies and advances in salinity management processes include Primary Desalters which are in the 50-85% overall recovery range, Near Zero Liquid Discharge in the 80% to 96% recovery range (also called High Recovery) , and Zero Liquid Discharge (ZLD) which is the 95% to 100% range. Hundreds of companies are working on research & development in this area, but the largest market for these efforts is the non-municipal market, particularly oil & gas. It was noted that Utilities can rarely afford the high costs associated with HR and ZLD. The main drivers for R&D are; increasing regulation of disposal options, the oil & gas market, other markets (such as water if the costs can be brought down far enough).

Also noted was the high cost of brine concentrate processes per MGD compared to Reverse Osmosis:
<table>
<tr><th></th><th>Reverse Osmosis</th><th>Brine Concentration</th></tr>
<tr><td>Capital Cost for 1 MGD</td><td>$2 million</td><td>$22 million</td></tr>
<tr><td>Power (kilowatt hour / 1,000 gal)</td><td>2.2</td><td>90</td></tr>
</table>
Edison Water Resources, an Edison International subsidiary, talked about their interest in developing Public Private Partnership opportunities in the Onsite Water Recycling and Brackish Groundwater Recovery areas.

The San Diego Regional Water Quality Control Board noted that TDS in recycled water has generally been increasing since 2012
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Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
				and that the State was looking toward getting more groundwater basin Salt & Nutrient Management Plans adopted. Greg Woodside of OCWD presented information on salinity management for the Orange County groundwater basin. The basin benefitted from 75,000 tons less salt going into the basin due to water from the Groundwater Replenishment System (compared to an equivalent amount of Colorado River Water).
				Charles Busslinger attended the Direct Potable Reuse Stakeholder Workshop #4 at West Basin Municipal Water District on November 18 **Overview of Indirect/Direct Potable Recycling** US Davis Professor Emeritus, Dr. George Tchobanoglous, began by discussing a paradigm shift for water: 'Wastewater is a renewable recoverable source of potable water, resources, and energy.' Potable reuse can be classified into three general categories: • **de facto Indirect Potable Reuse** (df-IPR) where downstream use of surface water as a drinking water source is subject to upstream wastewater discharges (Santa Ana River over the past several decades), • **Indirect Potable Reuse** (IPR) which was divided up into sub-categories of surface water augmentation (San Vicente Reservoir Water Purification Project in San Diego) and groundwater augmentation (OCWD Groundwater Replenishment System), • **Direct Potable Reuse** (DPR) which was sub-divided into:

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
				Direct Raw Water Potable Reuse (little retention time, but additional polishing and commingling with other sources, followed by treatment) and Direct Potable Reuse (finished water delivered directly into a water supply distribution system with or without blending - sometimes referred to as 'flange-to-flange'). IPR becomes DPR when the reservoir (or environmental buffer) becomes too small to provide the required retention time specified by the State. Notable Comments: • De facto IPR is largely unregulated • Climate Change, will make storms infrequent & intense making stormwater capture very difficult. • We are now running out of wastewater in places that recycle it • Greywater systems cannot pay for themselves • Unintended consequences o due to conservation efforts, corrosion in downstream reinforced concrete pipes (as H_2S flows downstream with surface tension) has gone up 8-fold, causing some agencies to move to system flushing from fire hydrants eliminating much of the water savings. o Los Angeles has a distributed wastewater treatment system which is a fantastic unintended consequence for distributed IPR infrastructure that will reduce conveyance costs. Dr. Tchobanoglous offered his personal opinions: • Single use of water was unsustainable • Purple pipe sends the wrong message (i.e. recycled water is

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
				not fit for consumption, and it is expensive). He advocates spending more in treatment and having one conveyance system. • Tacking on Advanced Treatment systems on any Activated Sludge Treatment facility is not right. The system has to be fully designed to produce recycled water, not just tacked on. **Overview of Technology and Monitoring** Dr. Rhodes Trussell discussed pathogens and chemical contaminants in recycled water. He pointed out that Reverse Osmosis is by far the most important treatment for chemical contaminants, but that source control was needed for ethanol, Boron, and NDMA. He pointed out that OCWD's GWRS system experienced Total Organic Carbon spikes 9 times between 2007 and 2012 and that recycling systems must provide time to respond to these spike events. **Regulatory Status of Direct Potable Reuse** Cindy Forbes, Deputy Director of the Division of Drinking Water, was very forceful in her comments that DPR will go forward very slowly. The General Managers of West Basin MWD, OCWD, and Eastern MWD all thought DPR would happen in about 5 years, but Cindy insisted that the State was going to look for years of experience from the San Vicente Reservoir Project (scheduled to begin in 2022) before the State allows DPR to expand further. **Overview of Recent Public Acceptance Polling**

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
				David Metz of FM3 talked about public focus group research findings on DPR: • Over 75% of voters do not know where their water comes from. • Only 21% of voters drink unfiltered tap water • Few focus group participants could cite major ways the drought had impacted them • For solutions, participants listed desalination more often than recycled water • Focus group participants were willing to pay 13% more on each water bill to secure a reliable supply • 73% were at least somewhat familiar with recycled water • Of those familiar with recycled water, 78% support its use • Although initially opposed to DPR, voters quickly became more comfortable with DPR after being provided a small amount of safety information (additional information did not improve acceptance) • Messaging that stood out as most effective for the focus group: o Safety (i.e. Purification). The assertion that the process produces water purer than bottled water. That there is a 3 stage treatment process. Directly addressing lingering concerns about chemicals also stood out. o Adoption (i.e. other communities, particularly Orange County, is already using it). • Public Health message is the core to DPR

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments

Status of Ongoing WEROC Projects
November 2016

Description	Comments
Coordination with Member Agencies	Kelly Hubbard arranged to provide 4 sessions of the National Incident Management System (NIMS), Standardized Emergency Management System SEMS), and Incident Command System (ICS) combined training on November 15 and 30th at Irvine Ranch Water District (IRWD). Besides providing homeland security grant required training to approx. 100 water utility staff, Kelly trained 2 individuals to also teach the class. Sunny Lee (IRWD) and Thomas Marcoux (South Coast Water District) both observed the morning sessions of each day and then provided the afternoon sessions on each day. Having additional water utility staff trained in providing this training should assist WEROC and its member agencies in meeting this grant requirement when new staff are hired.
Coordination with the County of Orange	Kelly attended the October Orange County Emergency Management Organization (OCEMO) meeting. The primary topic was a presentation on the Christchurch, New Zealand earthquake from 2011. One of the major lessons learned was how to handle the loss of wastewater systems for months following the earthquake. Fun fact, Christchurch held a "porta-potty decorating" contest to rally the community around the plan. Kelly will be working on incorporating some of these lessons learned into WEROC planning. Kelly attended the Urban Area Security Initiative (UASI) meeting in Anaheim. The group reviewed grant proposals for 2017 grant funding. Kelly presented a new grant proposal for $1,668.00 for equipment to conduct a multi-agency water quality field exercise that would include multiple water utilities, law enforcement, OC Fire Hazardous Materials (HAZMAT) Response Teams and the WEROC EOC. The project was approved and will be funded with unspent available grant funds from current open grant years. Additionally, Kelly will meet with the OC fire agencies Training Committee in January to propose the project and work on timelines. Kelly attended the OC Operational Area Executive Board Meeting on November 9th in Santa

Description	Comments
	Ana as the voting representative of ISDOC. Of interest to the water districts was a new county-wide policy for "Rain Event Homeless Notification Procedure." Since a large homeless population has taken residence in the Santa Ana River and other water ways throughout the county, the procedure includes a threshold to notify the homeless population of flood risk due to a potential rain event. Since, many of the WEROC member agencies work within these channels and often come across homeless populations during their daily work, Kelly provided the water utilities this information and some available resources to keep their message on point with the County. Additionally, it was reported that most of the OC cities conducted the first live test of the new AlertOC reverse notification system on September 29th. The test was very successful with many lessons learned that will enhance the system for when the water utilities may need the system for notification.
Coordination with Outside Agencies	Kelly attended an "iREV Workshop for Fleet and Emergency Managers" hosted by the US Department of Energy's Clean Cities Program. iREV stands for Initiative for Resiliency in Energy through Vehicles. The workshop's focus was on the use of alternative fuel vehicles during a disaster. The group's primary research had been conducted on the East Coast to date and had shown significant benefits to a diverse fleet with different types of fuel/energy sources during disaster response. This meeting and several throughout the US were intended to expand the group's research of fuel diverse fleets, disaster response, and planning/response barriers with various types of vehicles. The information provided will be incorporated into a national report of lessons learned and focus future research into policy and response needs for alternative fuels. This is very important research as WEROC Member Agencies continue to diversify their fleets and in many cases as required to purchase alternative fuel vehicles due to AQMD requirements. The California National Guard in coordination with the Orange County Emergency Management Bureau, Orange County Fire Authority, Orange County Sheriff's Department and the City of Irvine conducted the Vigilant Guard Exercise on November 17th. The Vigilant Guard Exercise was a Point of Distribution (POD) exercise that was conducted at the Great Park based on a large earthquake scenario. It involved over 100 National Guardsmen (50 of them drove rental cars through the POD to test the system), 100 Community Emergency Response Team (CERT)

Description	Comments
	volunteers, dozens of staff of the involved agencies, heavy equipment, pallets of food and water, chinook helicopter, additional air support, and the Incident Command Vehicles of 3 agencies. Kelly was able to attend as an observer. Once an After-Action Report is made available Kelly will utilize those lessons learned to update the current OC water and commodity POD plans and planning process.
WEROC Emergency Operations Center (EOC) Readiness	Staff participated in the November MARS and Operational Area Radio Tests successfully. The WEROC radio test was conducted from MWDOC's Administration Office. Due to some previously noted interference issues with the WEROC radio system, Kelly asked two radio technicians to listen to the test from different locations and provide some input on possible solutions. They were able to identify that one issue is the WEROC radio at the MWDOC Administrative Offices; this hopefully will be resolved when the WEROC staff complete their move into their new assigned office. Additionally, it was noted that there was some interference being generated at the Pleasants Peak repeater. Kelly has requested that MET Radio Staff check the repeater at that site. WEROC has an informal agreement with MET Communications Staff to provide service to this site while they are onsite to ensure the two radio systems are working and not interfering with each other.

Status of Water Use Efficiency Projects

December 2016

Description	Lead Agency	Status % Complete	Scheduled Completion or Renewal Date	Comments
Smart Timer Rebate Program	MWDSC	Ongoing	Ongoing	For October 2016, 62 residential and 15 commercial smart timers were installed in Orange County. For program water savings and implementation information, see MWDOC Water Use Efficiency Program Savings and Implementation Report.
Rotating Nozzles Rebate Program	MWDSC	Ongoing	Ongoing	For October 2016, 20, 1790 rotating nozzles were installed in Orange County. For program savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.
Water Smart Landscape Program	MWDOC	On-going	On hold pending evaluation and RFP process	This Program is currently on hold while a Process and Impact Evaluation is conducted. Once the Evaluation is complete, the results will be used to make refinements to the Program. For program savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.
SoCal Water$mart Residential Indoor Rebate Program	MWDSC	On-going	On-going	In October 2016, 195 high efficiency clothes washers, 1 high efficiency toilet, and 27 premium high efficiency toilets were installed through this program. For program savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.

SoCal Water$mart Commercial Rebate Program	MWDSC	On-going	On-going	In October 2016, 2 zero water urinals and 706 premium high efficiency toilets were installed through this program. For program savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.
Industrial Process Water Use Reduction Program	MWDOC	95%	September 2016	A total of 41 Focused Surveys and 19 Comprehensive Surveys have been completed or are in progress. To date, 15 companies have signed Incentive Agreements. Updated discharger lists have been obtained, and outreach is continuing to sites with feasible water savings potential. As a result of this program, 359 AFY of water savings is being achieved.
Turf Removal Program	MWDOC	On-going	On-going	In October 2016, 59 rebates were paid, representing $179,854.83 in rebates paid this month in Orange County. To date, the Turf Removal Program has removed approximately 20.4 million square feet of turf. For program savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.
California Sprinkler Adjustment Notification System – Base Irrigation Schedule Calculator	MWDOC	On-going	On-going	The California Sprinkler Adjustment Notification System (CSANS) will e-mail or "push" an irrigation index to assist property owners with making global irrigation scheduling adjustments. Participants voluntarily register to receive this e-mail at www.csans.net and can unsubscribe at any time. Through a grant from the Department of Water Resources (DWR) to the California Urban Water Conservation Council, the East Bay Municipal Utility District and Bay Area Water Supply and Conservation Agency are now enrolled in CSANS. Once this has been completed, staff will be pursuing DWR for administration of CSANS state-wide. The following member agencies have recently requested access to the CSANS to administer their own messages to their

California Sprinkler Adjustment Notification System – Base Irrigation Schedule Calculator (cont.)				customers: City of Brea, Mesa Water District, City of San Juan Capistrano, and Laguna Beach County WD. MWDOC will work with these agencies over the next month to transition administration of CSANS to these agencies. All other agencies are currently receiving educational messages administered by MWDOC.
Spray to Drip Conversion Program	MWDOC	75%	October 2017	This is a pilot program designed to test the efficacy of replacing conventional spray heads in shrub beds with low-volume, low-precipitation drip technology. Through a rebate program format, residential and commercial sites will be encouraged to convert their existing spray nozzles to drip. To date, 193 residential sites and 52 commercial sites have completed spray to drip conversion projects.
MWDOC Conservation Meeting	MWDOC	On-going	Monthly	This month's meeting was held on November 3, 2016 at MWDOC. The next meeting will be on December 1, 2016 at the City of Newport Beach.
Metropolitan Conservation Meeting	MWDSC	On-going	Monthly	This month's meeting was held on November 17, 2016. The next meeting will be December 15, 2016 at Metropolitan.

Orange County

Water Use Efficiency Programs Savings
and
Implementation Report

Retrofits and Acre-Feet Water Savings for Program Activity

Program	Program Start Date	Retrofits Installed in	Month Indicated		Current Fiscal Year		Overall Program		
			Interventions	Water Savings	Interventions	Water Savings	Interventions	Annual Water Savings[4]	Cumulative Water Savings[4]
High Efficiency Clothes Washer Program	2001	October-16	195	0.56	1,346	10.06	110,129	3,799	23,745
Smart Timer Program - Irrigation Timers	2004	October-16	77	1.09	865	184.00	18,347	6,974	38,046
Rotating Nozzles Rebate Program	2007	October-16	1,790	7.16	24,599	98.35	545,957	2,690	11,122
SoCal Water$mart Commercial Plumbing Fixture Rebate Program	2002	October-16	708	2.20	7,497	50.46	77,779	3,518	39,190
Water Smart Landscape Program [1]	1997	November-15	12,677	904.62	12,677	3,615.21	12,677	10,621	72,668
Industrial Process Water Use Reduction Program	2006	October-16	0	0.00	0	0.00	15	359	1,881
Turf Removal Program[3]	2010	October-16	88,465	1.03	380,905	780	20,407,574	2,858	7,189
High Efficiency Toilet (HET) Program	2005	October-16	28	0.10	655	27.86	59,240	2,190	14,139
Home Water Certification Program	2013	November-15	0	0.000	53	0.251	312	7.339	15.266
Synthetic Turf Rebate Program	2007						685,438	96	469
Ultra-Low-Flush-Toilet Programs [2]	1992						363,926	13,452	162,561
Home Water Surveys [2]	1995						11,867	160	1,708
Showerhead Replacements [2]	1991						270,604	1,667	19,083
Total Water Savings All Programs				**917**	**428,597**	**4,766**	**22,563,865**	**48,391**	**391,816**

(1) Water Smart Landscape Program participation is based on the number of water meters receiving monthly Irrigation Performance Reports.
(2) Cumulative Water Savings Program To Date totals are from a previous Water Use Efficiency Program Effort.
(3) Turf Removal Interventions are listed as square feet.
(4) Cumulative & annual water savings represents both active program savings and passive savings that continues to be realized due to plumbing code changes over time.

HIGH EFFICIENCY CLOTHES WASHERS INSTALLED BY AGENCY

through MWDOC and Local Agency Conservation Programs

Agency	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY13/14	FY14/15	FY15/16	FY16/17	Total	Current FY Water Savings Ac/Ft (Cumulative)	Cumulative Water Savings across all Fiscal Years	15 yr. Lifecycle Savings Ac/Ft
Brea	156	42	186	144	93	115	114	76	12	1,822	0.10	396.73	943
Buena Park	146	59	230	145	105	106	91	76	13	1,477	0.09	306.31	764
East Orange CWD RZ	17	3	23	10	10	8	8	8	-	189	0.00	43.34	98
El Toro WD	130	32	162	112	134	121	111	65	12	1,486	0.09	309.60	769
Fountain Valley	243	72	289	158	115	102	110	76	27	2,362	0.22	531.60	1,222
Garden Grove	332	101	481	236	190	162	165	251	55	3,491	0.31	743.99	1,806
Golden State WC	447	168	583	485	265	283	359	260	56	4,933	0.43	1,050.88	2,552
Huntington Beach	751	211	963	582	334	295	319	225	49	8,115	0.37	1,865.04	4,199
Irvine Ranch WD	1,844	1,394	2,621	2,170	1,763	1,664	1,882	1,521	448	23,741	3.47	4,868.38	12,284
La Habra	83	22	179	128	82	114	87	66	13	1,287	0.09	267.75	666
La Palma	51	25	76	46	34	25	34	29	4	452	0.02	92.61	234
Laguna Beach CWD	77	27	96	57	38	37	39	32	2	915	0.01	204.32	473
Mesa Water	246	73	232	176	114	86	89	113	33	2,471	0.22	567.44	1,279
Moulton Niguel WD	742	250	1,127	679	442	421	790	688	209	9,555	1.56	1,961.28	4,944
Newport Beach	259	57	197	142	116	92	95	66	21	2,584	0.15	608.57	1,337
Orange	403	111	349	262	218	163	160	124	24	3,842	0.18	886.01	1,988
Orange Park Acres	-	-	-	-	-	-	-	-		12	0.00	3.42	6
San Juan Capistrano	127	43	190	110	76	73	92	63	15	1,441	0.07	310.67	746
San Clemente	278	63	333	206	140	94	141	75	20	2,570	0.16	563.41	1,330
Santa Margarita WD	740	257	1,105	679	553	662	792	466	127	9,276	0.96	1,922.70	4,800
Seal Beach	57	7	81	51	31	29	38	23	-	593	0.00	129.29	307
Serrano WD	23	7	21	20	13	10	26	8	4	350	0.04	80.93	181
South Coast WD	148	43	183	112	89	79	68	43	15	1,555	0.11	338.00	805
Trabuco Canyon WD	62	28	82	62	30	45	47	34	7	777	0.05	167.44	402
Tustin	144	45	174	97	78	59	80	66	20	1,588	0.16	357.64	822
Westminster	233	74	329	208	121	82	109	149	43	2,545	0.26	552.24	1,317
Yorba Linda	367	117	394	273	181	167	156	123	21	3,717	0.16	850.52	1,923
MWDOC Totals	8,106	3,331	10,686	7,350	5,365	5,094	6,002	4,726	1,250	93,146	9.28	19,980.12	17,995
Anaheim	781	860	910	477	331	285	295	266	49	10,518	0.41	2,372.56	5,442
Fullerton	330	69	397	270	200	186	211	165	28	3,616	0.21	725.57	1,871
Santa Ana	257	87	355	190	163	131	132	259	19	2,849	0.16	666.96	1,474
Non-MWDOC Totals	1,368	1,016	1,662	937	694	602	638	690	96	16,983	0.78	3,765.09	3,281
Orange County Totals	9,474	4,347	12,348	8,287	6,059	5,696	6,640	5,416	1,346	110,129	10.06	23,745.22	21,276

SMART TIMERS INSTALLED BY AGENCY

through MWDOC and Local Agency Conservation Programs

Agency	FY 09/10		FY 10/11		FY 11/12		FY 12/13		FY 13/14		FY 14/15		FY 15/16		FY16/17		Total Program		Cumulative Water Savings across all Fiscal Years
	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm.	
Brea	0	0	2	0	8	0	9	8	4	0	43	6	20	4	12	0	112	76	457.93
Buena Park	0	0	0	0	4	19	3	0	0	0	4	10	7	4	2	5	23	39	116.07
East Orange CWD RZ	0	0	1	0	5	0	2	0	0	0	2	0	1	0	1	0	15	0	6.68
El Toro WD	2	18	5	5	26	2	7	2	11	0	8	9	9	17	9	3	91	350	2,227.49
Fountain Valley	0	6	2	2	8	2	3	2	4	0	7	10	13	1	13	0	71	28	138.30
Garden Grove	6	0	5	4	7	0	5	2	9	0	10	14	13	11	6	0	79	38	141.53
Golden State WC	9	22	7	4	13	3	9	49	9	25	39	12	35	16	18	34	187	189	668.25
Huntington Beach	6	27	6	36	15	4	18	33	20	35	19	2	42	12	34	4	218	178	804.76
Irvine Ranch WD	14	145	28	153	267	71	414	135	71	59	67	310	239	207	101	51	1,526	1,917	9,434.44
La Habra	0	21	0	0	3	0	4	7	2	0	4	7	3	1	2	7	26	44	171.30
La Palma	0	0	0	0	1	0	1	0	2	0	2	0	3	2	0	0	9	2	4.12
Laguna Beach CWD	2	14	4	1	109	2	76	2	71	0	86	0	86	1	3	0	473	20	197.45
Mesa Water	13	7	7	22	21	0	10	2	15	2	17	28	36	12	10	0	179	113	580.50
Moulton Niguel WD	17	162	36	60	179	31	51	74	40	45	46	95	163	100	84	33	762	705	2,921.55
Newport Beach	7	58	6	0	275	12	242	26	168	75	11	9	28	43	15	10	1,023	407	2,289.94
Orange	2	13	5	8	25	0	20	24	13	9	18	31	51	13	20	1	236	156	794.78
San Juan Capistrano	7	49	13	1	103	2	14	18	6	11	6	19	20	8	8	0	208	117	541.85
San Clemente	13	209	46	11	212	17	26	7	28	2	28	24	26	3	12	1	1,026	362	2,345.83
Santa Margarita WD	10	152	61	53	262	7	53	171	64	93	53	321	189	136	181	53	1,009	1,204	4,520.84
Santiago CWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Seal Beach	0	1	0	0	0	3	1	0	1	36	1	12	2	2,446	2	4	7	2,502	3,435.01
Serrano WD	11	0	4	0	3	0	1	0	0	0	4	0	11	2	2	0	36	2	10.77
South Coast WD	3	10	13	3	78	10	13	16	8	4	104	73	9	11	1	0	272	212	991.77
Trabuco Canyon WD	2	0	2	10	12	0	6	0	2	0	6	1	16	50	5	0	95	154	837.43
Tustin	10	14	10	0	11	0	8	4	9	1	18	14	33	8	12	1	122	58	262.83
Westminster	3	0	1	1	2	0	1	1	2	0	13	17	7	1	6	0	54	32	155.77
Yorba Linda	5	21	25	0	22	0	20	0	12	5	32	2	61	27	26	1	292	113	638.35
MWDOC Totals	142	949	289	374	1,671	185	1,017	583	571	402	648	1,026	1,123	3,136	585	208	8,151	9,018	34,695.52
Anaheim	5	46	12	11	23	60	19	10	9	26	7	52	30	34	33	10	190	457	2,284.71
Fullerton	2	39	9	33	22	51	9	29	8	0	40	26	32	12	17	6	163	198	788.07
Santa Ana	1	8	8	0	6	5	8	19	7	8	9	27	22	26	4	2	71	99	277.79
Non-MWDOC Totals	8	93	29	44	51	116	36	58	24	34	56	105	84	72	54	18	424	754	3,350.57
Orange County Totals	150	1,042	318	418	1,722	301	1,053	641	595	436	704	1,131	1,207	3,208	639	226	8,575	9,772	38,046

ROTATING NOZZLES INSTALLED BY AGENCY
through MWDOC and Local Agency Conservation Programs

Agency	FY 11/12			FY 12/13			FY 13/14			FY 14/15			FY 15/16			FY 16/17			Total Program			Cumulative Water Savings across all Fiscal Years
	Small		Large	Small		Large	Small		Large	Small		Large	Small		Large	Small		Large	Small		Large	
	Res	Comm.	Comm.	Res	Comm.	Comm.	Res	Comm.	Comm.	Res	Comm.	Comm.	Res	Comm.	Comm.	Res	Comm.	Comm.	Res	Comm.	Comm.	
Brea	130	0	0	65	120	0	84	0	0	157	45	0	74	2,484	0	0	0	0	572	2,749	0	32.68
Buena Park	32	0	0	65	0	0	53	0	0	248	0	0	45	98	0	0	0	0	509	173	2,535	453.42
East Orange	340	0	0	55	0	0	30	0	0	221	0	0	0	0	0	0	0	0	751	0	0	10.83
El Toro	357	76	0	23	6,281	0	56	3,288	0	1,741	28,714	0	730	4,457	0	55	242	0	3,369	46,222	890	820.63
Fountain Valley	108	0	0	35	0	0	0	0	0	107	0	0	222	0	0	0	0	0	710	0	0	10.22
Garden Grove	119	0	0	95	0	0	80	0	0	88	50	0	110	0	0	55	0	0	933	201	0	19.33
Golden State	294	0	0	257	2,595	0	192	0	0	583	1,741	0	1,088	0	0	176	4,701	0	3,417	10,009	0	152.29
Huntington Beach	458	0	0	270	0	0	120	0	0	798	1,419	0	1,345	2,836	0	149	1,465	0	3,797	10,629	2,681	790.51
Irvine Ranch	1,715	4,255	0	25,018	1,014	0	11,010	4,257	0	1,421	632	0	1,989	5,047	0	287	2,953	0	47,089	88,003	2,004	2,893.80
La Habra	33	90	0	0	0	0	15	0	0	109	338	0	300	0	0	0	0	0	481	1,236	900	221.65
La Palma	0	0	0	0	0	0	0	0	0	0	0	0	46	505	0	0	0	0	56	505	0	4.65
Laguna Beach	763	0	0	3,596	0	0	2,948	878	0	2,879	1,971	0	1,390	0	0	0	0	0	12,139	2,896	0	224.61
Mesa Water	297	277	0	270	0	0	361	0	0	229	0	0	166	0	0	70	0	0	1,987	385	343	121.99
Moulton Niguel	1,225	0	0	512	1,385	0	361	227	0	1,596	4,587	0	5,492	1,441	0	76	5,609	0	11,797	20,252	2,945	1,016.16
Newport Beach	640	3,273	0	25,365	50	0	19,349	6,835	0	460	3,857	0	348	670	0	0	0	0	46,678	21,413	0	1,178.02
Orange	343	0	0	264	0	0	245	120	0	304	668	0	631	91	0	0	0	0	3,170	1,072	0	69.27
San Clemente	4,266	117	1,343	631	172	0	415	5,074	0	326	0	0	426	0	0	0	0	0	9,989	7,538	1,343	415.75
San Juan Capistrano	949	0	0	684	30	0	370	0	0	495	737	0	310	593	0	75	0	0	5,495	8,729	0	256.54
Santa Margarita	4,817	0	0	983	0	0	389	0	0	1,207	1,513	0	1,820	837	0	15	0	0	16,165	6,921	611	450.33
Seal Beach	0	0	0	0	0	0	0	0	0	40	5,261	0	0	2,300	0	0	0	0	155	7,852	0	90.55
Serrano	58	0	0	190	0	0	105	0	0	377	0	0	695	0	0	0	0	0	3,405	0	0	55.23
South Coast	688	359	0	435	0	0	70	0	0	4,993	13,717	0	1,421	2,889	0	16	0	0	8,130	18,870	0	323.31
Trabuco Canyon	379	0	0	34	0	0	0	0	0	56	0	0	130	0	0	0	0	0	2,086	791	0	53.52
Tustin	476	1,013	0	378	0	0	329	0	0	408	0	0	317	386	0	65	0	0	3,371	1,399	0	69.73
Westminster	26	0	0	15	0	0	0	0	0	54	0	0	73	0	0	105	0	0	464	0	0	6.53
Yorba Linda	559	0	0	730	0	0	40	990	0	921	0	0	1,715	0	0	213	0	0	6,081	4,359	500	278.38
MWDOC Totals	19,072	9,460	1,343	59,970	11,647	0	36,622	21,669	0	19,818	65,250	0	20,883	24,634	0	1,357	14,970	0	192,796	262,204	14,752	10,019.91
Anaheim	742	38,554	0	459	813	0	338	0	0	498	712	0	794	5,221	0	147	3,953	0	4,020	49,799	105	630.16
Fullerton	409	0	0	119	0	0	107	0	0	684	1,196	0	521	7,015	0	32	3,034	0	2,877	11,309	1,484	386.27
Santa Ana	22	65	0	99	0	0	86	2,533	0	310	0	0	0	1,420	0	0	1,106	0	859	5,752	0	85.35
Non-MWDOC Totals	1,173	38,619	0	677	813	0	531	2,533	0	1,492	1,908	0	1,315	13,656	0	179	8,093	0	7,756	66,860	1,589	1,101.78
Orange County Totals	20,245	48,079	1,343	60,647	12,460	0	37,153	24,202	0	21,310	67,158	0	22,198	38,290	0	1,536	23,063	0	200,552	329,064	16,341	11,121.69

SOCAL WATER$MART COMMERCIAL PLUMBING FIXTURES REBATE PROGRAM[1]
INSTALLED BY AGENCY
through MWDOC and Local Agency Conservation Programs

Agency	FY 07/08	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY 16/17	Totals	Cumulative Water Savings across all Fiscal Years
Brea	27	113	24	4	1	234	0	10	91	0	**631**	**394**
Buena Park	153	432	122	379	290	5	23	56	591	0	**2,356**	**1,070**
East Orange CWD RZ	0	0	0	0	0	0	0	0	0	0	**0**	**0**
El Toro WD	0	92	143	1	137	0	212	6	268	25	**1,052**	**586**
Fountain Valley	17	35	0	2	314	0	0	1	249	0	**872**	**584**
Garden Grove	5	298	130	22	0	4	1	167	676	310	**2,351**	**1,480**
Golden State WC	46	414	55	68	135	0	1	0	1,008	53	**2,865**	**1,896**
Huntington Beach	48	104	126	96	156	104	144	7	783	0	**2,313**	**1,541**
Irvine Ranch WD	121	789	2,708	1,002	646	1,090	451	725	11,100	3,431	**25,339**	**7,274**
La Habra	191	75	53	4	0	0	0	0	340	0	**883**	**544**
La Palma	0	140	21	0	0	0	0	0	0	446	**612**	**100**
Laguna Beach CWD	20	137	189	0	0	0	27	0	0	0	**446**	**312**
Mesa Water	141	543	219	669	41	6	0	79	661	763	**4,235**	**2,068**
Moulton Niguel WD	9	69	151	6	0	0	0	3	413	0	**996**	**811**
Newport Beach	98	27	245	425	35	0	0	566	0	0	**1,834**	**1,279**
Orange	18	374	67	1	73	1	271	81	275	1,535	**3,714**	**1,769**
San Juan Capistrano	2	1	1	0	0	0	14	0	0	0	**260**	**397**
San Clemente	2	18	43	0	19	0	0	1	0	0	**432**	**381**
Santa Margarita WD	6	23	11	0	0	0	0	2	90	0	**207**	**206**
Santiago CWD	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Seal Beach	1	2	124	0	0	0	0	0	0	184	**538**	**427**
Serrano WD	0	0	0	0	0	0	0	0	0	0	**0**	**0**
South Coast WD	9	114	56	422	84	148	0	382	0	0	**1,320**	**509**
Trabuco Canyon WD	0	4	0	0	0	0	0	0	0	0	**11**	**15**
Tustin	115	145	25	230	0	0	0	75	358	0	**1,190**	**814**
Westminster	40	161	16	63	35	1	28	0	146	79	**1,040**	**995**
Yorba Linda	10	24	8	30	0	1	0	0	226	0	**511**	**555**
MWDOC Totals	**1,079**	**4,134**	**4,537**	**3,424**	**1,966**	**1,594**	**1,172**	**2,161**	**17,275**	**6,826**	**56,008**	**26,007**
Anaheim	766	3,298	582	64	48	165	342	463	3,072	39	**13,483**	**6,897**
Fullerton	133	579	29	4	0	94	0	178	476	402	**2,559**	**1,619**
Santa Ana	493	815	728	39	12	16	17	5	1,293	230	**5,729**	**4,667**
Non-MWDOC Totals	**1,392**	**4,692**	**1,339**	**107**	**60**	**275**	**359**	**646**	**4,841**	**671**	**21,771**	**13,183**
Orange County Totals	**2,471**	**8,826**	**5,876**	**3,531**	**2,026**	**1,869**	**1,531**	**2,807**	**22,116**	**7,497**	**77,779**	**39,190**

[1] Retrofit devices include ULF Toilets and Urinals, High Efficiency Toilets and Urinals, Multi-Family and Multi-Family 4-Liter HETs, Zero Water Urinals, High Efficiency Clothes Washers, Cooling Tower Conductivity Controllers, Ph Cooling Tower Conductivity Controllers, Flush Valve Retrofit Kits, Pre-rinse Spray heads, Hospital X-Ray Processor Recirculating Systems, Steam Sterilizers, Food Steamers, Water Pressurized Brooms, Laminar Flow Restrictors, and Ice Making Machines.

Water Smart Landscape Program

Total Number of Meters in Program by Agency

Agency	FY 07-08	FY 08-09	FY 09-10	FY 10-11	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16	FY 16-17	Overall Water Savings To Date (AF)
Brea	0	0	0	0	22	22	22	22	22	0	64.37
Buena Park	0	0	17	103	101	101	101	101	101	0	462.69
East Orange CWD RZ	0	0	0	0	0	0	0	0	0	0	0.00
El Toro WD	352	384	371	820	810	812	812	812	812	0	4,856.93
Fountain Valley	0	0	0	0	0	0	0	0	0	0	0.00
Garden Grove	0	0	0	0	0	0	0	0	0	0	0.00
Golden State WC	14	34	32	34	32	32	32	32	32	0	200.59
Huntington Beach	0	0	31	33	31	31	31	31	31	0	148.43
Irvine Ranch WD	708	1,008	6,297	6,347	6,368	6,795	6,797	6,769	6,780	0	38,304.89
Laguna Beach CWD	0	57	141	143	141	124	124	124	124	0	733.07
La Habra	0	23	22	24	22	22	22	22	22	0	136.72
La Palma	0	0	0	0	0	0	0	0	0	0	0.00
Mesa Water	165	286	285	288	450	504	511	514	515	0	2,943.57
Moulton Niguel WD	180	473	571	595	643	640	675	673	661	0	4,120.71
Newport Beach	58	142	171	191	226	262	300	300	300	0	1,501.19
Orange	0	0	0	0	0	0	0	0	0	0	0.00
San Clemente	227	233	247	271	269	269	299	407	459	0	2,368.77
San Juan Capistrano	0	0	0	0	0	0	0	0	0	0	0.00
Santa Margarita WD	945	1,571	1,666	1,746	1,962	1,956	2,274	2,386	2,386	0	14,178.10
Seal Beach	0	0	0	0	0	0	0	0	0	0	0.00
Serrano WD	0	0	0	0	0	0	0	0	0	0	0.00
South Coast WD	62	117	108	110	118	118	118	164	164	0	829.91
Trabuco Canyon WD	12	49	48	62	60	60	60	60	60	0	350.52
Tustin	0	0	0	0	0	0	0	0	0	0	0.00
Westminster	10	18	18	20	18	18	18	18	18	0	116.46
Yorba Linda WD	0	0	0	0	0	0	0	0	0	0	0.00
MWDOC Totals	**2,733**	**4,395**	**10,025**	**10,787**	**11,273**	**11,766**	**12,196**	**12,435**	**12,487**	**0**	**71,316.9**
Anaheim	0	0	142	146	144	190	190	190	190	0	1,351.53
Fullerton	0	0	0	0	0	0	0	0	0	0	0.00
Santa Ana	0	0	0	0	0	0	0	0	0	0	0.00
Non-MWDOC Totals	**0**	**0**	**142**	**146**	**144**	**190**	**190**	**190**	**190**	**0**	**1,351.53**
Orange Co. Totals	**2,733**	**4,395**	**10,167**	**10,933**	**11,417**	**11,956**	**12,386**	**12,625**	**12,677**	**0**	**72,668.45**

INDUSTRIAL PROCESS WATER USE REDUCTION PROGRAM

Number of Process Changes by Agency

Agency	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY 16/17	Overall Program Interventions	Annual Water Savings[1]	Cumulative Water Savings across all Fiscal Years[1]
Brea	0	0	0	0	0	0	0	0	0	0	0
Buena Park	0	0	0	0	0	0	0	0	1	54	423
East Orange	0	0	0	0	0	0	0	0	0	0	0
El Toro	0	0	0	0	0	0	0	0	0	0	0
Fountain Valley	0	0	0	0	0	0	0	0	0	0	0
Garden Grove	0	0	0	0	0	0	0	0	0	0	0
Golden State	0	0	0	0	0	0	0	0	1	3	25
Huntington Beach	0	0	0	2	0	1	0	0	3	127	372
Irvine Ranch	2	1	1	1	1	0	0	0	6	98	472
La Habra	0	0	0	0	0	0	0	0	0	0	0
La Palma	0	0	0	0	0	0	0	0	0	0	0
Laguna Beach	0	0	0	0	0	0	0	0	0	0	0
Mesa Water	0	0	0	0	0	0	0	0	0	0	0
Moulton Niguel	0	0	0	0	0	0	0	0	0	0	0
Newport Beach	0	0	0	0	0	1	0	0	1	21	41
Orange	0	0	0	0	0	0	1	0	2	45	379
San Juan Capistrano	0	0	0	0	0	0	0	0	0	0	0
San Clemente	0	0	0	0	0	0	0	0	0	0	0
Santa Margarita	0	0	0	0	0	0	0	0	0	0	0
Seal Beach	0	0	0	0	0	0	0	0	0	0	0
Serrano	0	0	0	0	0	0	0	0	0	0	0
South Coast	0	0	0	0	0	0	0	0	0	0	0
Trabuco Canyon	0	0	0	0	0	0	0	0	0	0	0
Tustin	0	0	0	0	0	0	0	0	0	0	0
Westminster	0	0	0	0	0	0	0	0	0	0	0
Yorba Linda	0	0	0	0	0	0	0	0	0	0	0
MWDOC Totals	2	1	1	3	1	2	1	0	14	348	1712
Anaheim	0	0	0	0	0	0	0	0	0	0	0
Fullerton	0	0	0	0	0	0	0	0	0	0	0
Santa Ana	0	0	0	0	0	0	1	0	1	11	169
OC Totals	2	1	1	3	1	2	2	0	15	359	1881

[1] Acre feet of savings determined during a one year monitoring period.

If monitoring data is not available, the savings estimated in agreement is used.

TURF REMOVAL BY AGENCY[1]

through MWDOC and Local Agency Conservation Programs

Agency	FY 11/12		FY 12/13		FY 13/14		FY 14/15		FY 15/16		FY 16/17		Total Program		Cumulative Water Savings across all Fiscal Years
	Res	Comm.	Res	Comm.	Res	Comm.	Res	Comm.	Res	Comm.	Res	Comm.	Res	Comm.	
Brea	3,397	9,466	7,605	0	5,697	0	71,981	30,617	118,930	404,411	3,556	0	211,166	444,494	**209.44**
Buena Park	0	0	0	0	0	0	11,670	1,626	77,127	16,490	861	0	89,658	18,116	**31.92**
East Orange	0	0	0	0	1,964	0	18,312	0	27,844	0	0	0	48,120	0	**16.59**
El Toro	4,723	0	4,680	72,718	4,582	0	27,046	221,612	63,546	162,548	2,852	23,019	107,429	479,897	**232.07**
Fountain Valley	1,300	0	682	7,524	4,252	0	45,583	5,279	65,232	0	418	0	117,467	12,803	**48.90**
Garden Grove	14,013	0	4,534	0	8,274	0	67,701	22,000	177,408	49,226	9,383	0	281,313	117,403	**167.27**
Golden State	42,593	30,973	31,813	3,200	32,725	8,424	164,507	190,738	310,264	112,937	0	0	581,902	346,272	**377.04**
Huntington Beach	27,630	48,838	9,219	12,437	20,642	0	165,600	58,942	305,420	270,303	7,394	21,534	536,706	415,705	**354.87**
Irvine Ranch	6,450	1,666	32,884	32,384	36,584	76,400	234,905	317,999	782,844	2,675,629	79,991	23,455	1,179,081	3,140,327	**1,348.67**
La Habra	0	8,262	0	0	0	0	14,014	1,818	49,691	72,164	0	0	63,705	90,019	**55.33**
La Palma	0	0	0	0	0	0	4,884	0	10,257	59,760	0	0	15,141	59,760	**21.66**
Laguna Beach	2,533	0	2,664	1,712	4,586	226	13,647	46,850	47,614	0	0	0	72,022	48,788	**47.58**
Mesa Water	6,777	0	10,667	0	22,246	0	131,675	33,620	220,815	106,896	3,006	39,746	395,186	180,262	**192.78**
Moulton Niguel	4,483	26,927	11,538	84,123	14,739	40,741	314,250	1,612,845	889,748	1,059,279	101,940	0	1,337,654	2,840,054	**1,510.51**
Newport Beach	3,454	0	3,548	2,346	894	0	33,995	65,277	76,675	375,404	0	0	118,566	443,027	**175.80**
Orange	12,971	0	15,951	8,723	11,244	0	120,093	281,402	289,990	106,487	1,271	2,366	451,520	398,978	**314.61**
San Clemente	21,502	0	16,062	13,165	18,471	13,908	90,349	1,137	215,249	438,963	356	0	361,989	467,173	**278.30**
San Juan Capistrano	22,656	103,692	29,544	27,156	12,106	0	101,195	32,366	197,290	143,315	2,624	0	365,415	306,529	**304.43**
Santa Margarita	1,964	11,400	10,151	11,600	17,778	48,180	211,198	514,198	534,048	550,420	8,517	25,912	788,139	1,167,271	**686.35**
Seal Beach	0	0	3,611	0	0	0	15,178	504	17,349	15,911	0	0	36,138	16,415	**18.43**
Serrano	0	0	0	0	2,971	0	41,247	0	127,877	4,403	0	0	172,095	4,403	**56.02**
South Coast	6,806	0	9,429	4,395	15,162	116,719	84,282	191,853	181,102	128,290	3,312	0	300,093	457,581	**308.31**
Trabuco Canyon	272	0	1,542	22,440	2,651	0	14,771	0	42,510	88,272	0	0	61,746	110,712	**61.32**
Tustin	0	0	9,980	0	1,410	0	71,285	14,137	232,697	33,362	7,793	0	323,165	47,499	**119.24**
Westminster	0	0	0	0	0	0	14,040	34,631	71,833	23,902	5,894	0	91,767	58,533	**48.07**
Yorba Linda	0	0	0	0	0	0	112,136	12,702	360,279	116,985	5,705	0	489,469	129,687	**197.98**
MWDOC Totals	**183,524**	**241,224**	**216,104**	**303,923**	**238,978**	**304,598**	**2,195,544**	**3,692,153**	**5,493,639**	**7,015,357**	**244,873**	**136,032**	**8,596,652**	**11,801,708**	**7,183.49**
Anaheim	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**-**
Fullerton	0	0	0	0	0	9,214	0	0	0	0	0	0	0	9,214	**5.16**
Santa Ana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**-**
Non-MWDOC Totals	**0**	**0**	**0**	**0**	**0**	**9,214**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9,214**	**5.16**
Orange County Totals	**183,524**	**241,224**	**216,104**	**303,923**	**238,978**	**313,812**	**2,195,544**	**3,692,153**	**5,493,639**	**7,015,357**	**244,873**	**136,032**	**8,596,652**	**11,810,922**	**7,189**

[1] Installed device numbers are listed as square feet

HIGH EFFICIENCY TOILETS (HETs) INSTALLED BY AGENCY

through MWDOC and Local Agency Conservation Programs

Agency	FY05-06	FY 06-07	FY 07-08	FY 08-09	FY 09-10	FY 10-11	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16	FY 16-17	Total	Cumulative Water Savings across all Fiscal Years
Brea	0	2	7	43	48	8	0	0	38	146	154	0	446	**77.33**
Buena Park	0	1	2	124	176	7	0	0	96	153	112	0	671	**156.23**
East Orange CWD RZ	0	0	10	12	1	0	0	0	13	26	24	0	86	**16.77**
El Toro WD	0	392	18	75	38	18	0	133	218	869	264	8	2,033	**437.38**
Fountain Valley	0	69	21	262	54	17	0	0	41	132	220	2	818	**207.69**
Garden Grove	0	14	39	443	181	24	0	0	63	350	363	-1	1,476	**347.88**
Golden State WC	2	16	36	444	716	37	80	2	142	794	512	3	2,784	**638.81**
Huntington Beach	2	13	59	607	159	76	0	0	163	1,190	628	1	2,898	**574.68**
Irvine Ranch WD	29	1,055	826	5,088	2,114	325	0	1,449	810	1,777	2,798	442	16,713	**4,555.78**
Laguna Beach CWD	0	2	17	91	28	11	0	0	45	112	81	-1	386	**84.65**
La Habra	0	3	18	296	34	20	0	0	37	94	83	-1	584	**165.30**
La Palma	0	1	10	36	26	13	0	0	21	59	52	0	218	**46.77**
Mesa Water	0	247	19	736	131	7	0	0	147	162	162	-1	1,610	**511.77**
Moulton Niguel WD	0	20	104	447	188	46	0	0	400	2,497	1,939	27	5,668	**855.65**
Newport Beach	0	5	19	163	54	13	0	0	49	168	243	3	717	**145.72**
Orange	1	20	62	423	79	40	0	1	142	978	416	8	2,170	**422.10**
San Juan Capistrano	0	10	7	76	39	11	0	0	35	140	202	0	520	**94.35**
San Clemente	0	7	22	202	66	21	0	0	72	225	246	11	872	**181.13**
Santa Margarita WD	0	5	14	304	151	44	0	0	528	997	1,152	91	3,286	**508.37**
Seal Beach	0	678	8	21	12	1	0	2	17	50	69	-1	857	**348.77**
Serrano WD	2	0	1	13	5	0	0	0	2	40	55	1	119	**18.30**
South Coast WD	2	2	29	102	41	12	23	64	102	398	235	6	1,016	**178.83**
Trabuco Canyon WD	0	0	4	23	23	0	0	0	10	108	169	1	338	**48.26**
Tustin	0	186	28	387	479	17	0	0	64	132	201	13	1,507	**460.79**
Westminster	0	17	25	541	167	23	0	0	35	161	359	2	1,330	**346.69**
Yorba Linda WD	0	14	89	323	96	18	0	0	40	280	379	0	1,239	**281.02**
MWDOC Totals	38	2,779	1,494	11,282	5,106	809	103	1,651	3,330	12,038	11,118	614	50,362	**11,711.02**
Anaheim	0	255	78	2,771	619	114	0	0	156	1,188	614	26	5,821	**1,690.28**
Fullerton	0	4	28	286	60	23	0	0	61	293	286	10	1,051	**223.18**
Santa Ana	0	11	25	925	89	23	0	0	33	602	293	5	2,006	**514.88**
Non-MWDOC Totals	0	270	131	3,982	768	160	0	0	250	2,083	1,193	41	8,878	**2,428.34**
Orange County Totals	**38**	**3,049**	**1,625**	**15,264**	**5,874**	**969**	**103**	**1,651**	**3,580**	**14,121**	**12,311**	**655**	**59,240**	**14,139.36**

HOME WATER SURVEYS PERFORMED BY AGENCY

through MWDOC and Local Agency Conservation Programs

Agency	FY 13/14		FY 14/15		FY 15/16		Total		Cumulative
	Surveys	Cert Homes	Surveys	Cert Homes	Surveys	Cert Homes	Surveys	Cert Homes	Water Savings
Brea	1	0	2	0	0	0	3	0	0.16
Buena Park	0	0	1	0	0	0	1	0	0.05
East Orange	19	0	1	0	0	0	20	0	1.39
El Toro	0	0	3	0	0	0	3	0	0.14
Fountain Valley	3	0	4	0	1	0	8	0	0.42
Garden Grove	0	0	6	0	1	0	7	0	0.31
Golden State	0	0	0	0	0	0	0	0	0.00
Huntington Beach	2	0	5	0	2	0	9	0	0.42
Irvine Ranch	1	0	3	0	6	0	10	0	0.35
La Habra	0	0	1	0	0	0	1	0	0.05
La Palma	0	0	0	0	0	0	0	0	0.00
Laguna Beach	4	0	8	0	1	0	13	0	0.68
Mesa Water	0	0	0	0	0	0	0	0	0.00
Moulton Niguel	4	0	4	0	0	0	8	0	0.47
Newport Beach	2	0	8	0	6	0	16	0	0.66
Orange	2	0	18	0	1	0	21	0	1.01
San Clemente	15	0	13	0	0	0	28	0	1.67
San Juan Capistrano	4	0	13	0	2	0	19	0	0.94
Santa Margarita	15	0	40	1	14	0	69	1	3.27
Seal Beach	0	0	1	0	2	0	3	0	0.09
Serrano	0	0	2	0	0	0	2	0	0.09
South Coast	6	0	4	0	1	0	11	0	0.64
Trabuco Canyon	0	0	4	0	0	0	4	0	0.19
Tustin	0	0	10	0	5	0	15	0	0.59
Westminster	0	0	0	0	0	0	0	0	0.00
Yorba Linda	0	0	13	0	10	0	23	0	0.85
MWDOC Totals	78	0	164	1	52	0	294	1	14.44
Anaheim	0	0	0	0	0	0	0	0	0.00
Fullerton	0	0	17	0	1	0	18	0	0.82
Santa Ana	0	0	0	0	0	0	0	0	0.00
Non-MWDOC Totals	0	0	17	0	1	0	18	0	0.82
Orange County Totals	78	0	181	1	53	0	312	1	15.266

SYNTHETIC TURF INSTALLED BY AGENCY[1]

through MWDOC and Local Agency Conservation Programs

Agency	FY 07/08		FY 08/09		FY 09/10		FY 10/11		Total Program		Cumulative Water Savings across all Fiscal Years
	Res	Comm.	Res	Comm.	Res	Comm.	Res	Comm.	Res	Comm.	
Brea	0	0	2,153	2,160	500	0	0	0	2,653	2,160	3.30
Buena Park	0	0	1,566	5,850	0	0	0	0	1,566	5,850	5.19
East Orange	0	0	0	0	983	0	0	0	983	0	0.55
El Toro	3,183	0	2,974	0	3,308	0	895	0	10,360	0	6.98
Fountain Valley	11,674	0	1,163	0	2,767	0	684	0	16,288	0	12.46
Garden Grove	1,860	0	0	0	3,197	0	274	0	5,331	0	3.47
Golden State	6,786	0	13,990	0	15,215	0	2,056	0	38,047	0	24.88
Huntington Beach	15,192	591	12,512	0	4,343	1,504	0	0	32,047	2,095	25.29
Irvine Ranch	11,009	876	13,669	0	2,585	0	0	0	27,263	876	21.00
La Habra	0	0	0	0	0	0	0	0	0	0	-
La Palma	429	0	0	0	0	0	0	0	429	0	0.36
Laguna Beach	3,950	0	3,026	0	725	0	0	0	7,701	0	5.84
Mesa Water	4,114	0	3,005	78,118	4,106	0	2,198	0	13,423	78,118	63.46
Moulton Niguel	14,151	0	25,635	2,420	7,432	0	0	0	47,218	2,420	35.69
Newport Beach	2,530	0	6,628	0	270	0	0	0	9,428	0	6.92
Orange	4,169	0	7,191	0	635	0	0	0	11,995	0	8.89
San Clemente	9,328	0	11,250	455	2,514	1,285	500	0	23,592	1,740	18.37
San Juan Capistrano	0	0	7,297	639	2,730	0	4,607	0	14,634	639	9.02
Santa Margarita	12,922	0	26,069	0	21,875	0	7,926	0	68,792	0	44.68
Seal Beach	0	0	817	0	0	0	0	0	817	0	0.57
Serrano	7,347	0	1,145	0	0	0	0	0	8,492	0	6.97
South Coast	2,311	0	6,316	0	17,200	0	1,044	0	26,871	0	16.43
Trabuco Canyon	1,202	0	9,827	0	0	0	0	0	11,029	0	7.89
Tustin	6,123	0	4,717	0	2,190	0	0	0	13,030	0	9.67
Westminster	2,748	16,566	8,215	0	890	0	0	0	11,853	16,566	22.47
Yorba Linda	11,792	0	12,683	0	4,341	5,835	0	0	28,816	5,835	24.48
MWDOC Totals	132,820	18,033	181,848	89,642	97,806	8,624	20,184	0	432,658	116,299	384.83
Anaheim	4,535	0	7,735	20,093	13,555	65,300	4,122	0	29,947	85,393	69.18
Fullerton	4,865	876	5,727	0	6,223	0	105	0	16,920	876	12.36
Santa Ana	0	0	2,820	0	525	0	0	0	3,345	0	2.27
Non-MWDOC Totals	9,400	876	16,282	20,093	20,303	65,300	4,227	0	50,212	86,269	83.81
Orange County Totals	142,220	18,909	198,130	109,735	118,109	73,924	24,411	0	482,870	202,568	468.63

[1]Installed device numbers are calculated in square feet

ULF TOILETS INSTALLED BY AGENCY

through MWDOC and Local Agency Conservation Programs

Agency	Previous Years	FY 95-96	FY 96-97	FY 97-98	FY 98-99	FY 99-00	FY 00-01	FY 01-02	FY 02-03	FY 03-04	FY 04-05	FY 05-06	FY 06-07	FY 07-08	FY 08-09	Total	Cumulative Water Savings across all Fiscal Years
Brea	378	189	299	299	122	144	867	585	341	401	26	48	17	4	0	**3,720**	**1,692.64**
Buena Park	361	147	331	802	520	469	524	1,229	2,325	1,522	50	40	18	9	0	**8,347**	**3,498.37**
East Orange CWD RZ	2	0	33	63	15	17	15	50	41	44	19	18	13	2	0	**332**	**138.23**
El Toro WD	1,169	511	678	889	711	171	310	564	472	324	176	205	61	40	0	**6,281**	**3,091.16**
Fountain Valley	638	454	635	858	1,289	2,355	1,697	1,406	1,400	802	176	111	58	32	0	**11,911**	**5,383.10**
Garden Grove	1,563	1,871	1,956	2,620	2,801	3,556	2,423	3,855	3,148	2,117	176	106	67	39	0	**26,298**	**12,155.41**
Golden State WC	3,535	1,396	3,141	1,113	3,024	2,957	1,379	2,143	3,222	1,870	167	116	501	43	0	**24,607**	**11,731.47**
Huntington Beach	3,963	1,779	2,600	2,522	2,319	3,492	3,281	2,698	3,752	1,901	367	308	143	121	0	**29,246**	**13,854.70**
Irvine Ranch WD	4,016	841	1,674	1,726	1,089	3,256	1,534	1,902	2,263	6,741	593	626	310	129	0	**26,700**	**11,849.23**
Laguna Beach CWD	283	93	118	74	149	306	220	85	271	118	32	26	29	6	0	**1,810**	**845.69**
La Habra	594	146	254	775	703	105	582	645	1,697	1,225	12	31	6	7	0	**6,782**	**2,957.73**
La Palma	65	180	222	125	44	132	518	173	343	193	31	27	20	17	0	**2,090**	**927.52**
Mesa Water	1,610	851	1,052	2,046	2,114	1,956	1,393	1,505	2,387	988	192	124	56	14	0	**16,288**	**7,654.27**
Moulton Niguel WD	744	309	761	698	523	475	716	891	728	684	410	381	187	100	0	**7,607**	**3,371.14**
Newport Beach	369	293	390	571	912	1,223	438	463	396	1,883	153	76	36	16	0	**7,219**	**3,166.77**
Orange	683	1,252	1,155	1,355	533	2,263	1,778	2,444	2,682	1,899	193	218	88	53	4	**16,600**	**7,347.93**
San Juan Capistrano	1,234	284	193	168	323	1,319	347	152	201	151	85	125	42	39	0	**4,663**	**2,324.42**
San Clemente	225	113	191	65	158	198	667	483	201	547	91	66	37	34	0	**3,076**	**1,314.64**
Santa Margarita WD	577	324	553	843	345	456	1,258	790	664	260	179	143	101	29	0	**6,522**	**3,001.01**
Seal Beach	74	66	312	609	47	155	132	81	134	729	29	10	6	12	0	**2,396**	**1,073.80**
Serrano WD	81	56	68	41	19	52	95	73	123	98	20	15	14	2	0	**757**	**338.66**
South Coast WD	110	176	177	114	182	181	133	358	191	469	88	72	32	22	0	**2,305**	**990.05**
Trabuco Canyon WD	10	78	42	42	25	21	40	181	102	30	17	20	12	14	0	**634**	**273.02**
Tustin	968	668	557	824	429	1,292	1,508	1,206	1,096	827	69	89	26	12	0	**9,571**	**4,423.88**
Westminster	747	493	969	1,066	2,336	2,291	2,304	1,523	2,492	1,118	145	105	70	24	0	**15,683**	**7,064.28**
Yorba Linda WD	257	309	417	457	404	1,400	759	1,690	1,155	627	158	136	81	41	0	**7,891**	**3,409.49**
MWDOC Totals	24,256	12,879	18,778	20,765	21,136	30,242	24,918	27,175	31,827	27,568	3,654	3,242	2,031	861	4	**249,336**	**113,878.61**
Anaheim	447	1,054	1,788	3,661	1,755	7,551	4,593	6,346	9,707	5,075	473	371	462	341	1	**43,625**	**18,359.52**
Fullerton	1,453	1,143	694	1,193	1,364	2,138	1,926	2,130	2,213	1,749	172	77	44	23	2	**16,321**	**7,435.23**
Santa Ana	1,111	1,964	1,205	2,729	2,088	8,788	5,614	10,822	10,716	9,164	279	134	25	5	0	**54,644**	**22,887.95**
Non-MWDOC Totals	3,011	4,161	3,687	7,583	5,207	18,477	12,133	19,298	22,636	15,988	924	582	531	369	3	**114,590**	**48,682.70**
Orange County Totals	27,267	17,040	22,465	28,348	26,343	48,719	37,051	46,473	54,463	43,556	4,578	3,824	2,562	1,230	7	**363,926**	**162,561.30**