MWDOC

*Street Address:*
18700 Ward Street
Fountain Valley, California 92708

*Mailing Address:*
P.O. Box 20895
Fountain Valley, CA 92728-0895

(714) 963-3058
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January 30, 2018

Ms. Debra Whitney
Bureau of Reclamation
27708 Jefferson Avenue, Suite 202
Temecula, CA 92590

Re: **Notice for Closeout/Final Report for Federal Grant Agreement No. R12AP35344 – Spray to Drip Conversion Pilot Project**

Dear Deb:

The Municipal Water District of Orange County is pleased to submit the final report for the above referenced funding agreement for the Spray to Drip Conversion Pilot Project.

We have completed all work for the Project, and the final ASAP drawdown has already been submitted. Final Federal funds in the amount of $5,407.70 are pending payment by Reclamation.

Enclosed please find the following items:

- Federal Financial Report SF425 – Marked Final;
- Release of Claims Form;
- Final Progress Report;
- Program Benefits Form;
- Attachment 1 – Website and Marketing Materials;
- Attachment 2 – Post Evaluation Form and Sample Photos;
- Attachment 3 – Eligible Products List;
- Attachment 4 – Activity Report; and
- Attachment 5 – Program Evaluation.

A digital copy of the report has also been sent via email. Should you have any questions regarding the report, please contact me at (714) 593-5015 or bfahl@mwdoc.com.

Sincerely,

Beth Fahl
Water Use Efficiency Program Specialist

cc: Joseph Berg
MWDOC Accounting
Bonnie (Van Veldhuizen) Allison
LCFA@USBR.gov

**For MWDOC Accounting Purposes Only:**
4405-8112-34-1230-000-3423-433-4-$3,088.73
4405-8112-34-1220-000-3423-433-4-$2,318.97

# Federal Financial Report

(Follow form Instructions)

OMB Number: 4040-0014
Expiration Date: 01/31/2019

| 1. Federal Agency and Organizational Element to Which Report is Submitted | 2. Federal Grant or Other Identifying Number Assigned by Federal Agency (To report multiple grants, use FFR Attachment) |
|---|---|
| Southern California Area Office of Reclamation | R12AP35344 |

3. Recipient Organization (Name and complete address including Zip code)

Recipient Organization Name: MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Street1: 18700 WARD STREET

Street2: P.O. BOX 20895

City: FOUNTAIN VALLEY County: ORANGE

State: CA: California Province:

Country: USA: UNITED STATES ZIP / Postal Code: 92708-0895

| 4a. DUNS Number | 4b. EIN | 5. Recipient Account Number or Identifying Number (To report multiple grants, use FFR Attachment) |
|---|---|---|
| 087380721 | 95-2650400 | 8112 |

| 6. Report Type | 7. Basis of Accounting | 8. Project/Grant Period | 9. Reporting Period End Date |
|---|---|---|---|
| ☐ Quarterly<br>☐ Semi-Annual<br>☐ Annual<br>☒ Final | ☐ Cash<br>☒ Accrual | From: 08/27/2012 To: 10/30/2017 | 01/30/2018 |

| 10. **Transactions** | Cumulative |
|---|---|
| *(Use lines a-c for single or multiple grant reporting)* | |
| **Federal Cash (To report multiple grants, also use FFR attachment):** | |
| a. Cash Receipts | 61,609.21 |
| b. Cash Disbursements | 61,609.21 |
| c. Cash on Hand (line a minus b) | 0.00 |
| *(Use lines d-o for single grant reporting)* | |
| **Federal Expenditures and Unobligated Balance:** | |
| d. Total Federal funds authorized | 67,016.91 |
| e. Federal share of expenditures | 61,609.21 |
| f. Federal share of unliquidated obligations | 5,407.70 |
| g. Total Federal share (sum of lines e and f) | 67,016.91 |
| h. Unobligated balance of Federal Funds (line d minus g) | 0.00 |
| **Recipient Share:** | |
| i. Total recipient share required | 99,945.65 |
| j. Recipient share of expenditures | 211,731.15 |
| k. Remaining recipient share to be provided (line i minus j) | 0.00 |
| **Program Income:** | |
| l. Total Federal program income earned | 0.00 |
| m. Program Income expended in accordance with the deduction alternative | 0.00 |
| n. Program Income expended in accordance with the addition alternative | 0.00 |
| o. Unexpended program income (line l minus line m or line n) | 0.00 |

11. Indirect Expense

| a. Type | b. Rate | c. Period From | Period To | d. Base | e. Amount Charged | f. Federal Share |
|---|---|---|---|---|---|---|
| N/A | | | | | | |
| | | | | | | |
| | | | g. Totals: | | | |

*12. Remarks: Attach any explanations deemed necessary or information required by Federal sponsoring agency in compliance with governing legislation:*

Add Attachment | Delete Attachment | View Attachment

**13. Certification: By signing this report, I certify that it is true, complete, and accurate to the best of my knowledge. I am aware that any false, fictitious, or fraudulent information may subject me to criminal, civil or administrative penalties. (U.S. Code, Title 18, section 1001)**

a. Name and Title of Authorized Certifying Official

Prefix: | First Name: ROBERT | Middle Name: J.

Last Name: HUNTER | Suffix:

Title: GENERAL MANAGER

b. Signature of Authorized Certifying Official

c. Telephone (Area code, number and extension): 714-593-5026

d. Email Address: rhunter@mwdoc.com

e. Date Report Submitted: 01/30/2018

**14. Agency use only:**

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

Southern California Area Office

Agreement Number
R12AP35344

Agreement Date

August 27, 2012 to
October 30, 2017

# RELEASE OF CLAIMS

WHEREAS, by the terms of the above-identified agreement for

**Spray to Drip Conversion Pilot Project**

entered into by the United States of America, hereinafter also referred to as the United States, and the grant recipient whose name appears on the agreement as

**Municipal Water District of Orange County**

it is provided that after completion of all work, the grant recipient will furnish the United States with a release of all claims;

NOW, THEREFORE, in consideration of the above premises and the payment by the United States to the recipient the total amount of

**$67,016.91**

the grant recipient hereby remises, releases, and forever discharges the United States, its officers, agents, and employees, of and from all manner of debts, dues, liabilities, obligations, accounts, claims, and demands whatsoever, in law and equity, under or by virtue of the said agreement except:

IN WITNESS WHEREOF, the agreement recipient has executed this release this 30th day of January, 2018.

By _____
(Signature)

Robert J. Hunter
(Name -- Type or Print)

General Manager
(Title)

Municipal Water District of Orange County
(Agreement Recipient)

# Spray to Drip Conversion Pilot Project
# Orange County, CA

# Final Project Report


**R12AP35344**

**Municipal Water District of Orange County**
**18700 Ward Street**
**Fountain Valley, CA 92708**

**January 30, 2018**

# Final Report: Spray to Drip Conversion Pilot Project

| **1. Recipient Information:** | |
|---|---|
| Recipient Name: | **Municipal Water District of Orange County**<br>**Joseph M. Berg**<br>**18700 Ward Street, Fountain Valley, CA 92708** |
| Project Name: | **Spray to Drip Conversion Pilot Project** |
| Assistance Agreement No: | **R12AP35344** |
| Date of Award:<br>(Month, Year) | **August 2012** |
| Estimated Completion Date<br>(Month, Year) | **October 30, 2017** |
| Actual Completion Date:<br>(Month, Year) | **October 30, 2017** |

| **2. Final Funding Information** | **Funding Amount** |
|---|---|
| Non-Federal Entities | |
| 1. Municipal Water District of Orange County | $99,945.65 |
| 2. | |
| 3. | |
| *Non-Federal Subtotal:* | $99,945.65 |
| | |
| Other Federal Entities | |
| 1. | |
| 2. | |
| 3. | |
| *Other Federal Subtotal:* | *$0* |
| | |
| *Requested Reclamation Funding:* | *$67,016.91* |
| | |
| *Total Project Funding:* | *$166,962.56* |

**3. One Paragraph Project Summary:**

Spray-to-Drip Conversion Pilot Project (Program) was developed to encourage the replacement of inefficient high-water-using spray heads with efficient low-water-using drip irrigation at residential and commercial properties. The objective of this Program is to attain quantifiable and sustained water savings and improved water management, thus providing an increase in energy efficiency of water management and promoting activities that support water supply sustainability. The Program also enhances the Municipal Water District of Orange County's (MWDOC) existing landscape water use efficiency programs by expanding the suite of landscape rebate opportunities beyond Smart Timer Rebates, Rotating Sprinkler Nozzle Rebates, and Turf Removal Rebates. The Program was implemented within the service area of MWDOC's 28 retail water agencies throughout Orange County, and targeted the conversion of 175,126 square feet from spray irrigation to drip. The Program was projected to save more than 188 acre-feet over the life of the irrigation system improvements. Customers access the Program be completing an online rebate application, which includes the submittal of photos, a site plan, and a water bill. Residential applicants could receive a base rebate of up to $0.50 per square foot of conversion area (up to $0.30 from Reclamation and a match of $0.20 from MWDOC) which, using an average of 350 square feet converted per kit, resulted in an incentive of up to $175 per "kit" (350 x .50). Commercial applicants could receive a base rebate of up to $0.20 per square foot of conversion area ($0.20 fully funded by MWDOC as a match). Each application was reviewed by MWDOC staff and, if approved, a Notice to Proceed was sent to the customer. The customer was given 60 days from the date of the Notice to complete their conversion projects, at which point the customer submitted equipment purchase receipts and post-completion project photos to MWDOC. A post-inspection was then scheduled and conducted and the receipts were reviewed by MWDOC staff and, if the project satisfied the terms and conditions of the Program, a rebate check was then issued to the customer.

**4. Final Project Description:** *Briefly describe components of the project and the work completed, including each element of the scope of work and the work completed at each stage of the project. Please include maps, sketches, and/or drawing of the features of the completed project, as appropriate. In addition, please describe any changes in the project scope.*

MWDOC was awarded a Field Services Grant in 2012 to implement the Spray-to-Drip Conversion Pilot Project. The following are the Tasks associated with the Grant.

**Task 1 – Marketing and Promotion**

**Work completed**: Marketing and outreach included the development of a Participant Application, Term and Conditions sheet, Eligible Products List, Drip Tubing Fact Sheet, Specifications Sheet, Frequently Asked Questions sheet, Examples of Ineligible Equipment Sheet, and web page. Spray-to Drip Kit development meetings were held with irrigation equipment manufacturers. Contractors and installers were a significant partner in promoting the retrofits and incentives to the prospective sites. Retail agencies assisted in promoting the program via agency websites and through bill inserts and flyers developed by MWDOC. The Project was also promoted through social media outlets, such as Facebook and Instagram, at community outreach events, and on MWDOC's water use efficiency website. Copies of website materials, bill inserts, flyers, and social media advertisements are attached hereto as Attachment 1.

**Task 2 – Site Inspections**

**Work completed:** MWDOC conducts photo-based pre-inspections and on-site post inspections for all participants in the Program. For the photo-based pre-inspections, all applicants are required to submit three to five photos of the project area taken with the existing sprinkler system turned on. Submitted photos must clearly show the sprinkler system in use and that the spray heads are functional. Photos must also contain identifying features (house in background, unique landscape/decorating features, etc.) to confirm that the photos submitted are for the property/site listed in the application.

For the onsite-post inspection, once the project is complete, the applicant is required to submit all project-related equipment purchase receipts and at least three photos of the completed conversion area showing: (1) wide-angle view of the completed project area(s); (2) close-up photo(s) of the installed pressure regulation/filtration component(s); and (3) close-up photos of the installed drip tubing (Post-Project Documentation). The Post-Project Documentation is screened to ensure that the customer purchased and installed rebate-eligible equipment. If the applicant is unable to provide sufficient Post-Project Documentation, the post-inspection is considered a fail, no on-site post-inspection is conducted, and the application/rebate is denied. Once the Post-Project Documentation has been screened and approved, the on-site post-inspection is scheduled and conducted by either retail water agency staff or a contract-based inspector. As part of the on-site post inspection, the inspector verifies the following:

- The actual square footage of the conversion area.
- That drip irrigation equipment has been installed. For residential on-site post-inspections, if microspray, point-source emitters, or any other type of drip irrigation other than embedded emitter tubing has been installed, it is be noted and photographed. Only embedded emitter tubing installations are eligible for rebates in residential settings.
- That pressure regulation/filtration components have been installed as part of the drip conversion. Manufacturer/make, model, model number/sku, and quantity are documented, and the equipment is photographed.

- That drip tubing has been installed. The drip tubing is photographed.

- That spray irrigation is no longer functional in the drip conversion area(s). Any remaining spray heads in the conversion area must be capped.

A copy of the Post-Evaluation Form with sample photos is attached hereto as Attachment 2.

**Task 3 –Rebate Incentives**

**Work completed:** Incentives for the Program are processed in-house by MWDOC staff using one of two rebate processing platforms – Survey Gizmo for the first part of the Program period and Droplet Technologies (Droplet) thereafter and currently. Program participants are directed to visit the Spray-to-Drip Rebate Program website for information on the Program and all terms, conditions, requirements, and Eligible Products (Eligible Products List is attached hereto as Attachment 3). MWDOC staff processes the application and, upon successful project completion and post-inspection, issues a rebate check to the participant. Rebates were funded using a combination of Reclamation, MWDOC, and participating retail water agency funds.

Retrofits and activity completed since the last reporting period of September 30, 2017 can be found in the Activity Report attached hereto as Attachment 4. A total of 695,373.90 square feet of spray to drip irrigation was converted at 245 sites during the term of this Program.

**Task 4 – Statistical Evaluation**

**Work completed:** MWDOC staff performed both the process and impact evaluation of the Program to determine the successes and challenges faced by the Program and the actual water savings achieved.

As part of the Process Evaluation, over 100 customers were contacted about their experiences with the Spray to Drip Rebate Program, and a statistical analysis was performed to evaluate actual changes in customer water consumption. The goal of the Process Evaluation was to survey the participants in the Program regarding their observations and satisfaction since completing the project, experience with the program process, and general marketing information in order to evaluate the overall effectiveness of the Program.

The purpose of the Impact Evaluation was to quantify the actual water savings resulting from the Spray to Drip Rebate Program; meaning realized water savings that could be discerned at the meter. The Impact Statistical Analysis showed there were statistically significant reductions in water consumption once completing a drip project. The average residential water savings was 0.121 gallons per day per square foot (gpd/sq. ft.) and 84 gpd per project site, or a 24% reduction in total water consumption. Commercial water savings were 0.066 gpd/sq. ft. and 473 gpd per meter, or a 19% reduction in total water consumption. Total water savings combined for both commercial and residential sites at the time of the Impact Evaluation (through September 30, 2017) is 54 AF/yr or a lifetime savings of 540 AF. When including all activity through the Final Report (January 30, 2018), that water savings increases to a lifetime of 643 AF or 64 AF/year over a 10 year period. The statistically quantified water savings established through the Program will contribute to setting the rebate rates for a broader program within the MWDOC and Metropolitan service areas.

The Process and Impact Evaluation is attached hereto as Attachment 5. The Evaluation will be submitted for further review, and updates to the Evaluation may be made in the future. Any updated Evaluation will be submitted to Reclamation for its records.

**Task 5 –Database Enhancement**

**Work completed:** MWDOC's current historical database was modified to accommodate the Project's landscape participation data, and refinements were made to Droplet, MWDOC's Turf Removal Program rebate processing platform (https://mwdoc.dropletportal.com), to incorporate the Spray to Drip Rebate Program into the platform.

**5. Accomplishment of Project Goals:** *Describe the goals and objectives of the project and whether each of these was met. Where appropriate, state the reasons why goals and objectives were not met, and describe any problems or delays encountered in completing the project. Please include whether or not the project was completed within cost.*

The primary goal of the Program was to implement up to 175,126 square feet of spray-to-drip conversions at 84 sites, thereby achieving lifetime water savings of 188 AF or 19 AF/year over a ten (10) year period, as well as an associated energy cost savings from not distributing this water of 621,428 kilowatt-hours for the life of the Program. Additionally, it was projected that technical training would be provided to 168 people during the site visits (2 people per site x 84 sites). As of the Final Report date, MWDOC facilitated the conversion of spray to drip irrigation at 245 sites, with a total conversion area across all sites of 695,423.90 square feet (397% of the Program goal). Water savings achieved is a lifetime of 643 AF or 64 AF/year over a ten year period, exceeding the Program goal by 341%. Associated energy cost savings from not distributing this water of 2,121,677 kilowatt-hours for the life of the Program. Technical training was provided to approximately 245 people during the site visits (average of 1 person per site x 245 sites).

| Drip Conversions | Sq Ft Converted | Lifetime AF | AF Year | Energy (kWh/yr) | Energy (kWh/10yr) |
|---|---|---|---|---|---|
| Goal | 175,126 | 188 | 19 | 62,143 | 621,426 |
| Res as of 1/24/18 | 209,126.90 | 283 | 28 | 93,533 | 935,326 |
| CII as of 1/24/18 | 486,297.00 | 360 | 36 | 118,635 | 1,186,351 |
| **Total** | **695,423.90** | **643** | **64** | **212,168** | **2,121,677** |
| **Percent of Goal** | **397%** | | **341%** | | |

Issues encountered over the course of the Program included difficulties with the true "kit" based approach. Pre-packaged kits were not readily available at the irrigation supply houses, causing some customers to become frustrated with the Program. Transitioning to a build-your-own-kit based off of an Eligible Products List greatly increased the access to products for Participants. Additionally, while residential customers were mostly able to complete their projects within the 60 day project term, commercial sites, because of their greater size, often needed 90 days or more

to complete. Lastly, available match funding from one of the funding partners was frozen at multiple times during the implementation of the Program, forcing the Program to be placed on hold and applicants to be waitlisted until such time as the funding was once again available. This start-and-stop impacted Program momentum, requiring that more than one extension to the Program term be requested from Reclamation.

**6. Discussion of Amount of Water Conserved, Marketed or Better Managed:** *In responding to the questions set forth below, Recipients should rely on the best data or information available. Actual field measurements should be used whenever possible (e.g., baseline data or post-project data derived from measuring devices, diversion records, seepage tests, etc.) Where actual field measurements are not available, water savings (or amounts marketed or better managed) may be estimated based on studies, other similar improvement projects, or anecdotal evidence.*

**A. Recipient's total water supply (average, annual, available water supply in acre-feet per year):**

The five year average water demand in the Orange County service area is 571,695 acre-feet (AF). This is the total supply for all retail water agencies in Orange County and is comprised of both imported water from the Metropolitan Water District of Southern California, ground water pumped from the Orange County Water District ground water basin, and recycled water. This water is currently going to single- and multi-family residential users, landscape irrigation, and commercial, industrial and institutional users. Of the total and across all customer types, approximately 55% is used for landscape irrigation, and 45% is used indoor.

Imported sources account for 37% (213,000 AF), groundwater accounts for 55% (311,000 AF), recycled water accounts for 7% (42,000 AF), and surface water accounts for 1% (5,000 AF). Imported supplies provided by Metropolitan include the Colorado River and the Bay-Delta via the State Water Project. Approximately 99% of MWDOC's demand is for municipal and industrial purposes, and 1% is for agricultural purposes. Municipal and industrial water use in Orange County is comprised of single- and multi-family residential, commercial, industrial, and institutional users. As of December 2017, there are approximately 628,000 connections in the MWDOC service area.

Following three years of drought, water year 2017 experienced record rainfall in Northern California, and all major California Reservoirs are once again at healthy levels (excluding Lake Oroville which has been purposely lowered to accommodate construction on the new spillway). Overall water demands still remain low compared to 2013, even though all state regulations were lifted on mandatory water conservation in April 2017. As expected, the influence of water use rebound is beginning to be observed. The 2018 water year has begun drier than average, and initial State Water Project allocations are at a very conservative 15%.

**B. Amount of water conserved, marketed or better managed as a result of the project (in acre-feet per year):**

Since the launch of the Program through the date of the Final Report, MWDOC facilitated the conversion of spray to drip irrigation at 245 sites, with a total conversion area across all sites of 695,423.90 square feet (397% of the Program goal). Overall, the Program achieved a lifetime water savings of 643 AF or 64 AF/year over a ten year period, exceeding the Program goal by 341%.

**C. Describe how the amounts stated in response to 6.B were calculated or estimated:** *In responding to this question, please address (1) – (3) below.*

**(1) Describe the information/data being relied on to calculate/estimate the project benefits. State how that data/information was obtained, if appropriate. Provide any other information necessary to explain how the final calculation/estimate of project benefits was made.**

As a component of the Process Evaluation, a satisfaction survey was distributed via email to customers who applied to the Program. The purpose of this survey was to gain insight on participants' experiences with participating in the Program. Any customer who submitted an application was invited to participate, regardless of their status in the Program, and all surveys were completed anonymously to avoid bias through fear of consequence. Ninety-eight people completed the survey, and six people partially completed the survey, for a total of 104 responses. Partial responses were included for the questions that were answered. The questionnaire covered a variety of categories including customer observations and satisfaction since completing the project, experience with the Program process, and marketing information. Customers who did not complete a project were not directed to complete questions regarding observations and satisfaction since completing project, but were included in the Program process and marketing sections.

An Impact Evaluation/statistical analysis was performed to evaluate the impact of the Program on customer water consumption, and to quantify the volume of water that has been saved as a result of this Program. This analysis is used to evaluate how effective the Program is as a water savings tool, realize actual water savings, compute rebate incentive levels, and will contribute to the pool of data that makes up the established water-savings metric for converting from traditional spray to drip irrigation in Orange County. Water consumption history for customers who completed their projects before March 2017 was requested by MWDOC from the corresponding retail water agencies. Consumption history was received from retailers and homogenized into a standard format. Each water account's gpd water consumption was calculated per that billing cycle and was associated with the month the majority of the cycle fell into. Additional information was added, including if that assigned month occurred during the peak or minimal irrigation season, if the customer also participated in MWDOC's Turf Removal Program, if the site was within a coastal or non-coastal retail agency, and project size and/or number of kits approved. To quantify the change in water consumption patterns before and after participating in the Program, pre-project water use was compared to water use occurring after a project was completed. A One-Way Analysis of Variance (ANOVA) tested the following hypothesis:

$H_0$: There is no statistical difference between pre-project water consumption and post-project water consumption.

$H_a$: There is a statistical difference between pre-project water consumption and post-project water consumption.

The Least Squares Means regression identified if that statistical difference was a decrease in water consumption and by how much. Water consumption was evaluated in terms of customers' gallons per day (gpd) savings, percent reduction, and gpd per sq. ft. savings.

A complete copy of the Evaluation of the Spray-to-Drip Conversion Pilot Program is included as Attachment 5.

**(2) As appropriate, please include an explanation of any concerns or factors affecting the reliability of the data/information relied on.**

For the Process Evaluation, the customer survey results were positive, but also inherently contain some human error and bias. Naturally some customers seemed to have difficulty separating any feelings of dissatisfaction with program management or process from questions pertaining to perceived results from the project. For example, some respondents who indicated they finished their project and did not receive a rebate, presumably owners of a denied project, answered all or almost all questions with the most negative answer available and provided negative comments when given the opportunity. While negative responses are not brushed off as malice and are considered when evaluating how to make improvements to the Program, it is most likely true that some participants took the survey with the intent of answering questions negatively despite what was being asked. However, such imperfections are to be expected with a customer survey, and the high response rate (over 100 participants) helped to minimize any anomalies.

With regard to the Impact Evaluation, there are several factors that may potentially influence the statistical analysis results. Most prominently, these projects took place during the latest California drought, 2011-2015 and fell close to the two hottest driest years, 2014 and 2015, which prompted Governor Jerry Brown to declare the drought a state of emergency in January 2014. Shortly after, water restrictions were imposed and customers throughout Orange County were asked to conserve water and were allowed to only irrigate their landscapes on specified days set by their retail water agency. During this time, a large amount of drought awareness and water conservation messaging was issued to the public, asking residents to do their part to save water and help the region make it through the drought. Because these drip conversion projects were completed during this time, it is possible that customer water consumption was reduced more dramatically because of the drought response messaging and restrictions. Pre-Project to Post-Project reductions represent water savings achieved from the Program, but may also include additional savings as a result of other drought-response activities; e.g., irrigating only two days per week. However, the Program provided a clear route for customers to save water and meet the new restrictions, and it is very likely that participating in this Program was a major change implemented by customers doing their part to conserve water during the drought.

Additionally, the data used in this study was evaluated to ensure it met a number of requirements before it was used. This determined a level of accuracy and precision; however, it did reduce the population size of the test groups. The most common reason for data to be deemed unusable was because not enough time had lapsed since the customer completed their project, meaning there was a not a full two years of post-project consumption to use in the analysis.

Lastly, the difference in water savings results for commercial and residential sites is most likely related to their inherent differences in consumption patterns, management practices, and sheer volume of consumption. Therefore, these two classifications were evaluated separately for the analysis. Both the pre-project and post-project data on the commercial side was much more variable. Because of this, those extreme anomalies were removed from much of the commercial analysis to prevent the overall relationships and patterns from being skewed. Residential sites were much more uniform, and usage was more predictable and relatively consistent. A residential

customer's indoor water usage stays relatively constant over the year, and outdoor use generally fluctuates season to season.

**(3) Attach any relevant data, reports or other support relied on in the calculation/estimate of project benefits, if available. Please briefly describe the data/information attached, if any.**

The Evaluation of the Spray to Drip Conversion Pilot Project is included as Attachment 5.

**D. Use of Conserved Water:** *Please explain where the water saved, better managed, or marketed as a result of the project is going (e.g. used by the recipient, in stream flows, available to junior water users, etc.*

The Project will improve water supply reliability by being more efficient with existing supplies. As a result, less pumping will occur from the groundwater basin, aiding in refilling the basin more rapidly, and less imported water will be used, allowing unused water to be retained in regional water storage reservoirs for use at a future date. Both these benefits will minimize or forestall shortages due to drought.

The Project promoted and encouraged collaboration among all water agencies in Orange County. While MWDOC serves approximately 70% of the county, the Project was available throughout 100% of the county in partnership with all 31 retail water agencies. Wide spread support for this Project was demonstrated by the letters of support from these retail agencies. This partnership was significant as all water agencies in the county will have a united message of "efficient water use" to water users.

The Project significantly increased the awareness of water conservation in Orange County, and served as an example of efficiency that can be replicated not only from user to user, but also by water agency to water agency, thereby increasing the capability of future water conservation and efficiency efforts beyond Orange County.

**E. Future tracking of project benefits:** *Please state whether and how the recipient plans to track the benefits of the project (water saved, marketed or better managed) in the future. If no actual field measurements are currently available to support the estimate of project benefits in 6.B., please state whether actual field measurements will become available in the future. If so, please state whether the Recipient is willing to provide such data to Reclamation on a voluntary basis once it is available.*

The Evaluation will be submitted for further review and updates to the Evaluation may be made in the future. Any updated Evaluation will be submitted to Reclamation for its records.

**7. Discussion of Amount of Renewable Energy Added:** *If your project included the installation of a renewable component, please describe the amount of energy the system is generating annually. Please provide any data/reports in support of this calculation.*

Not Applicable

**8. Describe how the project demonstrates collaboration, stakeholder involvement or the formation of partnerships, if applicable:** *Please describe the collaboration involved in the project, and the role of any cost-share or other types of partners. If there were any additional entities that provided support (financial or otherwise) please list them.*

This Project provided multi-level partnerships within MWDOC's entire service area, including the north and south subwatershed basins, with benefits yielded by cities, water districts, community, and the environment. The Project was built on established regional integration and coordination with multiple goals across geographic and water resource services.

MWDOC, the Metropolitan Water District of Southern California, and the 28 retail water agencies within the MWDOC service area were all proactive in marketing the Project. This Project promoted the region-wide utilization of non-structural Best Management Practices, appropriate to non-point-source pollutants, which aide in the prevention of potential pollutants from entering municipal storm drain systems and aquatic ecosystems, during dry weather.

The water savings achieved through this Project leads to supply reliability and reduction of imported water dependency. MWDOC, in collaboration with its retail agencies, and cities of Anaheim, Fullerton, and Santa Ana, established the OC 20x2020 Regional Alliance as part of MWDOC's 2010 Regional Urban Water Management Plan, where all retail water agencies benefit from pooling their water use efficiency investments.

**9. Describe any other pertinent issues regarding the project:**

None

**10. Feedback to Reclamation regarding the WaterSMART Project:** *Please let us know if there is anything we can do to improve the WaterSMART Project in general, including the process for applying for or completing a WaterSMART project. Your feedback is important to us.*

The overall WaterSmart process runs smoothly from start to finish, and Reclamation personnel are always ready to provide assistance, when needed. MWDOC has enjoyed working with Reclamation. Thank you for all your assistance and support.

**11. Attachments:** *Please attach the following*

- **Any available data or information relied on in responding to paragraph 7, above; Not Applicable**
- **A map or illustration showing the location of the recipient's facilities (see paragraph 4, above);**
- **Maps, sketches, and/or drawings of the features of the completed project, as appropriate (see paragraph 5, above);**
- **Representative before and after photographs, if available;**
- **A table showing the total expenditures for the completed project (please see Sample Final Project Costs Table, below).**

## FINAL PROJECT COSTS TABLE.

| BUDGET ITEM DESCRIPTION | COMPUTATION | | RECIPIENT FUNDING | RECLAMATION FUNDING | TOTAL COST |
|---|---|---|---|---|---|
| | $/Unit and Unit | Quantity | | | |
| SALARIES AND WAGES | | | | | |
| Joseph Berg | $66.77 | 30 | $1,891.50 | $111.61 | $2,003.11 |
| Beth Fahl | $33.60 | 1526.5 | $44,355.51 | $6,934.62 | $51,290.13 |
| Sergio Ramirez | $28.44 | 0.5 | $0.00 | $14.22 | $14.22 |
| Jessica Ouwerkerk | $36.47 | 2 | $72.94 | | $72.94 |
| Mary Snow | $32.97 | 1.25 | $41.21 | | $41.21 |
| Melissa Baum-Haley | $38.85 | 438.5 | $15,637.24 | $1,400.00 | $17,037.24 |
| Sarah Rae | $21.43 | 13.75 | $0.00 | $294.66 | $294.66 |
| Matthew Conway | $37.20 | 53.5 | $765.52 | $1,224.66 | $1,990.18 |
| Intern(s) | $13.63 | 72.5 | $987.95 | | $987.95 |
| FRINGE BENEFITS | | | | | |
| Joseph Berg | $21.35 | 30 | $607.01 | $33.36 | $640.37 |
| Beth Fahl | $13.47 | 1526.5 | $18,205.04 | $2,358.27 | $20,563.31 |
| Sergio Ramirez | $9.56 | 0.5 | $3.22 | $1.56 | $4.78 |
| Jessica Ouwerkerk | $11.82 | 2 | $23.64 | | $23.64 |
| Mary Snow | $9.11 | 1.25 | $11.39 | | $11.39 |
| Melissa Baum-Haley | $11.44 | 438.5 | $4,614.71 | $400.00 | $5,014.71 |
| Sarah Rae | $1.95 | 13.75 | $0.00 | $26.84 | $26.84 |
| Matthew Conway | $10.16 | 53.5 | $206.26 | $337.34 | $543.60 |
| Intern(s) | $1.86 | 72.5 | $134.84 | | $134.84 |
| TRAVEL | | | | | |
| EQUIPMENT | | | | | |
| SUPPLIES/MATERIALS | | | | | |
| Task 1 – Marketing/Promotions | | | $0.00 | $0.00 | $0.00 |
| CONTRACTUAL/ CONSTRUCTION | | | | | |
| Task 2 – Site Inspections | | | $0.00 | $0.00 | $0.00 |
| Task 3 – Rebate Incentives | | | $122,865.27 | $42,520.26 | $165,385.53 |
| Task 4 - Statistical Evaluation | | | $1,307.90 | $8,297.01 | $9,604.91 |
| Task 7 – Database Enhancement | | | $0.00 | $3,062.50 | $3,062.50 |
| ENVIRONMENTAL AND REGULATORY COMPLIANCE | | | | | |
| OTHER | | | | | |
| **TOTAL DIRECT COSTS** | | | | | |
| **TOTAL PROJECT COSTS** | | | $211,731.15 | $67,016.91 | $278,748.06 |

# WATER CONSERVATION FIELD SERVICES PROGRAM
# PROJECT BENEFITS

Please check the appropriate water management benefits for agricultural or urban measures that you anticipate addressing in you proposal. Where available, please provide an estimate of the benefit to units (i.e. Acre Feet, Dollars, Percentages)

**It is essential to establish benefits of the Program. Please help us with your best estimate.**

| | |
|---|---|
| Reduces Leaks and Seepage | __N/A_____ Acre Feet/Year |
| Reduces System Spills | _N/A_____ Acre Feet/Year |
| Makes More Water Available | __64___ Acre Feet/Year |
| Reduces Operation Costs | ___N/A____ $ /Year |
| Reduces Energy Costs | _212,168 kWh/Year |
| Reduces Waste Treatment Costs | ___N/A____ $ /Year |
| Improves Crop Yield | _N/A_____ Percent/Year |
| Reduces On-Farm Costs | ___N/A____ $ /Year |
| Reduces Per Capita Use | __0.2___ Gallons/Capita/Day |
| Provides Technical Training | ____245 # of People |
| Provides Water Conservation Education | __750__ # of People |
| Improves Water Supply Reliability<br>* Estimate of how often the improvement will occur (i.e. 1 = each year) | __N/A____ Frequency (Years)* |
| Delays Construction of New Supplies | ___N/A____ Years |
| Reduces Drainage/Erosion | __N/A_____ Tons |
| Improves Water Quality | ___N/A____ % reduction of __ |
| Enhances Aquatic/Riparian Habitat | __N/A_____ Years |

# ATTACHMENT 1
# WEBSITE AND MARKETING MATERIALS

# Drip Irrigation

Water your landscape more efficiently and save water by converting areas irrigated by spray heads to drip irrigation. Rather than spraying wide areas, drip systems utilize point emitters to deliver water to specific locations at or near plant root zones. Water drips slowly from the emitters either onto the soil surface or below ground. As a result, less water is lost to wind and evaporation, and weed growth is minimized. Drip irrigation systems are very water-efficient and are even customizable for different plant varieties in a small area.

## Rebate Information

**The Spray to Drip Rebate Program is currently available for Orange County residential and commercial customers, with the exception of customers served by the following retail water agencies:**

Not Currently Accepting Applications

- City of Anaheim
- Emerald Bay Service District
- City of Fullerton
- City of Garden Grove
- Golden State Water Company
- City of La Palma
- City of Santa Ana
- City of San Juan Capistrano
- Trabuco Canyon Water District

Conditional Participation

- Moulton Niguel Water District (Residential Customers Not Eligible/Commercial Customers May Apply)
- Santa Margarita Water District (Commercial Customers Not Eligible/Residential Customers May Apply)
- The current residential rebate level is up to $175 per component bundle (kit), and can be applied towards eligible equipment. Each site is eligible for up to three (3) kits. Each kit is able to provide coverage for between 250 and 500 square feet of spray irrigation retrofit.
- Commercial sites may be able to receive $0.20 per square foot of converted area, with a maximum of 45,000 square feet per customer. Contact Spray-to-Drip@mwdoc.com (mailto:Spray-to-Drip@mwdoc.com) for more information.
- **Projects that are underway or already completed prior to the receipt of the "Notice to Proceed" email are not eligible to participate.**
- The installed drip irrigation equipment **must be listed** on the Eligible Products List (found below). Only drip irrigation equipment on the Eligible Products List, as evidenced by the submission of a purchase receipt, will be eligible to receive a rebate. Microspray, point source emitters, and drippers are not rebate eligible under the Program. See samples of non-eligible equipment below under program documents.

- Contractor invoices **must include** price, SKU/model numbers, manufacturer, and quantities of the rebate-eligible products purchased.
- The conversion must replace standard spray irrigation with drip irrigation.
- A minimum of 250 square feet of irrigated area must be converted to drip irrigation. In addition, for each kit a minimum of 250 square feet must be converted. (For example, if installing one kit, the converted area must be a minimum of 250 square feet. If installing two kits, the minimum converted area must be 500 square feet. For three kits, the minimum converted area must be 750 square feet.)

# Steps to Participate

1. Complete and submit a Program application. As part of the application process, you will need to upload three to five pre-retrofit pictures of the project area (the photos must be taken with the spray irrigation in use) and a simple site plan sketch. Apply online by clicking: Online Application (https://mwdoc.dropletportal.com/program/get_started/)
2. You will be notified by email of your application status and next steps.
3. Following installation of the drip kits, return to the Droplet portal to upload post-retrofit pictures of the project area and purchase receipts/invoices for the equipment installed.
4. The Program Administrator will then make arrangements to schedule your MANDATORY Post-Inspection to verify the amount of the spray to drip conversion. You must provide the inspectors with full access to the Project site Monday–Friday during daylight hours.

# Program Documents

1. Eligible Products List (https://www.mwdoc.com/wp-content/uploads/2017/05/Rebate_Elig_Product_List_3_23_17.pdf)
2. Examples of Ineligible Drip Equipment (https://www.mwdoc.com/wp-content/uploads/2017/05/Non_Qualifying_Drip_Equipment.pdf)
3. Spray-to-Drip Program Terms and Conditions (https://mwdoc.dropletportal.com/program/terms/#SPRAY-TO-DRIP%20TERMS%20AND%20CONDITIONS)
4. Drip Tubing Fact Sheet (https://www.mwdoc.com/wp-content/uploads/2017/05/Drip-Tubing-Fact-Sheet.pdf)

5. Spec Sheet – Example of a Drip Tubing Component Bundle (https://www.mwdoc.com/wp-content/uploads/2017/05/Drip-Tubing-Kit-Parts-List.pdf)
6. Frequently Asked Questions (https://mwdoc.dropletportal.com/program/get_started/)

# Contact Information

Email: Spray-to-Drip@mwdoc.com (mailto:Spray-to-Drip@mwdoc.com)

*A rebate program application and all of the personal information listed in it is public record and will be made available to any member of the public who requests it. By signing a rebate program application, the applicant acknowledges that applicant has no privacy expectations to this information and waives any claim to such.

**Physical Address:**
18700 Ward Street
Fountain Valley CA 92708

**Phone:**
(714) 963-3058

**Mailing Address:**
PO Box 20895
Fountain Valley CA 92728

# Join Our List

EMAIL *

JOIN

# Planter Bed Spray-to-Drip Retrofit (PBSD-RETRO1800)

## Solution

Dense planted area is a perfect place to use the Rain Bird XFS Dripline tubing.

## Advantages

- Up to 60% water savings
- Low maintenance results in labor savings
- No runoff = reduced liability in high traffic areas
- Factory-installed pressure compensating emitters makes XFS Dripline an easy installation

* XFS Dripline has the option to be installed on grade then covered with mulch or can be buried below grade

## Installation Steps

Remove the existing spray head components leaving the bodies in place.

Cap off all but one of the spray bodies using the Xeri-Cap (XC-1800).

For the remaining head, install the Spray-to-Drip Retrofit kit (Retro-1800)

Cut lengths of XFS Series Dripline to assemble in the planting area. The XFS is flexible enough to install in a loop, linear or grid pattern to best meet the needs of the planter area. (Note: Grid pattern shown)

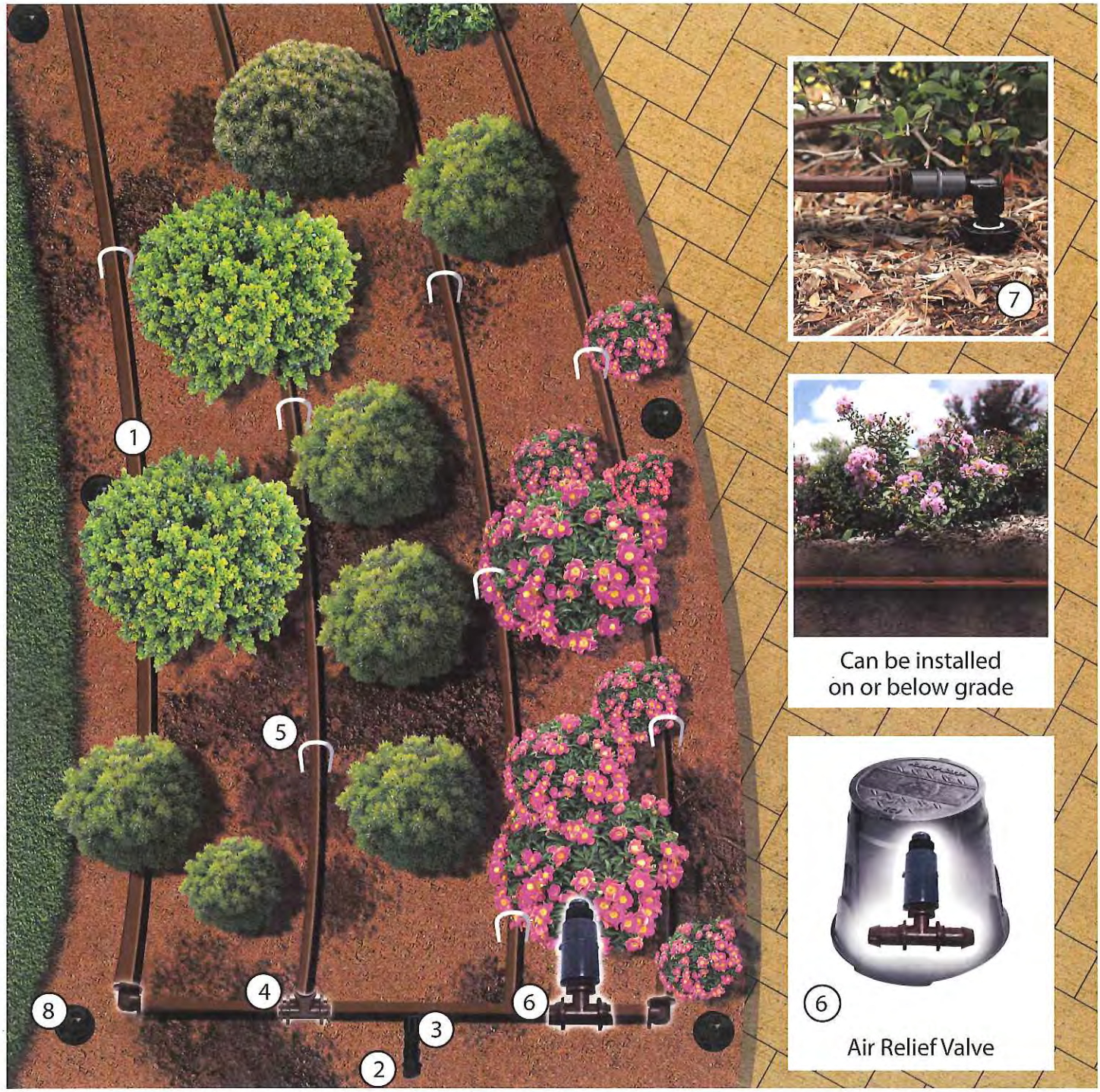
Connect lengths of XFS Series Dripline to XFF Fittings. If the dripline is to be buried, add Air Relief Valve Kit to the zone.

Stake XFS Series Dripline grid in place and flush until clean water flows.

Install planting material and mulch.

## Installation & Maintenance Tips

Flush the zone upon installation and 2-4 times per year.
If the Dripline is buried, install AR Valve Kit at high point in the system.









Can be installed on or below grade



6

Air Relief Valve

## DRIP SYSTEM COMPONENTS:

## Planter Bed Spray-to-Drip Retrofit (PBSD-RETRO1800)

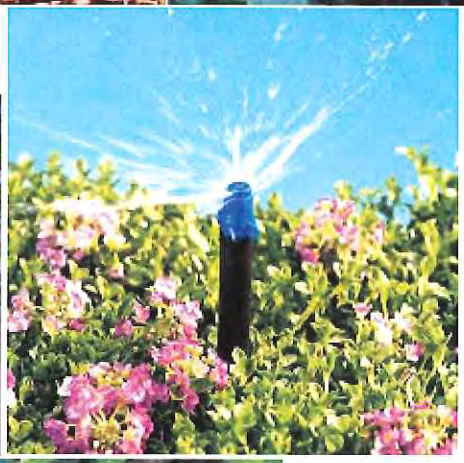
1. XFS Subsurface Dripline (XFS-06-12-100)
2. Removable Flush Cap For Easy Fit Fittings (MDCFCAP)
3. Easy Fit Compression Fitting - Coupling (MDCFCOUP)
4. XFF Fittings - Elbow Fitting (XFF-ELBOW) , TEE Fitting (XFF-TEE)
5. Galvanized Tie-Down Stake (TDS-050)
6. Air Relief Valve (ARV050) - required if tubing is installed below grade
7. Spray-to-Drip Retrofit Kit (1800RETRO)
8. Xeri-Caps (XC-1800)

Note: Required for below grade installation – Subterranean Emitter Box (SEB 7XB) for the Flush Cap Assembly (2-3) and the Air Relief Valve Assembly (6)

RAIN BIRD

| Planter Bed Sprays-To-Drip Retrofit (PBSD-Retro1800) | | | | |
|---|---|---|---|---|
| **Photo** | **Model** | **Description** | **Quantity** | **Reorder** |
| | **Rain Bird Products** | | | |
|  | XFS-06-12-100 | XFS Sub-Surface Dripline 0.6 gph 12" spacing with Copper Shield Technology | 2 | |
|   | XFF-COMBOPK | XFF Combo Pack | 2 | |
| | *Includes:*  | 5 XFF-TEE 17 mm barb tee | 0 | |
| |  | 2 XFF-Elbow 17 mm elbow | 0 | |
| |  | 5 XFF-Coup 17 mm barb Coupling | 0 | |
| |  | 1 FITINSTOOL Insertion Tool | 0 | |
|  | XFF-TMA-050 | XFF Tee Male Adapter | 1 | |
|  | XFF-MA-050 | 1/2" MPT x 17 MM | 1 | |
|  | | 1/2" Schedule 40 Threaded Coupler (gray) | 1 | |
|  | TDS-050BEND | Galvanized Tie Down Stakes | 40 | |
|  | RETRO-1800 | 1800 Retrofit Kit with 200 mesh filter and 30 psi regulator | 1 | |
|  | XC-1800 | Xeri-Caps for 1800 spray bodies | 10 | |
|  | MDCF-COUP | Flush Valve-Component 1 | 2 | |
|  | MDCF-CAP | Flush valve-Component 2 | 2 | |
|  | PPC200X | Tubing Cutters | 1 | |
|  | XFD-100 | 17 mm XFD Blank Tubing 100-foot (brown) | 1 | |
|  | | 1/2" PVC Threaded cap | 10 | |
| **Required for Sub-Surface: Air Relief Valve Assembly and Flush Valve Assembly** | | | | |
|  | ARV-050 | Rain Bird Air Relief Valve | 1 | |
|  | | Schedule 40 Coupler (Gray) | 1 | |
|  | XFF-TMA-050 | 17mm x 1/2" MPT | 1 | |
|  | SEB-7XB | Subterranean Emitter Box | 2 | |

**The following are samples of equipment types that are NOT rebate eligible under this program:**




RAIN BIRD
1/2" MPT to 8-Port Drip Manifold
CONVERT To Drip


RAIN BIRD
Drip Emitter Conversion Kit
Kit de conversión para emisores de riego por goteo
Kit de conversion de goutteur
CONVERT To Drip

Facebook/Instagram Ad

Municipal Water District of Orange County
Written by Bryce Roberto · February 14 at 10:29am

Turf removal and spray-to-drip rebates are available in your area! Apply today to begin replacing your thirsty grass or inefficient sprinklers.


**Turf Removal Rebates!**

Revamp Your Yard

Learn More

**Spray-to-Drip Rebates!**

Save Water

14,457 people reached

Like Comment Share


Municipal Water District of Orange County
Written by Bryce Roberto · February 14 at 10:29am

Turf removal and spray-to-drip rebates are available in your area! Apply today to begin replacing your thirsty grass or inefficient sprinklers.

tes!

Learn More

**See more at OCWATERSMART.COM**

14,457 people reached

Like Comment Share

Municipal Water District of Or

**only1santana** likes this 2w

Turf removal and spray-to-drip rebates are available in your area! Apply today to begin replacing your thirsty grass or inefficient sprinklers.

Add a comment...


Key Points:

- $300 budgeted over three weeks
  - Ran February 8 – March 1
  - Spent $299.80
- Targeted specific cities where Turf Removal and spray to drip rebates are active
  - Audience (very broad)
    - Initial: Ages 18-65+ Men and Women
    - Final: Ages 25-65+ Men and Women (~1.1 million potential residents according to Facebook)
- Reach: 16,924
  - Approximately $0.018 per person reached
- Total Clicks: 525
  - Approximately $0.571 per click
- Impressions: 24,404
  - Approximately $0.012 per impression

Interesting tidbits:

- Ad engaged most by men in age groups 35-44 and 45-54 (28% of clicks, 29% of reach)
- Very little engagement by 18-24 Male/Female
    - Removed age group after 1 week
- Changed first image after 1 week, due to a stead 3 day decline in engagement



Lessons Learned:

- Change parameters on the fly
    - Run time
    - Run budget
    - Pictures
    - Layout
    - Links
    - Turn on/off

# Spray to Drip Irrigation Program

**www.ocwatersmart.com/drip**


## Rebate Level

The current residential rebate level is up to $175 per component bundle (kit), and can be applied towards equipment. Each site is eligible for up to three (3) kits. Each kit is able to provide coverage for between 250 and 500 square feet of spray irrigation retrofit. For complete terms, conditions, requirements, and restrictions, please visit www.ocwatersmart.com.

## Steps to Participate

1. Complete and submit a Program application online: www.ocwatersmart.com/drip
2. You will be notified by email of your application status and next steps. Do not start your project until you receive a Project Approval.
3. Following installation of the drip system, you must submit the online Project Completion Form by following the link provided to you in your Project Approval email.
4. The Program Administrator will then make arrangements to schedule your MANDATORY post-inspection.

* As part of the application and project completion form process, you will need to upload the following: Step 1: 3 pre-retrofit pictures of the project area (the photos must be taken with the spray irrigation in use) and a simple site plan sketch; Step 3: post-retrofit pictures of the project area and invoices/receipts showing makes, models, and sku numbers for the equipment installed.

The Family of Orange County Water Agencies

# Rebates make it easy to save water!

## SMART SPRINKLER TIMERS - REBATES START AT $80*

***WATER SAVINGS:*** *40-50 gallons per day/home*

Choose a weather-based irrigation controller that adjusts the watering schedule based on current weather conditions, or a soil moisture sensor controller that measures the soil's water content to determine how much water plants need.

## ROTATING SPRINKLER NOZZLES - REBATES START AT $2* EA.

***WATER SAVINGS:*** *15 gallons per day/nozzle*

Upgrade to rotating sprinkler nozzles that water more evenly and efficiently than traditional pop-up spray heads.

*Minimum 30 nozzles*

## DRIP IRRIGATION - UP TO $175* PER KIT

***WATER SAVINGS:*** *50 gallons per day*

Convert spray heads to drip irrigation, which uses emitters to deliver water to specific locations at, or near, plant root zones.

*Up to 3 kits per site*

## TURF REMOVAL- $1 PER SQ. FT., MAXIMUM $2,000

***WATER SAVINGS:*** *Up to 70% less water used*

Replace thirsty turf with beautiful, climate-appropriate landscape.

***Visit the website for all rebate terms and conditions before applying***

www.OCWaterSmart.com

# Even more ways to save water indoors and outdoors!

## RAIN BARRELS/CISTERNS - REBATES START AT $35* PER BARREL OR $250* PER CISTERN

***WATER SAVINGS:*** *Varies based on rainfall*

Capture the rain water that falls on your roof and use it later to water your plants. Rain barrels can reduce urban runoff and ocean pollution.
*Maximum 2 rain barrels or 1 cistern per site*

## HIGH EFFICIENCY CLOTHES WASHER - REBATES START AT $85*

***WATER SAVINGS:*** *15 gallons per day*

Upgrade your old washing machine to a high efficiency clothes washer that uses up to 55% less water and gets clothes just as clean.

## HIGH EFFICIENCY TOILETS - REBATES START AT $40*

***WATER SAVINGS:*** *22 gallons per day*

Get paid to replace your old toilets with high efficiency models that use just 1.1 gallons per flush or less while maintaining high performance standards.

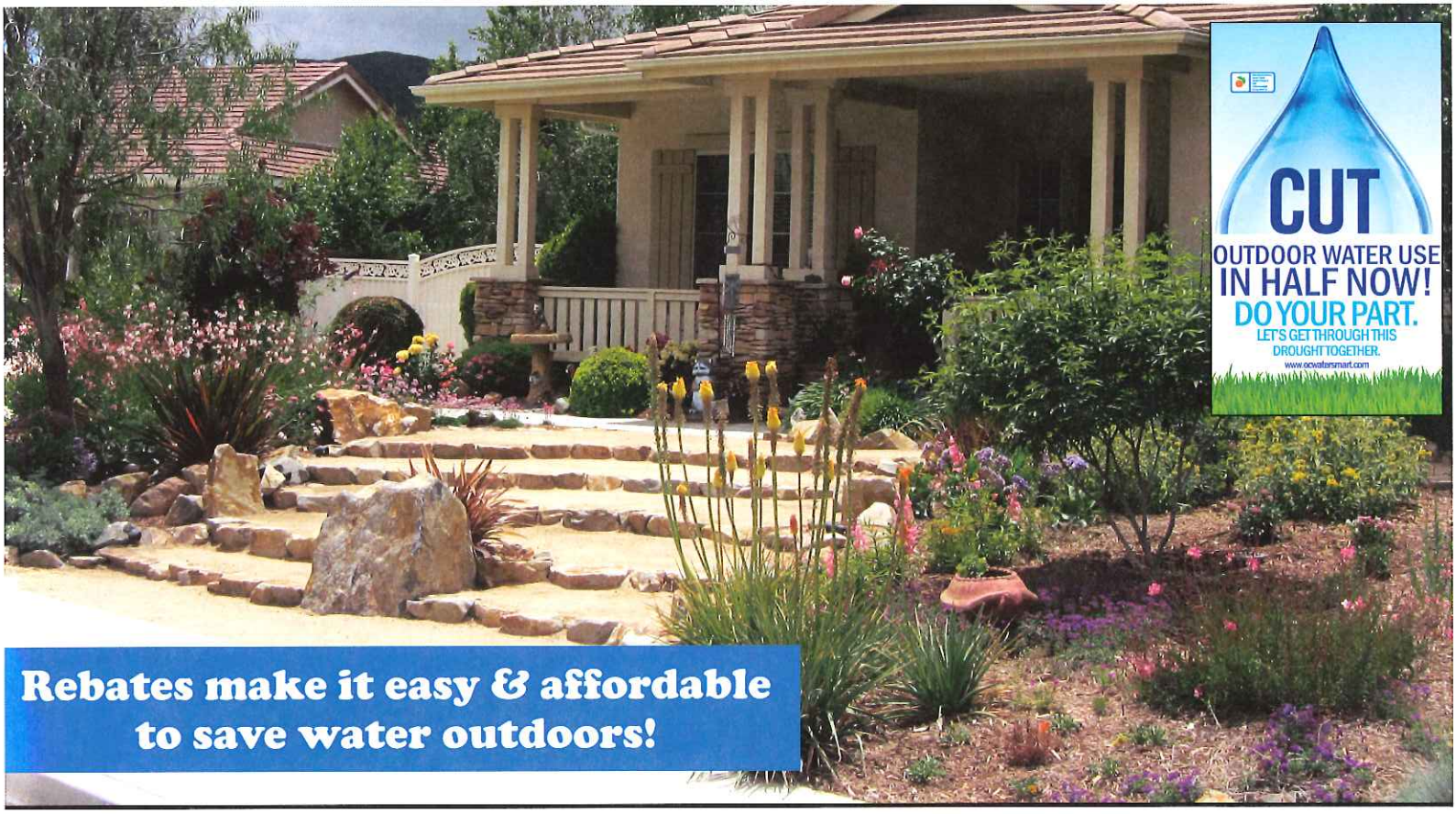
## SPRINKLER ADJUSTMENT REMINDERS - FREE

Sign up for free sprinkler adjustment reminder emails that tell you when/how to use the percent adjust feature on your basic sprinkler timer, ensuring proper watering year-round.


**Rebate amounts may vary by participating agency. Rebate levels are subject to change based on available funding. Rebate paid will not exceed the cost of device. Please visit www.OCWaterSmart.com for current rebate levels.*

MWDOC · The Metropolitan Water District of Southern California · U.S. Department of the Interior, Bureau of Reclamation · Department of Water Resources, State of California

**The Family of Orange County Water Agencies**




# Rebates make it easy & affordable to save water outdoors!


**SMART SPRINKLER TIMERS - REBATE: UP TO $80 >1 acre or $35 per station <1 acre*:** Choose a weather-based irrigation controller that adjusts the watering schedule based on current weather conditions, or a soil moisture sensor controller that measures the soil's water content to determine how much water plants need.

***WATER SAVINGS:*** *40-50 gallons per day*

**ROTATING SPRINKLER NOZZLES - REBATE: $2* EA. (30 nozzle min.):** Upgrade to rotating sprinkler nozzles that water more evenly and efficiently than traditional pop-up spray heads.

***Water Savings:*** *15 gallons per day*

**DRIP IRRIGATION - REBATE: $175* PER KIT**

Convert spray heads to drip irrigation, which uses emitters to deliver water to specific locations at or near plant root zones.

***WATER SAVINGS:*** *50 gallons per day*

**www.OCWaterSmart.com (888) 376-3314**

# More ways to save water inside and outside your home...

## RAIN BARRELS - REBATE: $75* EA.

Capture the rain water that falls on your roof and use it later to water your plants! Rain barrels can reduce urban runoff and ocean pollution.

**WATER SAVINGS:** *Varies based on rainfall*

## HIGH EFFICIENCY CLOTHES WASHER - REBATE: $85*

Upgrade your old washing machine to a high efficiency clothes washer that uses up to 55% less water and gets clothes just as clean.

**WATER SAVINGS:** *15 gallons per day*

## HIGH EFFICIENCY TOILETS - REBATE: $40* EA.

Get paid to replace your old toilets with high efficiency models that use just 1.28 gallons or less per flush while maintaining high performance standards.

**WATER SAVINGS:** *38 gallons per day*

## SPRINKLER ADJUSTMENT REMINDERS - FREE

Sign up for free sprinkler adjustment reminder emails that tell you when/how to use the percent adjust feature on your basic sprinkler timer, ensuring appropriate watering year-round.

**CSANS**

CALIFORNIA SPRINKLER ADJUSTMENT NOTIFICATION SYSTEM

**Rebate levels are subject to change based on funding availability. Rebate paid will not exceed device cost. Please check website for a list of current rebate levels.*

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

The Family of Orange County Water Agencies

# INCREASE BUSINESS, SAVE WATER

## WATER CONSERVATION REBATES

Landscape contractors can increase business and help save water by applying for rebates on behalf of their customers. Rebates on water-efficient devices are provided by Municipal Water District of Orange County and local water agencies.

### SMART SPRINKLER TIMERS

Choose a weather-based irrigation controller that adjusts the watering schedule based on current weather conditions, or a soil moisture sensor controller that measures soil moisture to determine how much water plants need.

**REBATE: Up to $155* each or $35* per station**

### ROTATING NOZZLES

Rotating nozzles water more evenly and uniformly than traditional pop-up spray heads. Better distribution uniformity means fewer brown spots.

**REBATE: $4* per nozzle**

### LARGE ROTARY NOZZLES

Commonly used to irrigate golf courses and other open landscapes, large rotary nozzles provide high distribution uniformity.

**REBATE: $13* per nozzle**

### DRIP CONVERSION

Convert spray heads to drip irrigation, which delivers water directly to plant root zones, reducing water waste due to runoff, overspray, and wind.

**REBATES AVAILABLE***

## HOW WILL THESE REBATES BENEFIT ME?

**There are many benefits to applying for water conservation rebates on behalf of your residential and commercial clients.**

- **Many customers will pay a contractor to install irrigation devices, resulting in more work and more revenue.**
- **Healthier plants mean more attractive landscapes and happier clients.**
- **Upgrading your clients' irrigation hardware makes it easier for you to manage their system and ensure appropriate watering.**
- **Due to the drought, all water users must reduce their daily water use. Help your clients do their part to save water.**

## APPLY NOW!

Additional rebate opportunities, approved product lists, applications, and program details are available at **www.OCWaterSmart.com**.

**Rebate levels are subject to change based on funding availability. Rebate paid will not exceed device cost. Please check website for a list of current rebate levels.*

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

The Family of Orange County Water Agencies

HYDRO-SCAPE

**(888) 376-3314** **www.OCWaterSmart.com**

page 1

# WATER SMART LANDSCAPE PROGRAM

The Water Smart Landscape Program is a FREE water management tool designed to help landscape contractors, homeowner associations, and property managers achieve irrigation efficiency. A 2004 study shows that participating irrigation meters save an average of 765 gallons of water per day compared to meters that are not part of the program.

## GET CERTIFIED!

Once your company begins participating in this program, you can **use the site to promote yourself as a water-efficient contractor**.

**Your company will be promoted** based on how well your sites are meeting the established water budget goals.

You will be able to **identify accounts that are over-watering** by reviewing your free monthly reports.

***www.OCWaterSmart.com/Landscape***

## HOW WILL THIS PROGRAM BENEFIT ME?

**The Program provides you with a FREE water management tool to help you and your customers:**

- **Easily track irrigation water use**
- **Improve the health, appearance, and value of landscapes**
- **Reduce your clients' water bills**
- **Protect the environment by decreasing urban runoff**
- **Maintain compliance with NPDES requirements**

# PERFORMANCE-BASED IRRIGATION MANAGEMENT CONTRACT

The Performance-Based Irrigation Management Contract (PBIMC) template is available to property owners and community managers who are seeking lower irrigation expenses through incentive-based efficient irrigation management.

The contract is designed to be used in conjunction with an irrigation budgeting tool based on localized ETo data, such as the Water Smart Landscape Program.

## HOW WILL USING THIS CONTRACT BENEFIT ME?

**By using the PBIMC template, you will have great opportunities to:**

- **Promote your business as environmentally sustainable**
- **Improve the health, appearance, and value of landscapes**
- **Reduce your clients' water bills**
- **Reduce property damage from excess irrigation runoff**
- **Maintain compliance with NPDES requirements**

## GET INCENTIVES!

The PBIMC provides several options for incorporating **incentivized performance standards** into a landscape maintenance contract.

**Performance-based incentives** are based on scientifically derived irrigation budgets customized to each irrigation meter.

**Technical assistance** is available to help participants make recommended changes.

***www.OCWaterSmart.com/Contract***

# CUT
## OUTDOOR WATER USE IN HALF NOW!
## DO YOUR PART.
LET'S GET THROUGH THIS DROUGHT TOGETHER.

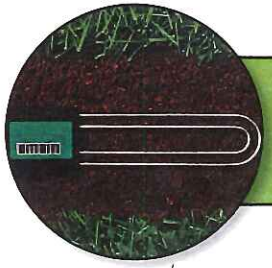
www.ocwatersmart.com

# Do your part to save water and get rebates!

## Smart Sprinkler Timer Rebate: Up to $260*

Choose a Weather-Based Irrigation Controller that adjusts the watering schedule based on current weather conditions, or a Soil Moisture Sensor Controller that measures the water content of soil to determine how much water plants need.


**Weather-Based Irrigation Controller**
*- Saves 40 gallons per day*



**Soil Moisture Sensor Controller**
*- Saves 50 gallons per day*

**www.OCWaterSmart.com/2015Rebates** **(888) 376-3314**

# More rebates to help you save water outside and inside your home...

## Drip Irrigation Rebate: Up to $175* per kit

Convert spray heads to drip irrigation, which delivers water to specific locations at or near plant root zones.

**Drip Irrigation Conversion**
*- Saves 50 gallons per day*

## High Efficiency Toilet Rebate: $100* each

Replace old toilets with high efficiency models that use just 1.28 gallons or less while maintaining high performance standards.

**High Efficiency Toilet**
*- Saves 38 gallons per day*

**Please check website for current rebate levels, which are subject to change due to funding availability. Rebate paid will not exceed device cost.*

# SIMPLE CHANGES, BIG SAVINGS!

Rebates are currently available to help you upgrade to water efficient devices and save water during the drought.

High Efficiency Clothes Washers: Upgrade your old washing machine to a high efficiency clothes washer that uses up to 55% less water while getting clothes just as clean.

Rebate level: $85 (or more) per clothes washer.*

Premium High Efficiency Toilets: Premium high efficiency toilets use just 1.1 gallons or less per flush, while maintaining high performance standards.

Rebate level: $40 (or more) per toilet.*

* For terms and conditions, current rebate levels, eligible products, and how to apply, visit ocwatersmart.com

ocwatersmart.com

## GET SMART ABOUT WATER by upgrading your irrigation system. Visit ocwatersmart.com to learn more.

Smart Sprinkler Timers: Smart timers use information about your plants, soil, and current weather conditions to automatically adjust the watering schedule for you.

Rebate level: Up to $120 per device for properties < 1 acre, or up to $50 per station for properties > 1 acre.* These devices reduce the amount of polluted water that runs off your landscape and eventually enters the ocean.

Drip Irrigation: Drip Irrigation delivers water to specific locations at or near plant root zones.

Rebate level: Up to $175 per kit, up to 3 kits per site. Must apply and receive approval to participate prior to commencing project. Additional restrictions apply.*

LET'S GET SMART ABOUT WATER

*For terms and conditions, current rebate levels, eligible products, and how to apply, visit ocwatersmart.com.

# GIVE YOUR LANDSCAPE A CALIFORNIA FRIENDLY MAKEOVER!

**TURF REMOVAL:** Get paid to replace a portion of your lawn with a California Friendly landscape that uses much less water.

*Residential Rebate level:* $**1*** per sq. foot, up to $1,000

**DRIP IRRIGATION:** Convert spray heads to drip irrigation, which delivers water to specific locations at or near plant root zones.

*Residential Rebate level:* Up to **$175*** per kit, up to 3 kits per site.

**RAIN BARRELS:** Capture rain water that falls on your roof and use it later to water your plants! Rain barrels can reduce urban runoff and ocean pollution.

*Residential Rebate level:* **$35*** each, max. 2 per home

** For terms and conditions, current rebate levels, eligible products, and how to apply, visit our website: ocwatersmart.com*

www.ocwatersmart.com

# REBATES MAKE IT EASY & AFFORDABLE TO SAVE WATER OUTDOORS!

**ROTATING SPRINKLER NOZZLES:** Replace traditional pop-up spray nozzles with rotating sprinkler nozzles, which water more evenly and efficiently.

*Residential Rebate level:* **$2*** per nozzle (30 nozzle minimum)

**SMART IRRIGATION TIMERS:** These "smart" timers use information about your landscape and local weather conditions to automatically adjust your watering schedule.

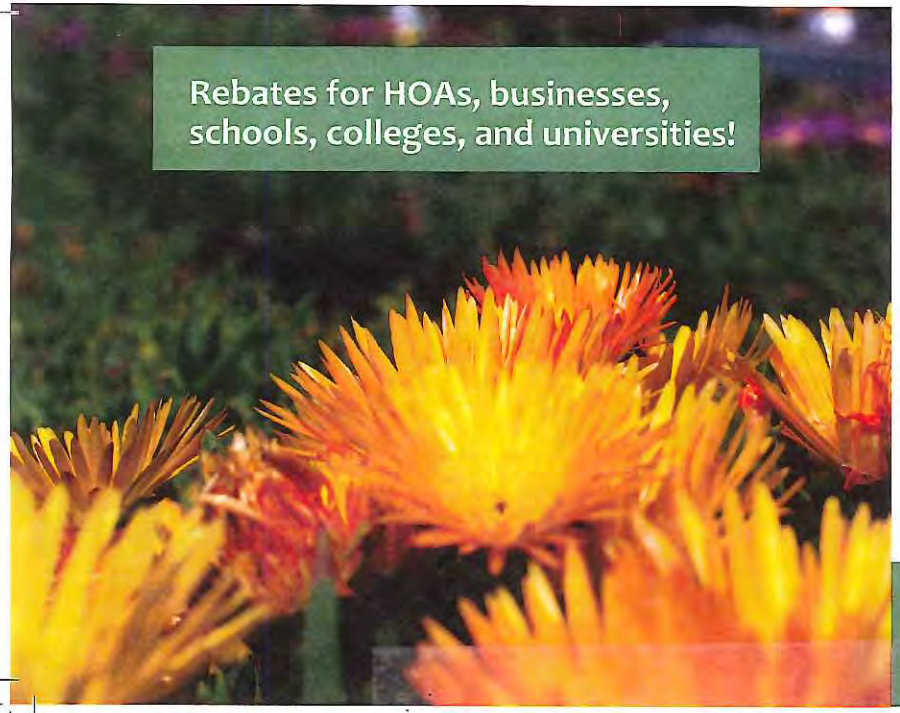
*Residential Rebate level:* Up to **$230*** per controller for properties less than 1 acre, or **$50** per station for properties greater than 1 acre

CSANS
CALIFORNIA SPRINKLER ADJUSTMENT NOTIFICATION SYSTEM

**FREE SPRINKLER ADJUSTMENT REMINDERS:** Sign up at csans.net to receive reminder emails that tell you when to adjust your sprinkler timer, ensuring appropriate watering year round!

** For terms and conditions, current rebate levels, eligible products, and how to apply, visit our website: ocwatersmart.com*

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY




**Turf Removal:** Receive a rebate for replacing your thirsty lawn with beautiful, climate-appropriate landscape.

**Rebate level:** $1 per sq. ft., maximum $10,000

**Drip Irrigation:** Convert spray heads to drip irrigation, which uses emitters to deliver water to specific locations at, or near, plant root zones.

**Rebate level:** $0.20 per sq. ft. of conversion of area, maximum $9,000

For more information, visit
www.ocwatersmart.com

# Save Money & Water Indoors

**Plumbing Flow Control Valves:** Maintain water pressure while reducing water flow in faucets and showers.

**Rebate level:** $5* each, maximum 10 required

**Ultra Low and Zero Water Urinals:** Provide effective, low-maintenance flushing in public restrooms while greatly reducing water use.

**Rebate level:** $200* each

**Premium High Efficiency Toilets:** Replace old toilets with high efficiency models that use just 1.06 gallons or less per flush while maintaining high performance standards.

**Rebate level:** $40* each

* For terms and conditions, current rebate levels, eligible products, and how to apply, visit our website: ocwatersmart.com

# WE COULD NOT HAVE DONE IT WITHOUT YOU, BUT WE ARE NOT DONE YET.


Thank you, Orange County residents, for the great strides you have made in conserving water. But we must continue to make water conservation a top priority! We are here to assist you in your water-efficiency efforts. We offer a variety of rebate programs, classes, and water-saving tools for water users. Visit our website to learn more!

**www.ocwatersmart.com**

FREE Sprinkler Adjustment Reminders! Sign up to receive reminder emails that tell you when to adjust your sprinkler timer, ensuring appropriate watering year round! Sign up at csans.net

CSANS
CALIFORNIA SPRINKLER ADJUSTMENT NOTIFICATION SYSTEM

# REBATES MAKE IT EASY TO SAVE WATER AND MONEY!

**SMART IRRIGATION TIMERS:** These "smart" timers use information about your landscape and local weather conditions to automatically adjust your watering schedule.

*Rebate level:* Up to **$80*** per controller for properties less than 1 acre, or $35 per station for properties greater than 1 acre

**DRIP IRRIGATION:** Convert spray heads to drip irrigation, which delivers water to specific locations at or near plant root zones.

*Rebate level:* Up to **$175*** per kit, up to 3 kits per site.

**ROTATING SPRINKLER NOZZLES:** Replace traditional pop-up spray nozzles with rotating sprinkler nozzles, which water more evenly and efficiently.

*Rebate level:* **$2*** per nozzle (30 nozzle minimum)

**RAIN BARRELS:** Capture rain water that falls on your roof and use it later to water your plants! Rain barrels can reduce urban runoff and ocean pollution.

*Rebate level:* **$35*** (or more), 2 barrel maximum

* For terms and conditions, current rebate levels, eligible products, and how to apply, visit our website: ocwatersmart.com

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

# SIMPLE CHANGES, BIG SAVINGS!

**Rebates are available to help you upgrade to water efficient devices, saving money and water.**

## SMART SPRINKLER TIMERS

Smart timers use information about your plants, soil, and current weather conditions to automatically adjust the watering schedule for you.

Rebates: Up to $290* per controller

## TURF REMOVAL

Receive a rebate for replacing your thirsty lawn with a beautiful, climate-appropriate landscape.

Rebates: Receive $2* per sq. ft., up to $2,000
*Pre-inspection required prior to removal of turf*

For resources and rebate information, visit ocwatersmart.com


## SPRINKLER ADJUSTMENT REMINDERS

Sign up for free sprinkler adjustment reminder emails that tell you when/how to use the percent adjust feature on your basic sprinkler timer, ensuring proper watering year-round.

Visit csans.net for more information.

## ROTATING SPRINKLER NOZZLES

Upgrade to rotating sprinkler nozzles that water more efficiently and uniformly than traditional sprinkler heads.

Rebates: Up to $3* each, minimum 30 nozzles

## DRIP IRRIGATION

Convert spray heads to drip irrigation, which uses emitters to deliver water to specific locations at, or near, plant root zones.

Rebates: Up to $175* per kit, up to 3 kits per site

## RAIN BARRELS & CISTERNS

Capture the rain water that falls on your roof and use it later to water your plants.

Rebates: Up to $50* per barrel or $250* per cistern, maximum 2 barrels or 1 cistern

* Rebate paid will not exceed the cost of the device. For terms and conditions, current rebate levels, eligible products, and how to apply, visit our website: ocwatersmart.com

# ATTACHMENT 2
# POST-EVALUATION FORM AND SAMPLE PHOTOS

# Orange County Spray-To-Drip Rebate Program

**POST-Evaluation Form**

Application #: _____

Contact Name: _____

Street Address: _____ Day Phone: _____

City/Zip: _____ Best Time To Call: _____

EMAIL:

Retail Water Agency

Scheduling Attempts

1st _____

2nd _____

3rd _____

WATER ACCT#

Was spray converted in all proposed areas? YES NO

Is pressure regulation Installed? YES NO

If yes, what is the quantity, make, and model? _____

Is filtration installed? YES NO

If yes, what is the quantity, make, and model? _____

Res only: Is the drip tubing embedded emitter? YES NO

CII only: Type of drip installed? _____

Recycled water site? YES NO

Contractor hired? YES NO

*Site Owner/Responsible Party Signature*

**Site Owner/Responsible Party Printed Name:** _____

## Area Measurements

Pre Evaluation Proposed Drip Conversion Area Measurement — **Pre** Date: _____ SQ/FT

Evaluator's Name _____

Eligible Drip Conversion Post-Project Area SqFt — **Post** Date: _____ SQ/FT

**Residential Base Rebate**

[ ] X $ 175.00 = $

*# of kits* *Base Rebate Level* *Estimated Rebate Total*

**CII Base Rebate**

[ ] X $ .20 /sq ft. = $

*Square Feet of Drip Conversion* *Base Rebate Level* *Estimated Rebate Total*

## Total Estimated Rebate Amount

$ _____

I Certify that the information provided is verified in accordance with the guidelines provided in the Agreement by our Staff who has no conflict of interest in the verification.

**Authorizing Signature** _____ **Authorizing Signer's Printed Name** _____ **Date:** _____

**Evaluator Signature:** _____ **Evaluator Printed Name:** _____ **Date:** _____

Application #: _____

# Orange County Spray-To-Drip Rebate Program

## POST-Evaluation Form

EMAIL:

Contact Name: _____

Scheduling Attempts

1st _____

2nd _____

3rd _____

**Retail Water Agency**

Street Address: _____ Day Phone: _____

City/Zip: _____ Best Time To Call: _____

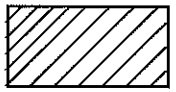
WATER ACCT#

### Instructions:

**Using the legend below, please indicate on the plot diagram the location of each item listed.**


Turf Area


Shrub Area



Retrofitted Area

## Comments

_____

_____

_____

_____

_____

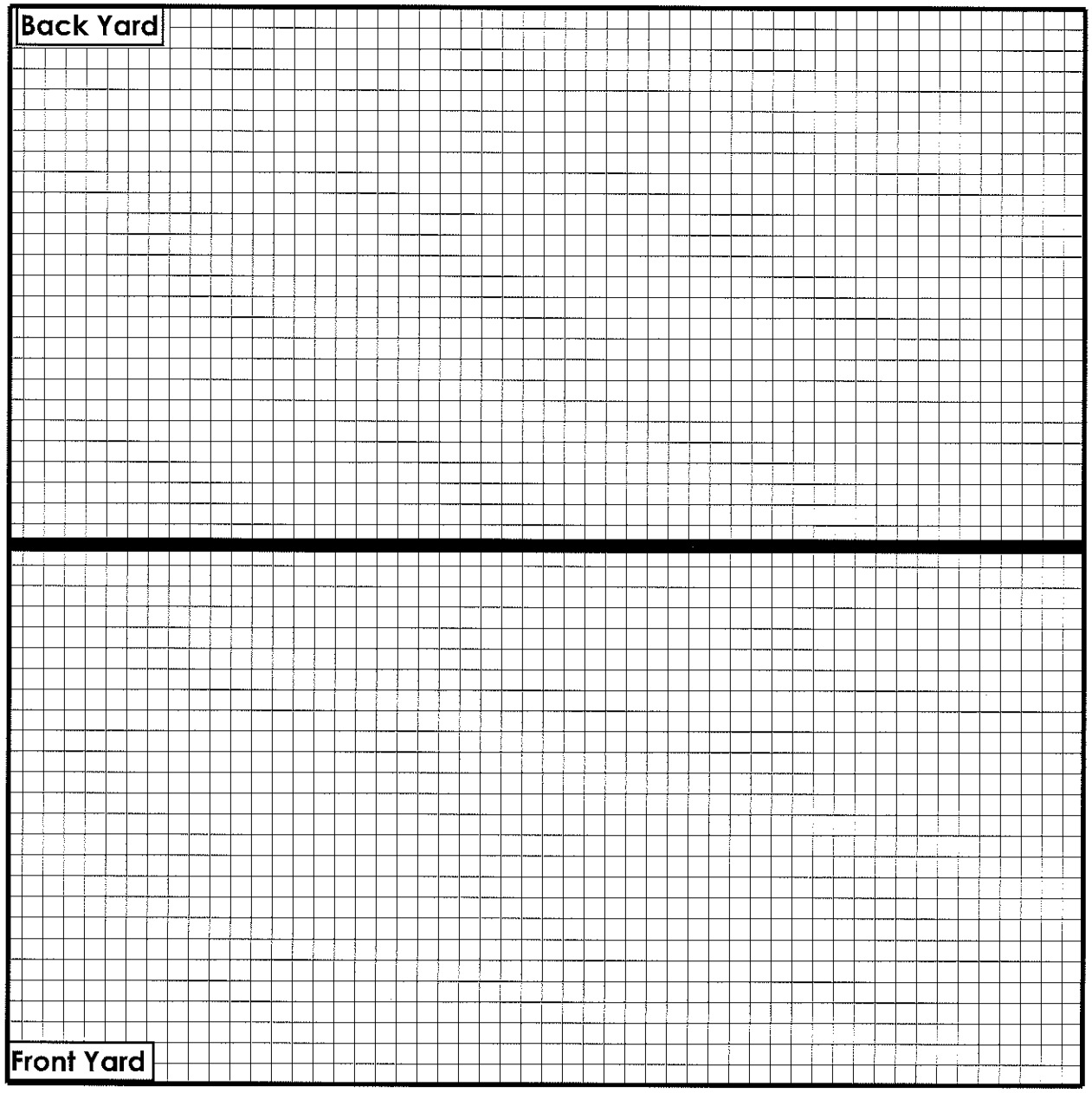
_____

_____

_____

_____

_____



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09/07/2017 11:05

# ATTACHMENT 3
# ELIGIBLE PRODUCTS LIST

# SPRAY TO DRIP
# RESIDENTIAL
# ELIGIBLE PRODUCTS LIST

| Manufacturer | Description | Model # |
|---|---|---|
| **All-In-One Component Bundle/Kit** | | |
| Rain Bird | Spray-to-Drip Retrofit Kit | S2DRetroKit |
| **Build-Your-Own Kit** | | |
| **Section (A)** | | |
| Rain Bird | Spray-to- Drip Retrofit Kit | 1800-RETRO |
| Rain Bird | Drip Control Zone Kit (¾" Anti Siphon Low Flow) | XACZ-075-PRF |
| Rain Bird | Inline Drip Control Zone Kit (¾" Low Flow) | XCZ-075-PRF |
| Rain Bird | Inline Drip Control Zone Kit (1" Low Flow) | XCZLF-100-PRF |
| Rain Bird | Drip Control Zone Kit (1" Anti-Siphon Medium Flow) | XACZ-100-PRF |
| Rain Bird | Inline Drip Control Zone Kit (1" Medium Flow) | XCZ-100-PRF |
| Rain Bird | Inline Drip Control Zone Kit (1" Medium Flow 2-Wire Compatible) | XCZPGA-100-PRF |
| Rain Bird | Pressure Regulating Filter (¾" PR RBY Filter) | PRF-075-RBY |
| Rain Bird | Pressure Regulating Filter (1" PR RBY Filter) | PRF-100-RBY |
| Netafim | 1" Valve with ¾" Low Flow Regulator with ¾" Filter | LVCZS8010075-LF |
| Netafim | 1" Valve with ¾" High Flow Regulator with ¾" Filter | LVCZS8010075-HF |
| Netafim | ¾" Low Flow Regulator with ¾" Filter, No Valve | LVCZNV10075-LF |
| Netafim | ¾" High Flow Regulator with ¾" Filter, No Valve | LVCZNV10075-HF |
| Hunter | ¾" PGV-ASV valve with ¾" HFR system with 25 PSI regulator | ACZ-075 |
| Hunter | 1" NPT PGV globe valve with 1" HFR system with 25 PSI regulator | PCZ-101 |
| Hunter | 1" ICV globe valve with 1" HY100 filter system with 25 PSI regulator | ICZ-101 |
| Hunter | ¾" NPT filter system and ¾" outlet with 25 PSI regulator | HFR-075-25 |
| Hunter | 1" NPT filter system and ¾" outlet with 25 PSI regulator | HFR-100-075-25 |
| Toro | 1" EZ-Flo Plus Valve, AVB, Filter, Regulator & Fittings | DZK-EZF-AS |
| Toro | 1" EZ-Flo Plus, Filter, Regulator & Fittings | DZK-EZF |
| Toro | 1" TPV, Filter, Regulator & Fittings | DZK-TPV |
| Toro | 1" 700 UltraFlow Inline Valve, Filter, Regulator & Fittings | DZK-700 |
| Toro | Drip Zone Kit Less Valve with Filter, Regulator & Fittings | DZK-X |

[Y] Alternate equivalent pressure regulation and filtration assembly components may be considered as a substution. Prior to purchase and installation, please email Spray-to-Drip@mwdoc.com with the assembly description, make, or model/sku information for consideration.

| | | |
|---|---|---|
| **Section (B)** | | |
| Rain Bird | XFD Dripline 0.6 GPH 12 inch spacing (Available in 100', 250', and 500' coil) | XFD-06-12-* |
| Rain Bird | XFD Dripline 0.9 GPH 12 inch spacing (Available in 100', 250', and 500' coil) | XFD-09-12-* |
| Rain Bird | XFD Dripline 0.6 GPH 18 inch spacing (Available in 100', 250', and 500' coil) | XFD-06-18-* |
| Rain Bird | XFD Dripline 0.9 GPH 18 inch spacing (Available in 100', 250', and 500' coil) | XFD-09-18-* |
| Rain Bird | XFS Dripline 0.4 GPH 12 inch spacing (Available in 100' and 500' coil) | XFS-04-12-* |
| Rain Bird | XFS Dripline 0.4 GPH 18 inch spacing (Available in 100' and 500' coil) | XFS-04-18-* |
| Rain Bird | XFS Dripline 0.6 GPH 12 inch spacing (Available in 100' and 500' coil) | XFS-06-12-* |
| Rain Bird | XFS Dripline 0.6 GPH 18 inch spacing (Available in 100' and 500' coil) | XFS-06-18-* |
| Rain Bird | XFS Dripline 0.9 GPH 12 inch spacing (Available in 100' and 500' coil) | XFS-09-12-* |
| Rain Bird | XFS Dripline 0.9 GPH 18 inch spacing (Available in 100' and 500' coil) | XFS-09-18-* |
| Rain Bird | XFCV Dripline 0.6 GPH 12 inch spacing (Available in 100' and 500' coil) | XFCV-06-12-* |
| Rain Bird | XFCV Dripline 0.6 GPH 18 inch spacing (Available in 100' and 500' coil) | XFCV-06-18-* |
| Rain Bird | XFCV Dripline 0.9 GPH 12 inch spacing (Available in 100' and 500' coil) | XFCV-09-12-* |
| Rain Bird | XFCV Dripline 0.9 GPH 18 inch spacing (Available in 100' and 500' coil) | XFCV-09-18-* |
| Rain Bird | 1/4 inch Landscape Dripline 0.8 GPH 6 inch spacing | LDQ0806100 |
| Rain Bird | 1/4 inch Landscape Dripline 0.8 GPH 12 inch spacing | LDQ0812100 |
| Netafim | Techline CV Dripline 0.26 GPH 12 inch spacing (Available in 100', 250, and 1000' coil) | TLCV26-12* |
| Netafim | Techline CV Dripline 0.26 GPH 18 inch spacing (Available in 100', 250, and 1000' coil) | TLCV26-18* |
| Netafim | Techline CV Dripline 0.4 GPH 12 inch spacing (Available in 100', 250, and 1000' coil) | TLCV4-12* |
| Netafim | Techline CV Dripline 0.4 GPH 18 inch spacing (Available in 100', 250, and 1000' coil) | TLCV4-18* |
| Netafim | Techline CV Dripline 0.6 GPH 12 inch spacing (Available in 100', 250, 500, and 1000' coil) | TLCV6-12* |

# SPRAY TO DRIP
# RESIDENTIAL
# ELIGIBLE PRODUCTS LIST

| Manufacturer | Description | Model # |
|---|---|---|
| Netafim | Techline CV Dripline 0.6 GPH 18 inch spacing (Available in 100', 250, 500, and 1000' coil) | TLCV6-18* |
| Netafim | Techline CV Dripline 0.6 GPH 24 inch spacing (Available in 100', 250, and 1000' coil) | TLCV6-24* |
| Netafim | Techline CV Dripline 0.9 GPH 12 inch spacing (Available in 100', 250, 500, and 1000' coil) | TLCV9-12* |
| Netafim | Techline CV Dripline 0.9 GPH 18 inch spacing (Available in 100', 250, 500, and 1000' coil) | TLCV9-18* |
| Netafim | Techline CV Dripline 0.9 GPH 24 inch spacing (Available in 100', 250, and 1000' coil) | TLCV9-24* |
| Netafim | Techline DL Dripline 0.26 GPH 12 inch spacing (Available in 100', 250, and 1000' coil) | TLDL26-12* |
| Netafim | Techline DL Dripline 0.26 GPH 18 inch spacing (Available in 100', 250, and 1000' coil) | TLDL26-18* |
| Netafim | Techline DL Dripline 0.4 GPH 12 inch spacing (Available in 100', 250, and 1000' coil) | TLDL4-12* |
| Netafim | Techline DL Dripline 0.4 GPH 18 inch spacing (Available in 100', 250, and 1000' coil) | TLDL4-18* |
| Netafim | Techline DL Dripline 0.6 GPH 12 inch spacing (Available in 100', 250, 500, and 1000' coil) | TLDL6-12* |
| Netafim | Techline DL Dripline 0.6 GPH 18 inch spacing (Available in 100', 250, 500, and 1000' coil) | TLDL6-18* |
| Netafim | Techline DL Dripline 0.6 GPH 24 inch spacing (Available in 100', 250, and 1000' coil) | TLDL6-24* |
| Netafim | Techline DL Dripline 0.9 GPH 12 inch spacing (Available in 100', 250, 500, and 1000' coil) | TLDL9-12* |
| Netafim | Techline DL Dripline 0.9 GPH 18 inch spacing (Available in 100', 250, 500, and 1000' coil) | TLDL9-18* |
| Netafim | Techline DL Dripline 0.9 GPH 24 inch spacing (Available in 100', 250, and 1000' coil) | TLDL9-24* |
| Netafim | Techline EZ Dripline 0.26 GPH 6 inch spacing (Available in 300', 500, and 1000' coil) | TLEZ26-06* |
| Netafim | Techline EZ Dripline 0.26 GPH 12 inch spacing (Available in 300', 500, and 1000' coil) | TLEZ26-12* |
| Netafim | Techline EZ Dripline 0.26 GPH 18 inch spacing (Available in 300', 500, and 1000' coil) | TLEZ26-18* |
| Netafim | Techline EZ Dripline 0.4 GPH 6 inch spacing (Available in 200', 500, and 1000' coil) | TLEZ4-06* |
| Netafim | Techline DL Dripline 0.4 GPH 12 inch spacing (Available in 200', 500, and 1000' coil) | TLEZ4-12* |
| Netafim | Techline EZ Dripline 0.4 GPH 18 inch spacing (Available in 200', 500, and 1000' coil) | TLEZ4-18* |
| Netafim | Techline EZ Dripline 0.6 GPH 12 inch spacing (Available in 300', 500, and 1000' coil) | TLEZ6-12* |
| Netafim | Techline EZ Dripline 0.6 GPH 18 inch spacing (Available in 200', 500, and 1000' coil) | TLEZ6-18* |
| Netafim | Techline EZ Dripline 0.9 GPH 12 inch spacing (Available in 200', 500, and 1000' coil) | TLEZ9-12* |
| Netafim | Techline EZ Dripline 0.9 GPH 18 inch spacing (Available in 200', 500, and 1000' coil) | TLEZ9-18* |
| Hunter | Professional Landscape Dripline 0.4 GPH 12 inch spacing (Available in 250', 500' and 1,000' coil) | PLD-04-12-* |
| Hunter | Professional Landscape Dripline 0.4 GPH 18 inch spacing (Available in 250', 500' and 1,000' coil) | PLD-04-18-* |
| Hunter | Professional Landscape Dripline 0.4 GPH 24 inch spacing (Available in 250', 500' and 1,000' coil) | PLD-04-24-* |
| Hunter | Professional Landscape Dripline 0.6 GPH 12 inch spacing (Available in 100', 250', 500' and 1,000' coil) | PLD-06-12-* |
| Hunter | Professional Landscape Dripline 0.6 GPH 18 inch spacing (Available in 250', 500' and 1,000' coil) | PLD-06-18-* |
| Hunter | Professional Landscape Dripline 0.6 GPH 18 inch spacing (Available in 250', 500' and 1,000' coil) | PLD-06-18-* |
| Hunter | Professional Landscape Dripline 1.0 GPH 12 inch spacing (Available in 100', 250', 500' and 1,000' coil) | PLD-10-12-* |
| Hunter | Professional Landscape Dripline 1.0 GPH 18 inch spacing (Available in 100, 250', 500' and 1,000' coil) | PLD-10-18-* |
| Hunter | Professional Landscape Dripline 1.0 GPH 24 inch spacing (Available in 250', 500' and 1,000' coil) | PLD-10-24-* |
| Hunter | Mini Landscape Dripline 0.5 GPH 6 inch spacing (Available in 100' and 250' coil) | MLD-05-06-* |
| Hunter | Mini Landscape Dripline 0.5 GPH 12 inch spacing (Available in 100' and 250' coil) | MLD-05-12-* |
| Hunter | Subsurface Irrigation Mat (100 FT OR 295 FT ROLL) | ECO-MAT |
| Hunter | Fleece Wrapped Tubing (250 FT ROLL) | ECO-WRAP |
| Toro | Brown PC Dripline 0.53 GPH 12 inch spacing (Available in 100', 250', and 500' coil) | T-PCB1853-12-* |
| Toro | Brown PC Dripline 0.53 GPH 18 inch spacing (Available in 100', 250', and 500' coil) | T-PCB1853-18-* |
| Toro | Brown PC Dripline 1.0 GPH 12 inch spacing (Available in 100', 250', and 500' coil) | T-PCB1810-12-* |
| Toro | Brown PC Dripline 1.0 GPH 18 inch spacing (Available in 100', 250', and 500' coil) | T-PCB1810-18-* |
| Toro | DL 2000 PC Dripline with rootguard 0.5 GPH 12 inch spacing (Available in 100', 500', and 1,000' coil) | RGP-212-* |
| Toro | DL 2000 PC Dripline with rootguard 0.5 GPH 18 inch spacing (Available in 100', 500', and 1,000' coil) | RGP-218-* |
| Toro | DL 2000 PC Dripline with rootguard 1.0 GPH 12 inch spacing (Available in 100', 500', and 1,000' coil) | RGP-412-* |
| Toro | DL 2000 PC Dripline with rootguard 1.0 GPH 18 inch spacing (Available in 100', 500', and 1,000' coil) | RGP-418-* |
| Toro | Soakerline 1/4 inch Classic Dripline 0.53 GPH 6 inch spacing (Available in 100' coil) | T-5DB252-6-100 |
| Toro | Soakerline 1/4 inch Classic Dripline 0.53 GPH 12 inch spacing (Available in 100' coil) | T-5DB252-12-100 |
| Toro | DL2000 Microline with rootguard 0.53 GPH 6 inch spacing (Available in 100' coil) | T-MCRG-206 |
| Toro | DL2000 Microline with rootguard 0.53 GPH 12 inch spacing (Available in 100' coil) | T-MCRG-212 |

* Represents coil length

# ATTACHMENT 4
# ACTIVITY REPORT

# ATTACHMENT 4
# Activity Report for Reporting Period of October 1, 2017 thru January 30, 2018

**Contract Number:** R12AP35344 – Spray to Drip Conversion Pilot Program
**Contractor:** Municipal Water District of Orange County
**Contact Person:** Beth Fahl, Designated Project Manager
**Phone:** 714-593-5015
**Email:** bfahl@mwdoc.com

**Reporting Period:** October 1, 2017 to January 30, 2018
**Due Date:** By January 30, 2018

## Progress Achieved

**Table 1 Site Conversions**

| Activity | No. Performed this Reporting Period | Total Performed | Goal | Percent Complete |
|---|---|---|---|---|
| Spray to Drip Conversion – Residential and Commercial (SF) | 132,692.4 sf | 695,423.90 sf | 175,126 sf | 397% |

**Table 2 Water Savings**

| Square Feet Converted | Total Water Savings (gpd) | Lifetime Acre Feet | Acre Feet/Year | Percent Complete |
|---|---|---|---|---|
| 695,423.90 sf | 57,400 | 643 | 64 | 341% |

**Table 3 Funding Information**

| Funding Source | Funding this Reporting Period | Cumulative Funding | % Funding Expended | Cost Share Ratio |
|---|---|---|---|---|
| Reclamation | $5,407.70 | $67,016.91 | 100% | 24% |
| MWDOC | $14,192.91 | $211,731.15 | 212% | 76% |
| **Total** | **$19,600.61** | **$278,748.06** | **312%** | **100%** |

## Activity

**Task 3 – Rebate Incentives**
**Federal Share: $42,520.26 - 100% expended**
**Applicant Match: $78,415.32 - 157% expended**

The overall goal of this task is to convert 175,126 square feet of high precipitation rate spray irrigation with drip irrigation. During this reporting period, a total of 8,108.4 square feet was converted at 10 residential sites and 124,584 square feet at two commercial sites, for a total of 132,692.40 square feet across 12 sites. For the 10 residential sites, rebates were paid for the installation of 18 spray-to-drip conversion kits, with each kit consisting of at least one pressure regulation/filtration component and at least 200 linear feet of inline emitter tubing. All rebates paid were for applicants who applied and were approved prior to the October 30, 2017 Program end date, but who completed their projects after October 30, 2017 and before the January 30, 2018 due date for the Final Report. A list of the program participants for the period of October 1, 2017 through January 30, 2018 is attached hereto.

| Direct Funds | MWDOC Direct Funding | Reclamation Direct Funding | Total this Task |
|---|---|---|---|
| Costs this Report | $10,550.00 | $3,088.73 | $13,638.73 |
| Cumulative | $122,865.27 | $42,520.26 | $165,385.53 |

| Staff Funds | MWDOC Indirect Funding | Reclamation Staff Time Reimbursement | Totals this Task |
|---|---|---|---|
| Current Report | $817.25 | $0.00 | $817.25 |
| Cumulative | $33,624.06 | $1,680.27 | $35,304.33 |

**Task 4 – Project Evaluation**
**Federal Share: $8,297.01 - 100% expended**
**Applicant Match: $1,307.90 - 100% expended**

During this reporting period, MWDOC's in-house statistical analyst spent 89 hours toward the preparation of the Project Evaluation. All data and survey responses underwent a comprehensive analysis, and the final results have been compiled into a written report to be submitted to Reclamation with the Final Report.

| Direct Funds | MWDOC Direct Funding | Reclamation Direct Funding | Total this Task |
|---|---|---|---|
| Costs this Report | $1,307.90 | $2,318.97 | $3,626.87 |
| Cumulative | $1,307.90 | $8,297.01 | $9,604.91 |

| Staff Funds | MWDOC Indirect Funding | Reclamation Staff Time Reimbursement | Totals this Task |
|---|---|---|---|
| Current Report | $1,517.76 | $0.00 | $1,517.76 |
| Cumulative | $2,238.98 | $978.62 | $3,217.60 |

# Total Program Expenditure Tracking

**Agreement No.:** R12AP35344
**Grantee:** Municipal Water District of Orange County
**Program:** Spray to Drip Conversion Pilot Program
**Term:** August 27, 2012 to October 30, 2017

| Invoice No. | Billing Period | Reclamation | Recipient | Total |
|---|---|---|---|---|
| 1 | 8/27/12 to 3/31/13 | $ 500.00 | $ 2,206.28 | $ 2,706.28 |
| 2 | 4/1/13 to 9/30/13 | $ 1,447.61 | $ 3,377.75 | $ 4,825.36 |
| 3 | 10/1/13 to 3/30/14 | $ 0 | $ 7,566.44 | $ 7,566.44 |
| 4 | 4/1/14 to 9/30/14 | $ 6,117.14 | $ 15,470.54 | $ 21,587.68 |
| 5 | 10/1/14 to 3/31/15 | $ 7,612.63 | $ 19,525.12 | $ 27,137.75 |
| 6 | 4/1/15 to 9/30/15 | $ 7,074.57 | $ 21,896.84 | $ 28,971.41 |
| 7 | 10/1/15 to 3/31/16 | $ 12,354.36 | $ 98,146.19 | $ 110,500.55 |
| 8 | 4/1/16 to 9/30/16 | $ 7,736.53 | $ 16,248.35 | $ 23,984.88 |
| 9 | 10/1/16 to 3/31/16 | $ 0 | $ 6,458.89 | $ 6,458.89 |
| 10 | 4/1/17 to 9/30/17 | $ 18,766.37 | $ 6,641.84 | $ 25,408.21 |
| Final Report | 10/1/17 to 1/29/18 | $ 5,407.70 | $ 14,192.91 | $ 19,600.61 |
| | **Budgeted Amount** | $ 67,016.91 | $ 99,945.65 | $ 166,962.56 |
| | Cost Share | 40% | 60% | 100% |
| | **Total Expended** | $ 67,016.91 | $ 211,731.15 | $ 278,748.06 |
| | Percentage Expended | 100% | 212% | 312% |
| | **Balance Remaining** | $ 0.00 | $ (111,785.50) | $ (111,785.50) |

MWDOC Documentation for Staff Cost

for

Period of October 1, 2017 through January 30, 2018

**Municipal Water District of Orange County**
**Report of Salary and Benefits Paid**
**For the Period 100117 thru 103017**
**Activity Code 8112 - Spray to Drip Conversion Pilot Project / Fund 2000 - General Fund**

| Name | Hours | Amount | Hourly Rate |
|---|---|---|---|
| Beth Fahl | | | |
| Salary | 30 | $1,236.89 | |
| Benefits | | $389.56 | |
| Total Salary & Benefits | 30 | $1,626.45 | 54.2150 |
| Mary Snow | | | |
| Salary | 0.25 | $8.99 | |
| Benefits | | $2.47 | |
| Total Salary & Benefits | 0.25 | $11.46 | 45.8400 |
| Matthew Conway | | | |
| Salary | 14 | $528.92 | |
| Benefits | | $168.18 | |
| Total Salary & Benefits | 14 | $697.10 | 49.7929 |
| Totals | | | |
| Salary | 44.25 | $1,774.80 | |
| Benefits | | $560.21 | |
| Total Salary & Benefits | 44.25 | $2,335.01 | 52.7686 |

Task 3
Back-up Documentation

List of Program Participants for Period
of
October 1, 2017 through January 30, 2018

**S2D Program Participants for the Period of October 1, 2017 through January 30, 2018**

| PerformingRetail | Payee | App Date | RebatePaidDate | Qty SF | QTY Kit | MET_Amt | Application Number | Eligible Costs | S2D Grant Amt | RWA Amount | Rebate Amount |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Santa Margarita Water District | Micaela Finlayson | 10/26/2017 | 1/22/2018 | 566 | 2 | $ - | S2D1-R-SM-21083-13079 | $ 350.00 | $ 350.00 | $ - | $ 350.00 |
| Santa Margarita W.D. | DAVID MACK | 8/31/2017 | 11/27/2017 | 367 | 1 | $ - | S2D1-R-SM-17863-10027 | $ 216.00 | $ 175.00 | $ - | $ 175.00 |
| Santa Margarita Water District | Jim Anderson | 6/13/2017 | 1/22/2018 | 802 | 1 | $ - | S2D1-R-SM-10017 | $ 241.79 | $ 175.00 | $ - | $ 175.00 |
| San Clemente | Susan Newkirk | 7/17/2017 | 11/27/2017 | 1065.4 | 3 | $ - | S2D1-R-SC-17862-10025 | $ 463.73 | $ 463.73 | $ - | $ 463.73 |
| City of San Clemente | Mike Heydenrych | 8/11/2017 | 1/22/2018 | 822 | 3 | $ - | S2D1-R-SC-17778-11043 | $ 538.57 | $ 525.00 | $ 13.57 | $ 538.57 |
| Mesa Consolidated W.D. | Steve Rausch | 6/27/2017 | 10/13/2017 | 2163 | 3 | $ - | S2D1-R-MESA-10000 | $ 531.37 | $ 525.00 | $ - | $ 525.00 |
| Laguna Beach County Water District | Jane Park | 10/14/2017 | 1/22/2018 | 374 | 1 | $ - | S2D1-R-LB-21161-13081 | $ 289.50 | $ 175.00 | $ - | $ 175.00 |
| Irvine Ranch Water District | David Eich | 8/29/2017 | 1/22/2018 | 728 | 2 | $ - | S2D1-R-IRWD-20992-13063 | $ 482.06 | $ 350.00 | $ - | $ 350.00 |
| Irvine Ranch Water District | Shelley Levine | 6/27/2017 | 1/22/2018 | 860 | 1 | $ - | S2D1-R-IRWD-10004 | $ 178.10 | $ 175.00 | $ - | $ 175.00 |
| City of Fountain Valley | Phoung Trinh | 8/22/2017 | 1/22/2018 | 361 | 1 | $ - | S2D1-R-FV-17846-13053 | $ 188.16 | $ 175.00 | $ - | $ 175.00 |
| Yorba Linda Water District | Rancho Dominguez Community | 10/5/2017 | 12/18/2017 | 4125 | | $ 750.00 | S2D1-C-YLWD-13541-13049 | $ 750.00 | $ - | $ - | $ 750.00 |
| Moulton Niguel W.D. | Lake Park Community Association c, | 3/13/2017 | 11/27/2017 | 120459 | | $ 9,800.00 | S2D1-C-MNT-4463-10043 | $ 68,069.37 | $ - | $ 24,091.80 | $ 33,891.80 |
| | | | | **132,692.40** | **18** | **$ 10,550.00** | | **$ 72,298.65** | **$ 3,088.73** | **$ 24,105.37** | **$ 37,744.10** |

Task 4
Back-up Documentation

Project Evaluation Time and Expenses
for
Period of October 1, 2017 through January 30, 2018

**Municipal Water District of Orange County**
**Report of Project Evaluation Time and Expenses**
**for the Period of October 1, 2017 through October 30, 2017**

| Name | Hours | Amount | Hourly Rate |
|---|---|---|---|
| Rachel Waite | | | |
| Salary | 89 | $2,881.82 | |
| Benefits | | $745.05 | |
| Total Salary & Benefits | 89 | $3,626.87 | 40.7513 |
| Totals | | | |
| Salary | 89 | $2,881.82 | |
| Benefits | | $745.05 | |
| **Total Salary & Benefits** | **89** | **$3,626.87** | **40.7513** |

# ATTACHMENT 5
# SPRAY TO DRIP CONVERSION PILOT PROGRAM EVALUATION

Prepared for:
United States Dept. of Interior
Bureau of Reclamation
Agreement No. R12AP35344

# Evaluation of Municipal Water District of Orange County's Spray-to-Drip Conversion Pilot Program

Prepared by:


MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

18700 Ward Street
Fountain Valley, CA 92708

The Family of Orange County Water Agencies

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# Acknowledgements

The Evaluation of the Municipal Water District of Orange County's Spray-to-Drip Conversion Pilot Project (S2D Program or Program) was achieved by the efforts put forth from the Water Use Efficiency Department of the Municipal Water District of Orange County and the local retail water agencies within Orange County. This study would not have been possible without the assistance of the participating retail water agencies that provided data for the program evaluation. It was a collaborative effort by all parties involved.

Valuable information and contributions were made by the following staff at the Municipal Water District of Orange County:

- Ms. Beth Fahl
- Dr. Melissa Baum-Haley
- Ms. Rachel Waite
- Mr. Joseph Berg
- Mr. Steve Hedges
- Mr. Matthew Conway

Funding for the S2D Program and this program evaluation were received through a grant from the United States Bureau of Reclamation.

The agencies that provided rebates and incentives to assist with the S2D Program:

- Metropolitan Water District of Southern California
- Municipal Water District of Orange County
- The Family of Orange County Water Agencies

Special thanks go out to all retail agencies and customers that supported and participated in the S2D Program and this program evaluation.

# Executive Summary

The Spray-to-Drip Conversion Pilot Project (S2D Program or Program) was developed by the Municipal Water District of Orange County (MWDOC) to provide monetary incentive, in the form of a rebate, for customers to replace inefficient, high-water-using spray heads with efficient, low-water-using drip irrigation. The S2D Program was implemented throughout Orange County within the service area of MWDOC's 28 retail water agencies. This Program targeted the conversion of 175,126 square feet of inefficiently irrigated area to low-water-using drip, reducing irrigation water use and runoff, and was projected to save more than 188 acre-feet over the life of the irrigation system improvements. The S2D Program provided a base incentive of up to $0.50 per square foot, up to $0.30 from Reclamation and a match of $0.20 from the Metropolitan Water District of Southern California.

A Program Evaluation was conducted to evaluate what successes and challenges came with implementation of the Program, the results of the Program in terms of actual water savings, and to provide a recommended rebate rate to help establish a regional S2D Program. This evaluation had two parts, a Process Evaluation where over 100 customers were contacted about their experiences with the S2D program, and an Impact Evaluation that includes a statistical analysis to evaluate actual changes in customer water consumption. The goal of the Process Evaluation was to survey the participants in the Program regarding their observations and satisfaction since completing the project, experience with the program process, and general marketing information in order to evaluate the overall effectiveness of the S2D Program. The purpose of the Impact Evaluation was to quantify the actual water savings resulting from the S2D program; meaning realized water savings that could be discerned at the meter.

The Process Evaluation survey revealed an overall positive customer response to the Program. Over 70% of participants reported that since completing their project, they have noticed water savings and a positive change to their landscape, and most would not have converted to drip irrigation if not for the S2D rebate. Additionally, participants indicated that, based on their experience, there was a high likelihood they would participate in another water-savings program. Overall, satisfaction with the program was high; 5 –point Likert scale answers regarding customer satisfaction averaged from 3.6 to 4.

The Impact Statistical Analysis showed there were statistically significant reductions in water consumption once completing a S2D project. The average residential water savings was 0.121 gallons per day per square foot (gpd/sq. ft.) and 84 gpd per project site, or a 24% reduction in total water consumption. Commercial water savings were 0.066 gpd/sq. ft. and 473 gpd per meter, or a 19% reduction in total water consumption. The statistically quantified water savings established through the Program will contribute to setting the rebate rates for a broader program within the MWDOC and Metropolitan service areas.

Through the S2D Program 562,682 sq. ft. of inefficiently irrigated landscape was converted to drip irrigation, decreasing water consumption and irrigation runoff. Overall, residential projects saved 27.25 AFY and commercial projects save 26.74 AFY, a total savings for Orange County of 53.99 AFY. Over the 10-year project life of the drip irrigation, 540 AF of water will be conserved.

# Introduction

The Municipal Water District of Orange County (MWDOC) commenced the S2D Program in August 2012. The Program was offered to residential and commercial sites located within participating MWDOC service territories, which includes 28 retail agencies. The purpose of the Program is to encourage and incentivize the replacement of traditional spray heads with drip irrigation, and is aimed at reducing water consumption and runoff from residential and commercial landscape irrigation. Stationary or fixed spray irrigation nozzles apply more water than any other typical domestic irrigation nozzle or head, and they are the most common irrigation head installed for ornamental beds and small turf grass areas. Spray irrigation also applies water at a rate faster than the infiltration rate of local soils, causing runoff (Figure 1). Runoff caused by inefficient irrigation systems not only wastes water, but can transport fertilizers, pesticides, herbicides, trash, and other pollutants throughout the watershed, often reaching the oceans of Orange County's beaches. Drip irrigation results in more efficient water application because it targets the root zone of the plants and irrigates 50% or less of the area, eliminating runoff. See Figure 3 for an examples of laid drip line before it is covered with mulch.

**Figure 1. Spray irrigation applied to a lawn with visible runoff (left) and flowerbed (right).**

To ensure the drip irrigation system will work efficiently and last a minimum of 10 years, the following equipment and rules are required:

- Filter – to keep the drip system clean from debris that may clog the emitters and damage the equipment and flows.
- Pressure Regulator – to maintain the system at a maximum 30 psi, which is the recommended pressure for drip irrigation. Unregulated Household water pressure is typically too high for the drip systems
- Embedded Emitter Tubing – flow rate may be a maximum of 1 gallon per hour to maintain efficiently.
- If all spray heads are not removed from the conversion area, they must be capped off.

Reference Figure 2 for images of these required components.

**Figure 3. Examples of sites with drip irrigation installed.**


**Figure 2. Pressure regulator and filter combination (left), drip tubing (right).**

Project participation begins with the submission of an application to MWDOC by a residential or commercial property owner (Participant). A Program workflow diagram can be found in Figure 1. A photo-based pre-inspection is then conducted to confirm that the site has working spray irrigation in place. If the site further qualifies, an authorization to proceed is emailed to the Participant, giving the Participant sixty (60) days to complete the conversion project. When all work is completed, the Participant contacts the Project Administrator to indicate that the project is finished and to schedule the mandatory post-inspection, which includes a measurement of the conversion area and verification that the appropriate equipment has been installed. Upon successful completion of the post-inspection, the rebate check is issued and mailed to the Participant. Program participation criteria include:

- The conversion area must be a minimum of 250 $ft^2$ and must be irrigated with working spray irrigation.
- Projects that have been started or are already completed prior to the completion of the rebate application are not eligible.
- Conversions must comply with all applicable laws, codes, policies, covenants, conditions, and restrictions.
- Drip equipment installed must be listed on the Eligible Products List (see Appendix A). Deviations from the Eligible Products List are considered on a case-by-case basis prior to installation.
- Only one Spray-to-Drip rebate per meter will be issued.

Program goals included converting 175,126 square feet of inefficiently irrigated area to low-water-using drip, reducing irrigation water use and runoff, and to reach a water-savings target of 188 acre-feet over the life of the irrigation system improvements.

The Program is funded by a Field Services Grant provided by the United States Department of Interior, Bureau of Reclamation (USBR), along with additional funding from the Metropolitan Water District of Southern California (MWD), and the Family of Orange County Water Agencies. As part of the Program, the funding agencies require that a Program Evaluation be performed.

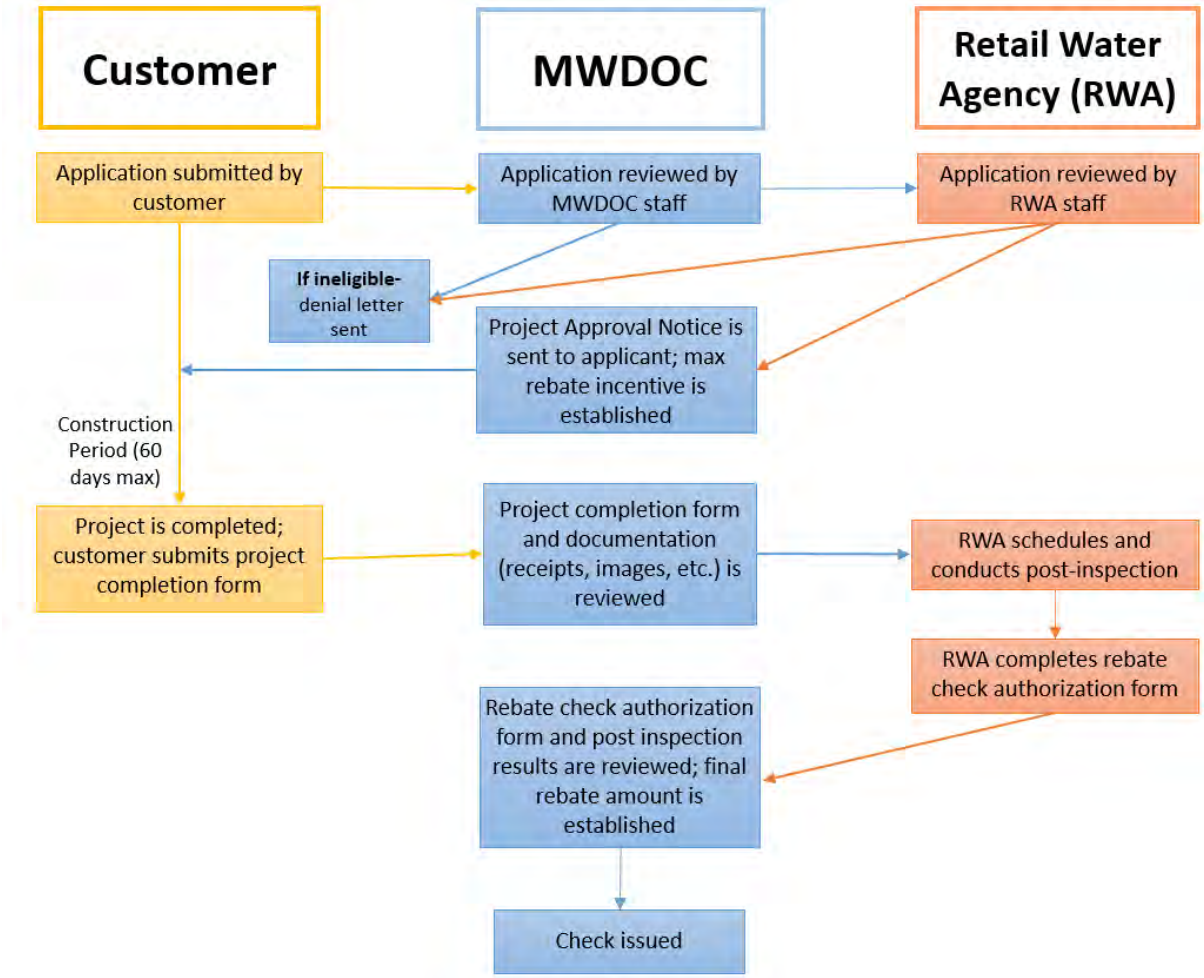


**Figure 4. S2D Program work flow.**

## Evaluation Need

The purpose of this Program Evaluation is to evaluate Program impact, participation, and trends. In addition to fulfilling a grant agreement requirement, MWDOC is looking to determine what successes and challenges came with implementation of the Program, as well as the results of the Program in terms of actual water savings. This Program Evaluation assesses two central aspects of the S2D Program: Program process and Program impact. As part of the Program Process Evaluation, an anonymous survey was distributed to Program participants to determine Program participation trends and customer response to the Program. This information is used to identify the strong aspects of the Program and those which may need tweaking in order to best improve the existing Program. As part of the Program Impact Evaluation, a statistical analysis was performed to determine the impact of Program participation on customer water use. This is used to evaluate Program effectiveness in terms of water saved, but will also contribute to setting the rebate rates for a broader program within the MWDOC and Metropolitan service areas and to increasing the broader pool of data which makes up the water savings metric associated with converting from traditional spray to drip irrigation.

A key requirement for receiving the grant funding from USBR was the performance of a Program Evaluation to determine either the successes and/or challenges faced by the Program and the water savings achieved. The results from this Program Evaluation will help determine the effectiveness of the Spray-to-Drip Program and will provide information on how to best focus the Program for the future, including suggested rebate incentives for a MWD regional Spray-to-Drip program.

## Program Evaluation Objectives

The goal of the Program Evaluation is to determine:

1. Impact on water consumption
2. Program participation trends
3. Customer response to the Program
4. Future rebate incentive levels

## Program Effectiveness

Since the launch of the Spray-to-Drip Pilot Program in August 2012 through the reporting period ending September 30, 2017, a total of 562,682 square feet was converted from spray irrigation to drip, 321% of the initial goal. The breakdown of the conversion is outlined in Table 1. The water savings metric used to calculate estimated water savings is 0.090 gpd/sq. ft. The total estimated savings is 61 AFY and over the 10-year project life total water savings is 610 AF.

**Table 1. Spray to Drip Conversion Pilot Program Activity and Estimated Savings**

| | Number of Sites | Square Feet Converted | Number of Kits | Est. Water Savings (AFY) |
|---|---|---|---|---|
| **Residential Sites** | 205 | 201,019 | 418 | 22 |
| **Commercial Sites** | 29 | 361,713 | N/A | 39 |
| **Total** | 234 | 562,732 | 418 | 61 |

The spatial distribution of projects was across Orange County, California, with nearly a project within each retail provider's service area (see Figure 5). The spatial range of participation is slightly concentrated in southern Orange County, specifically in the Moulton Niguel Water District and Santa Margarita Water District service areas. However, this trend is not uncommon for rebate programs in Orange County. Temperatures in Orange County's inland areas can be 15° warmer than on the coast, especially in summer months. Coastal Orange County falls within California Irrigation Management Information System (CIMIS) Evapotranspiration (ETo) Zones 2 and 4, whereas the non-coastal portion of the County falls in Zone 6, which can be as much as 1.5 times the rate of Zone 2 and 0.6 times the rate of Zone 4. The wide spatial spread of projects across Orange County's diverse geography presents a unique opportunity to study the effects of converting to drip irrigation in different microclimates.

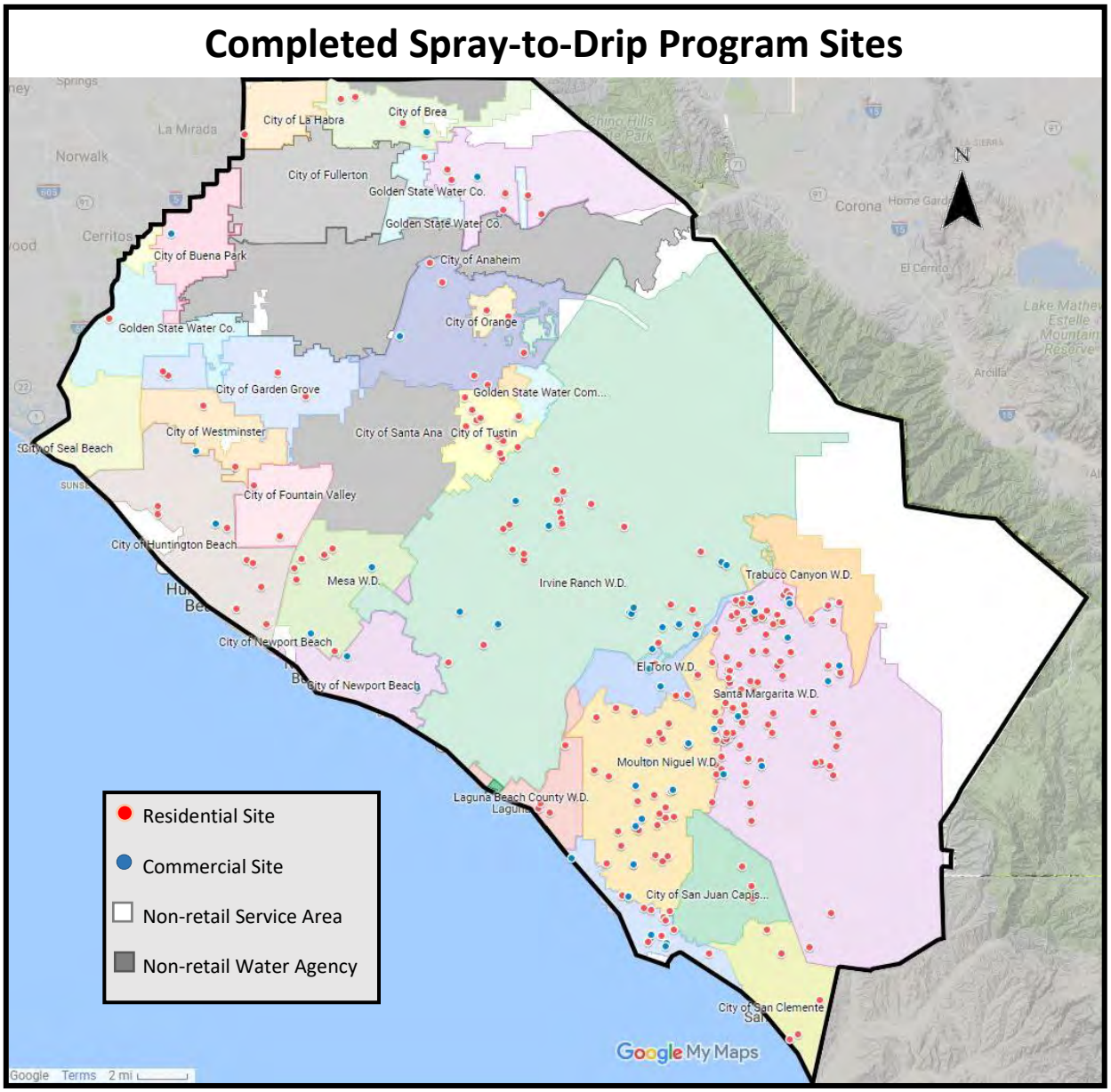


**Figure 5. Spatial distribution of completed sites that participated in the S2D Program.**

## Program Promotion

MWDOC and the retail agencies were proactive in marketing the S2D Program. Marketing for the Program involved local retail agencies including bill stuffers informing customers of the rebate available through this Program. Additionally, the Program was advertised on the MWDOC and local retail agency websites, and MWDOC used a variety of social media platforms as a promotion tactic. MWDOC also promoted the Program at public outreach and industry-specific events.

For the period of Fall 2015 through Winter 2017, the following promotional activities occurred: (1) Bill

inserts were sent out in Fall 2015 and 2016, Spring 2016 and 2017, Summer 2017, and Winter 2017 - total number of inserts sent was 862,350; (2) Full page flyers were produced - total number of flyers was 17, 450; and (3) Six weeks of Facebook and Instagram advertisements were posted – total reach was 33,926. The residential incentive is up to $175 per kit, with a cap of three kits, meaning the maximum residential rebate is $525. The commercial incentive rate is up to $0.20/sq. ft., with a cap of 45,000, meaning the maximum commercial rebate is potentially $9,000.

# Process Analysis

## Customer Survey

As a component of the Process Evaluation, a Program results and satisfaction survey was distributed via email to customers who applied to the S2D Program. The purpose of this survey was to gain insight on participants' experiences with participating in the S2D Program. Any customer who submitted an application was invited to participate, regardless of their status in the Program, and all surveys were completed anonymously to avoid bias through fear of consequence. Ninety-eight people completed the survey, and six people partially completed the survey, for a total of 104 responses. Partial responses were included for the questions that were answered. The questionnaire covered a variety of categories including customer observations and satisfaction since completing the project, experience with the Program process, and marketing information. Customers who did not complete a project were not directed to complete questions regarding observations and satisfaction since completing project, but were included in the Program process and marketing sections. A complete copy of the S2D Customer Survey can be found in Appendix B.

Most customers who participated in the survey received a rebate. The survey participant makeup is as follows: 72% completed a project and received a rebate; 14% completed a project and did not receive a rebate; 14% did not complete their project and did not receive a rebate; and 1% are currently completing their project. The most common reason cited for not completing a project was wanting to install equipment not on the Eligible Products List.

## Observations and Satisfaction since Completing Project

### *Perceived Results*

Customers were asked a series of questions pertaining to their perceived results from converting to drip irrigation. These questions provide information on how the customer feels about their project post-installation and helps to evaluate how customers have responded to their new system in terms of perceived efficiency achieved from the conversion.

Seventy percent of survey participants indicated that they noticed lower consumption (water savings) on their water bill since installing drip irrigation. A small fraction of participants, just 10%, indicated they did not notice water savings, and almost a quarter of participants were unsure if their water consumption had changed (see Figure 6). One participant commented that with increased rates and a confusing billing structure from their retail water agency, it was too difficult to tell if consumption was lower. This customer, and most likely many others, may use the price of their bill to gauge water consumption, which may not have a linear correlation. During the drought, particularly 2014 to 2015, many retailers altered their billing structures so that decreased water consumption was not necessarily represented by a lower water bill. Unfamiliarity with water utility bills and/or rate increases may have influenced customer response to this question, most likely causing participants to select they were unsure.

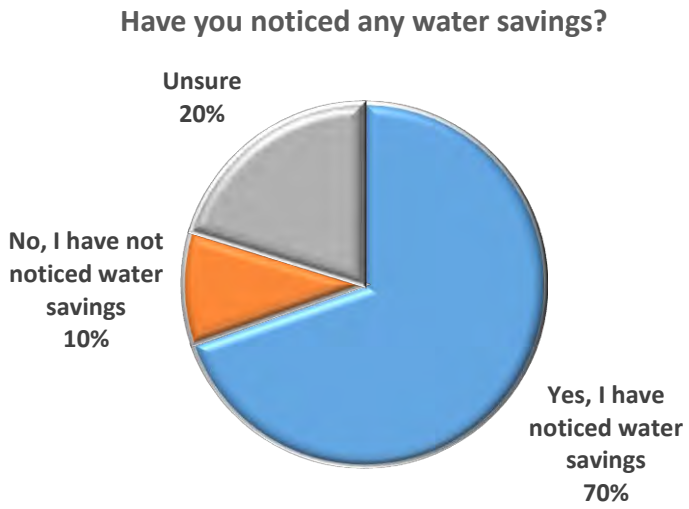


**Figure 6. Customer perceived water savings since completing an S2D Project.**

Seventy-one percent of participants noticed a positive change to their landscape since installing drip irrigation (e.g., healthier plants and soil and less run off), and only 9% reported a negative change. Twenty-one percent said there was no change, or they were unsure if a change occurred (see Figure 7).

Of the participants who reported a negative change, 62% completed their projects, but did not receive a rebate, and 62% also reported that they did not experience water-savings. Over 85% of customers who reported a negative change in their landscape also rated the Program processes unfavorably and provided a comment categorized as negative. While this question is meant to be answered independently from thoughts regarding Program process, it is very possible that negative feelings towards the administrative side of the Program affected answers in the perceived results section.

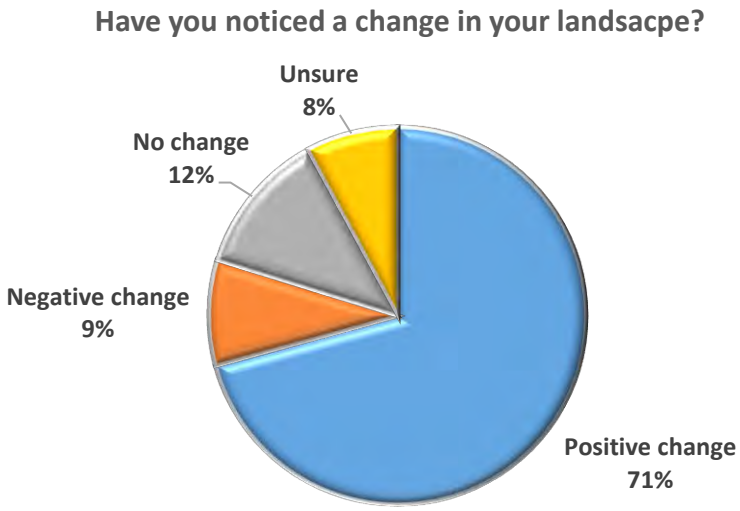


**Figure 7. Customer perceived landscape changes since completing an S2D Project.**

The high percentage of participants who noticed water savings and a positive change to their landscape after they have completed their project is positive validation for the S2D program. These results indicate that customers were able to maintain or improve the health of their landscape while using less water. Due to the drought, customers were being asked to cut back on water use, specifically outdoor use through irrigation, and to follow landscape watering schedules. These results suggest that converting to drip irrigation was a way to help customers maintain or improve their landscapes in drier than normal conditions while still complying with drought restrictions.

### *Actions*

Figure 8 represents actions taken by customers since they have completed their project. Thirty-nine percent of participants reported installing additional drip since completing their project. Installing additional drip is viewed as a positive factor. It indicates the customer was happy with the installation and was inclined to install more drip without receiving a rebate incentive. Thirty-eight percent reported making additional modifications to their drip system since completing the project. Information pertaining to what specifically was modified was not requested. However, it may imply that modifications to increase water flow were performed, which would be viewed as a negative action. The product eligibility requirements for this Program are very specific - purposefully so to ensure customers are installing quality product in a manner that will save water. Although Program requirements state that the project must remain in place and meet requirements for at least five years, it is important to note that customers seem to sometimes modify their systems. Stronger, more visible language and educational materials on why product eligibility guidelines are in place may help prevent customers from modifying their systems.

Seventy percent of participants indicated they would not have made the conversion to drip if not for the rebate, or were unsure if they would have made the conversion. The high number of projects that may not have occurred without the S2D Program is strong validation for the Program's purpose and expansion.

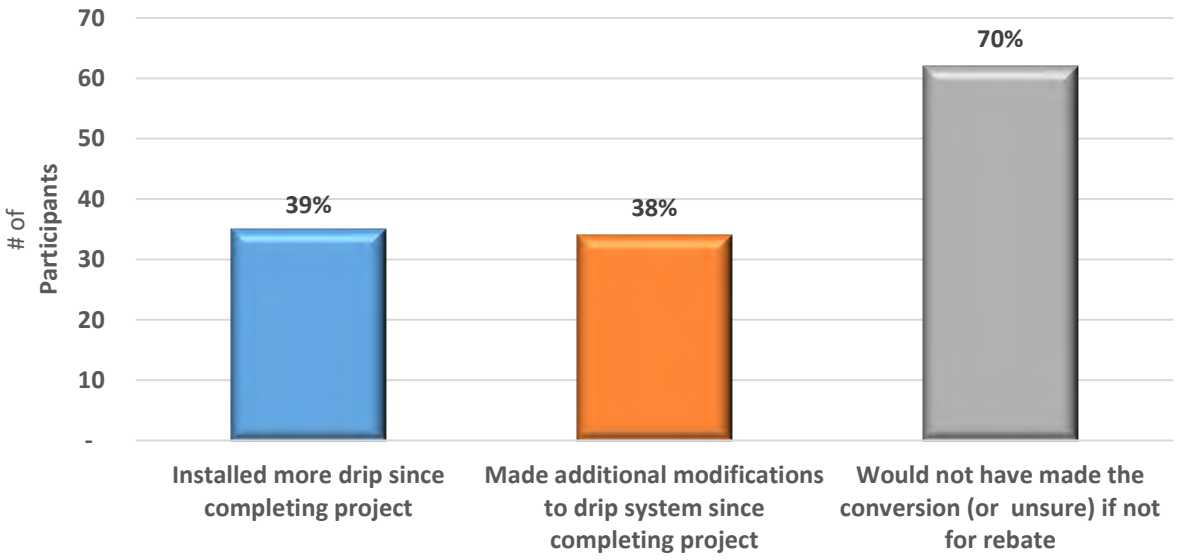


**Figure 8. Customer motivations and actions since completing an S2D Project.**

## Experience with Program Process

Customers were asked a series of questions focusing on their experience with the Program process, including the relationship between S2D and Turf Removal, and their overall satisfaction with the Program. These results provide feedback on the Program's process workflow, usability, ease, and customer satisfaction with finding information, interaction with customer service, effectiveness of the available information, and general feelings about participating in the Program.

### *Spray-to-Drip and Turf Removal Participation*

The ability for customers to participate in multiple programs at once is extremely important, especially among outdoor devices. It is common for a homeowner or HOA to do a renovation which transforms landscape, irrigation, and more. The Turf Removal Program requires low-flow irrigation be installed, prompting many customers to install drip irrigation to fulfill this requirement. Participation in the S2D Program helps to maximize the rebates they are eligible to receive.

The majority (64%) of survey participants participated in the S2D Program and the Turf Removal Program at the same time and 8% participated in both separately (see Figure 9). Of those who participated simultaneously, 70% thought it was easy to go through both programs simultaneously, and 19% thought the process was moderate. Only 11% of participants indicated it was difficult to participate in both programs at the same time. This shows that the two programs flow well together, but that some steps could be taken to maximize cohesion. The implementation of the Droplet platform, explained in the Steps Moving Forward section below, will further improve the unity between the two programs.

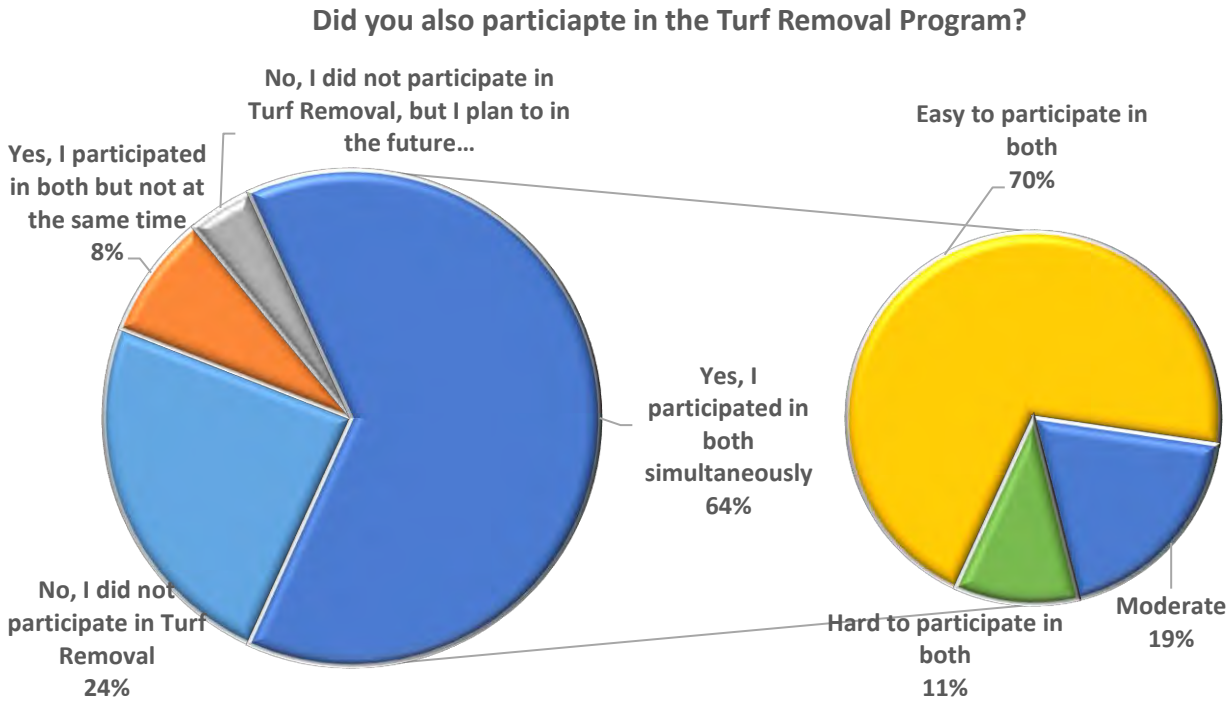


**Figure 9. Participation crossover in the S2D and Turf Removal Programs.**

Participants are given a 60-day window to complete their S2D project. Similarly, Turf Removal participants are also given 60 days to complete the Turf R. If a customer is participating in both programs at the same time, Program staff will give both projects the same 60-day window to complete the projects. Eighty-nine percent of participants thought the 60 day window was an adequate amount of time. Specifically, 53% noted they finished with time to spare, and 36% noted that they finished on time but with more difficulty (see Figure 10).

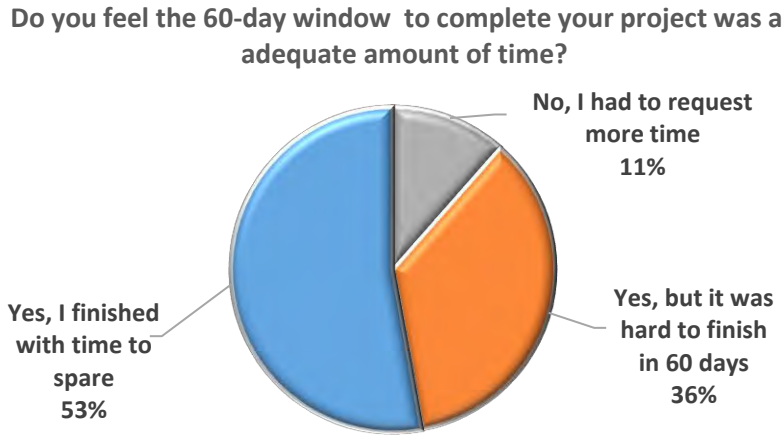


**Figure 10. Participant response to the 60-day project completion window.**

There is a negative correlation between simultaneously participating in S2D and Turf Removal and ease of finishing within the 60 day project window (see Figure 11). Of those participants who had to request more time, 80% simultaneously participated in the Turf Removal Program, compared to 60% of those who finished with time to spare. Because Turf Removal Program projects typically involve more work than a stand-alone spray to drip irrigation conversion, the difficulty in finishing within 60 days is most likely strongly tied to the Turf portion of the project requiring longer than 60 days. This correlation is important to note when evaluating a customer extension request for general program management.

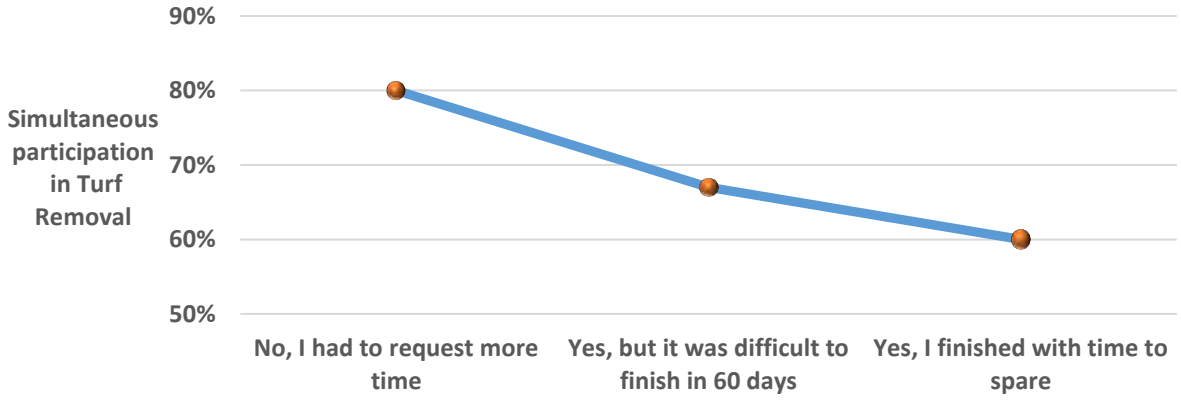


**Figure 11. Negative correlation between simultaneous participation in Spray-to-Drip and Turf Removal and ability to finish the project within the 60-day window.**

### *Program Ease and Satisfaction*

When asked if help was needed at any point in the process, about a quarter of participants indicated that they found all of the help they needed on the website, and 22% indicated that did not need help at all. About 9% of participants indicated they needed to call customer service multiple times, and 8% of participants reported they were lost and help was difficult to find. However, as indicated in Figure 12, the majority of participants were able to obtain Program information through the Program website and a call to customer service. While numerous customers needed to call customer service, only a few indicated that they needed to call customer service multiple times, implying their questions were cleared up on the first attempt.

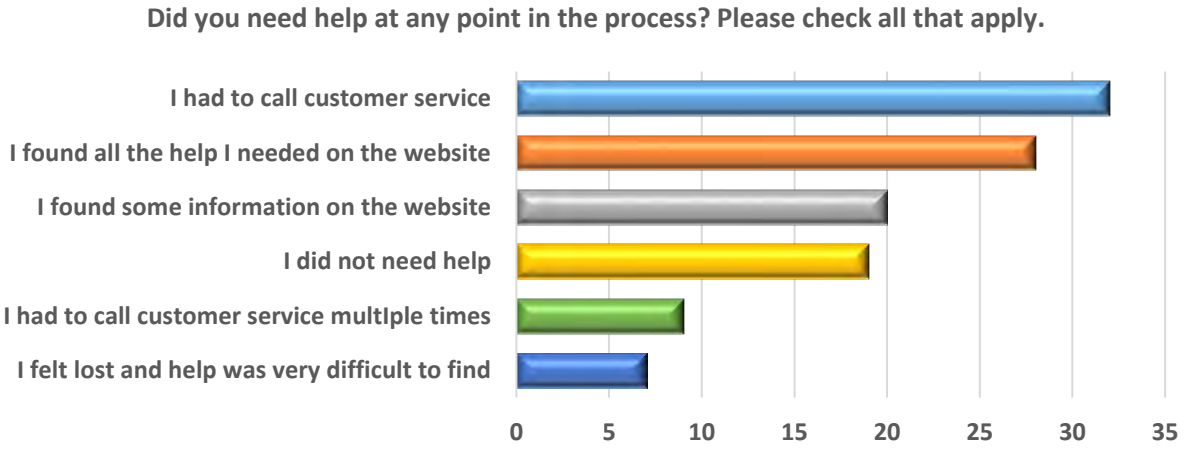


**Figure 12. Participant response regarding Program assistance.**

Survey participants were asked two sets of Likert scale questions, one set pertaining to the ease of the Program and one set regarding overall satisfaction with the Program. The majority of ease-of-the-Program questions were answered positively. Over 90% said it was at least moderately easy to find information about the Program, over 88% said it was at least moderately easy to understand Program instructions, and 73% thought it was at least moderately easy to obtain customer support. The average Likert scale answer to the three ease-of-Program process questions are shown in Figure 13. The average responses fall between moderate and easy, which is positive but also suggests there is some room for improvement. Such improvements may include more descriptive program instructions, and making sure contact information for customer support is easily found.

The majority of responses to the Likert scale Program satisfaction questions indicated high or highest satisfaction levels. Approximately 70% of participants reported they were likely to participate in another water savings rebate program - 50% selecting the highest likelihood and 20% selecting a high likelihood. This is a greatly encouraging response, as an understated goal of all MWDOC-sponsored water-saving rebate programs is to provide an experience that may help propel the customer to participate in other programs to maximize their water savings.

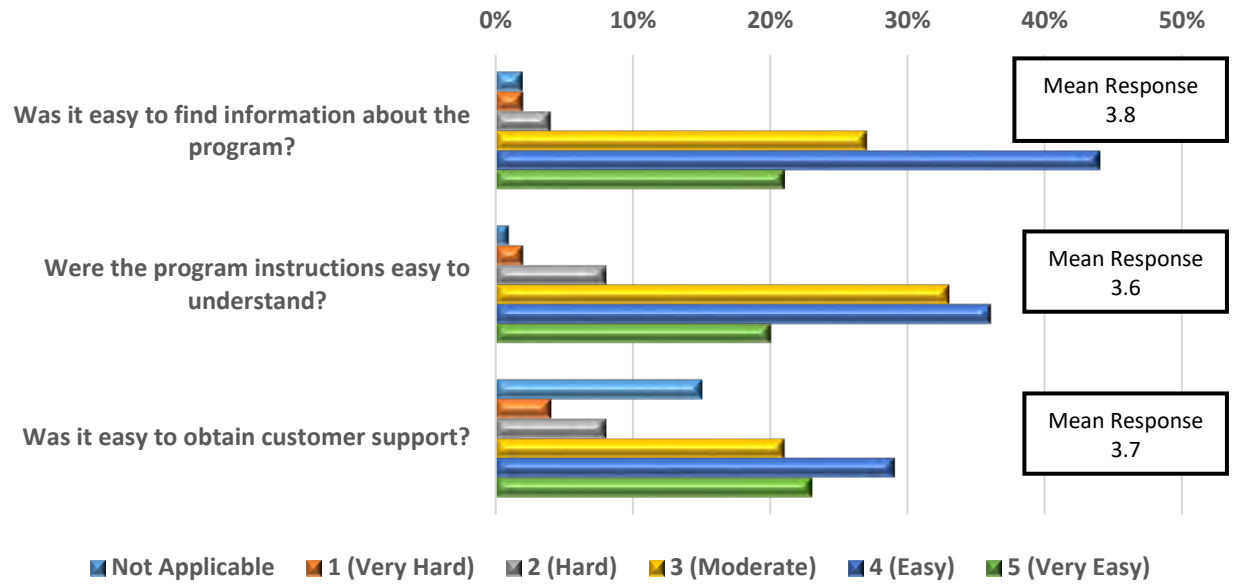


**Figure 13. Likert scale questions regarding ease of process.**

Of those who indicated they contacted customer service, about 70% ranked that experience as high or highest. Twenty-six percent of participants selected that this question was inapplicable (presumably indicating that they did not contact customer service), meaning they did not need assistance throughout the process of participating in the Program. When asked about their overall program satisfaction, 72% selected high or highest (5). The average responses ranged between 3.8 and 4, meaning on average each aspect of the program was rated close to "high." See Figure 14 for the average Likert scale scores and complete results.

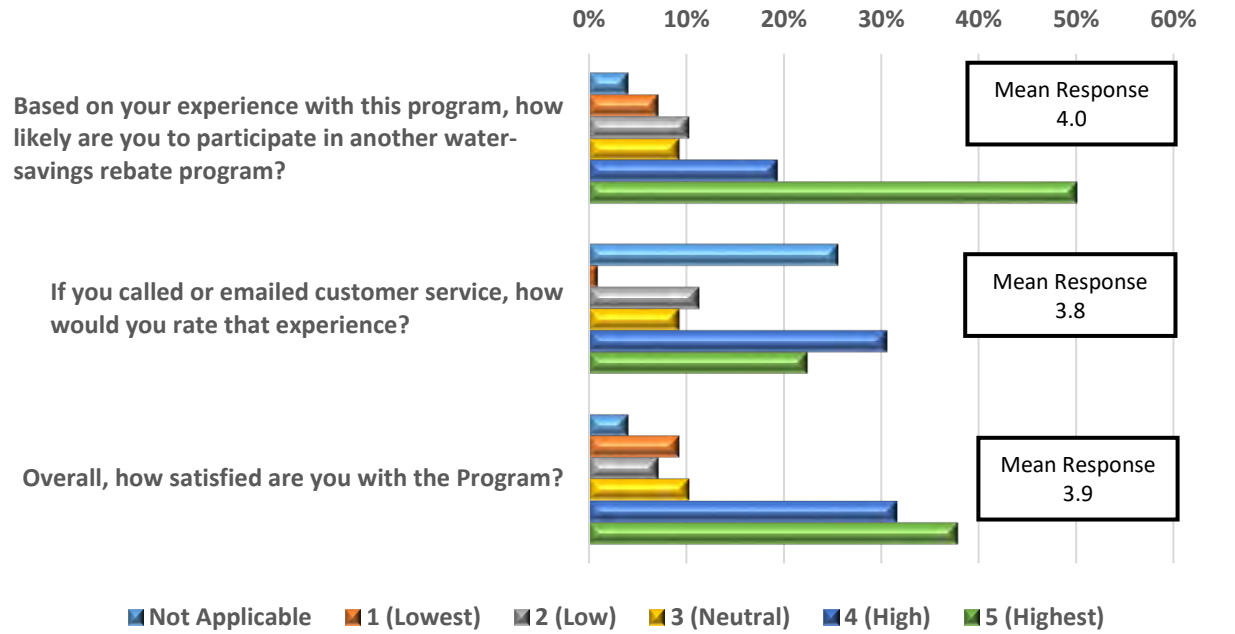


**Figure 14. Likert scale questions pertaining to customer satisfaction.**

### *Marketing*

The questions in this section were asked to gain perspective on how customers found out about the S2D Program and how to best reach them in the future. This input will be used to evaluate marketing efforts moving forward.

Around one half of participants learned about the S2D Program through participation in the Turf Removal Program or other water savings programs, and about a quarter of participants found out about the Program through information provided in their water bill/bill inserts (see Figure 15). The Turf Removal Program received a lot of attention and publicity during the drought, causing participation rates to in that program to skyrocket, especially in 2014 and 2015. Because of the close relationship between Turf Removal and S2D, many customers who applied for the Turf Removal Program were provided information about the S2D Program as part of that application process. While maintaining the relationship between Turf Removal and S2D is essential, it is also important to focus on other ways customers may be informed about the Program, especially reaching those customers who are not necessarily interested in replacing turf grass. It is important to see that almost 30% of participants found out about the S2D Program through bill inserts, which will be a key way to promote the Program in the future.

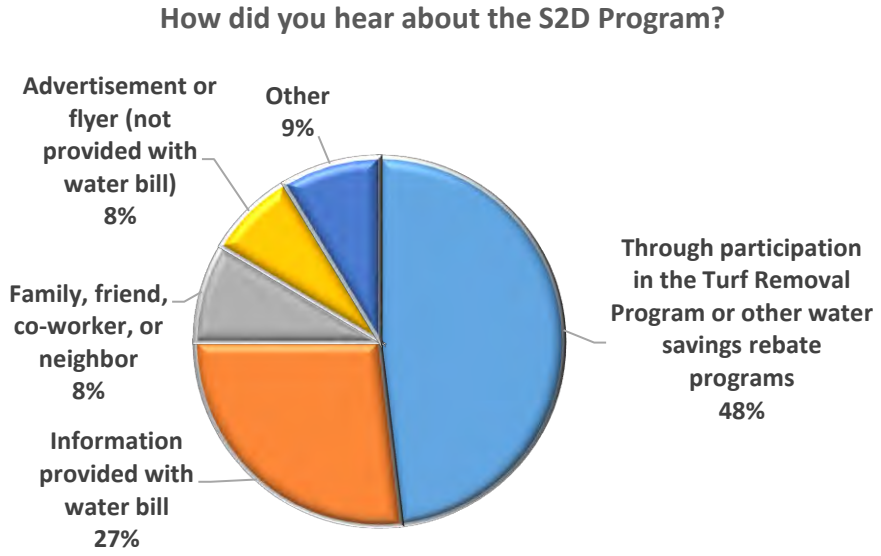


**Figure 15. Customer S2D Program awareness.**

Similarly, when asked about the best way to be contacted about future water-savings opportunities, the overwhelming majority (87%) of participants selected bill inserts (see Figure 16). This indicates that bill inserts are one of the most powerful marketing tools for water-savings rebate programs and represents the importance of connecting different rebates programs in a collaborative marketing effort. Of those who selected "other," the most common suggestion was to be reached through the email associated with the water account.

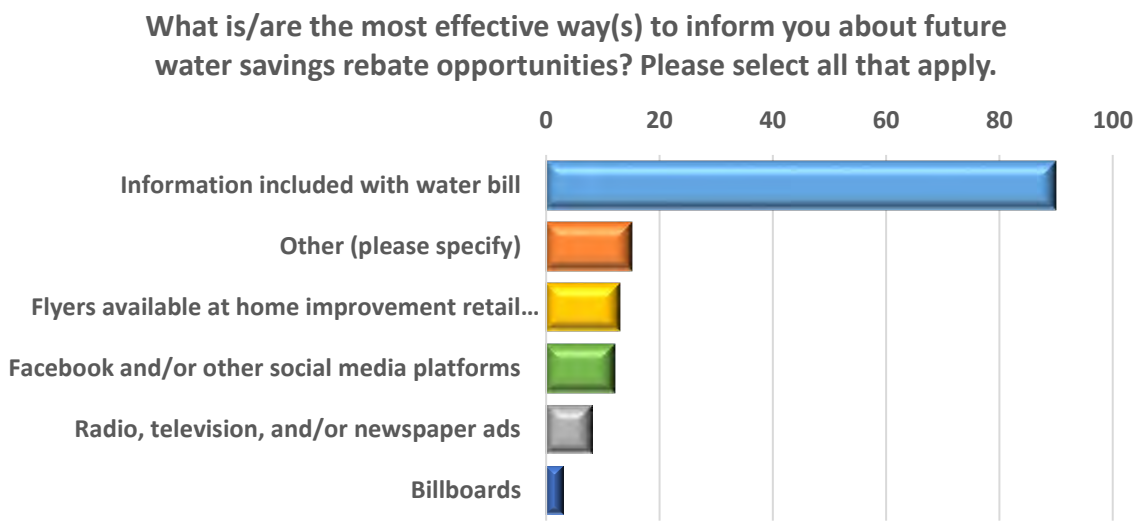


**Figure 16. Effective selected methods for reaching customers in the future.**

## Steps Moving Forward

Steps are already in progress to further improve areas of the Program. The S2D Program application process has been moved to the Droplet Technologies platform (Droplet), an interactive dashboard which houses the application and process steps that must be completed by the customer and staff. This online platform allows a customer to create a username and password to visit the dashboard at any time, fill out the application and other forms, upload photos and documents pertaining to their project, and notify MWDOC of their project completion. Droplet has streamlined the process on behalf of staff and the customer (see Figure 17 for an example of Staff's view of a customer application). The Droplet platform also houses the Turf Removal Program, which, through the customer survey, is noted to be the most common way participants found out about the S2D Program. As customers apply for the Turf Removal Program, they are exposed to the S2D Program and are able to apply for both on the same platform at the same time. This switch helps to resolve any issues brought up with Program ease and customers' abilities to find Program information and will simplify participating in S2D and Turf Removal concurrently. In addition, efforts are being made to have pre-assembled kits available for customer purchase from several different vendors. Customers indicated that the Eligible Products List and building a "kit" can be confusing. An actual kit with one SKU may make it easier for customers who have difficulty assembling a kit via the Eligible Products List by providing a clear understanding of drip equipment requirements, and will also allow Program administrators more easily ensure proper equipment is being installed.

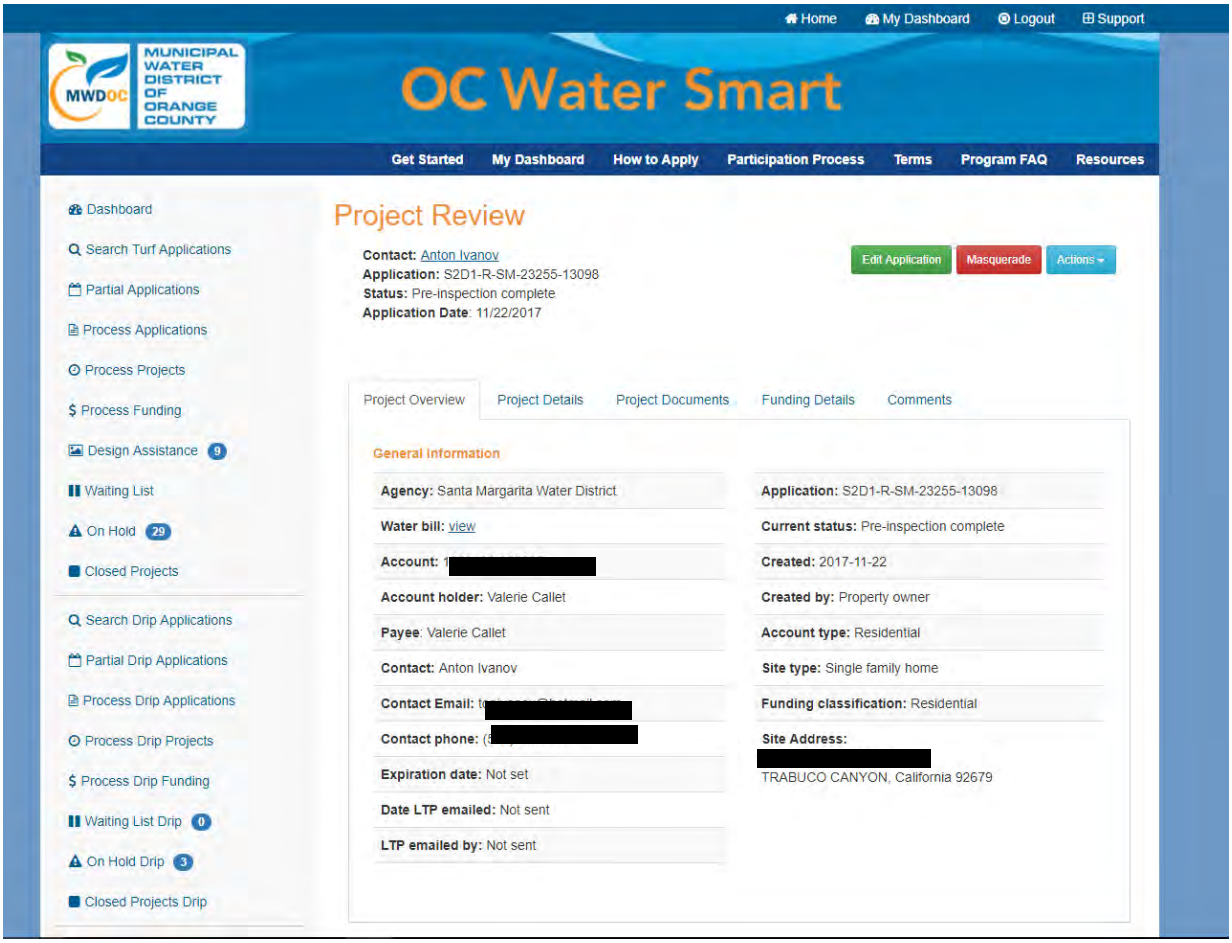


**Figure 17. Staff view of a customer's S2D Program application.**

# Impact Analysis

A statistical analysis was performed to evaluate the impact of the S2D Program on customer water consumption, and to quantify the volume of water that has been saved as a result of this Program. This analysis is used to evaluate how effective the S2D Program is as a water savings tool, realize actual water savings, compute rebate incentive levels, and will contribute to the pool of data that makes up the established water-savings metric for converting from traditional spray to drip irrigation in Orange County.

This evaluation used historic customer water consumption data provided by MWDOC's retail agencies, per signed permissions granted by the Program participants. Water consumption data was requested of the 205 residential project sites and 56 commercial project sites, which encompass 150 metered accounts that were completed before March 2017. Of these, 62 residential sites and 21 commercial sites (representing 49 metered accounts) are included in the analysis. See Figure 18 for the spatial distribution of water consumption datasets used in the analysis.

To quantify the change in water consumption patterns before and after participating in the S2D Program, pre-project water use was compared to water use occurring after a project was completed. A One-Way Analysis of Variance (ANOVA) tested the following hypothesis:

$H_0$: There is no statistical difference between pre-project water consumption and post-project water consumption.

$H_a$: There is a statistical difference between pre-project water consumption and post-project water consumption.

Least Squares Means regressions identified if that statistical difference was a decrease in water consumption and by how much. Water consumption was evaluated in terms of customers' gallons per day (gpd) savings, percent reduction, and gpd per sq. ft. savings.

## Methods

### Data Collection

Water consumption history for customers who completed their projects before March 2017 was requested by MWDOC from the corresponding retail water agencies. Consumption history was received from retailers and homogenized into a standard format. Each water account's gpd water consumption was calculated per that billing cycle and was associated with the month the majority of the cycle fell into. Additional information was added, including if that assigned month occurred during the peak or minimal irrigation season, if the customer also participated in the Turf Removal Program, if the site was within a coastal or non-coastal retail agency, and project size and/or number of kits approved. Residential and commercial sites were evaluated separately due to very distinct differences between the two, such as size, volume of use, indoor use consumption, and management practices. Residential sites have one meter per application, and the project site or application references one corresponding meter.

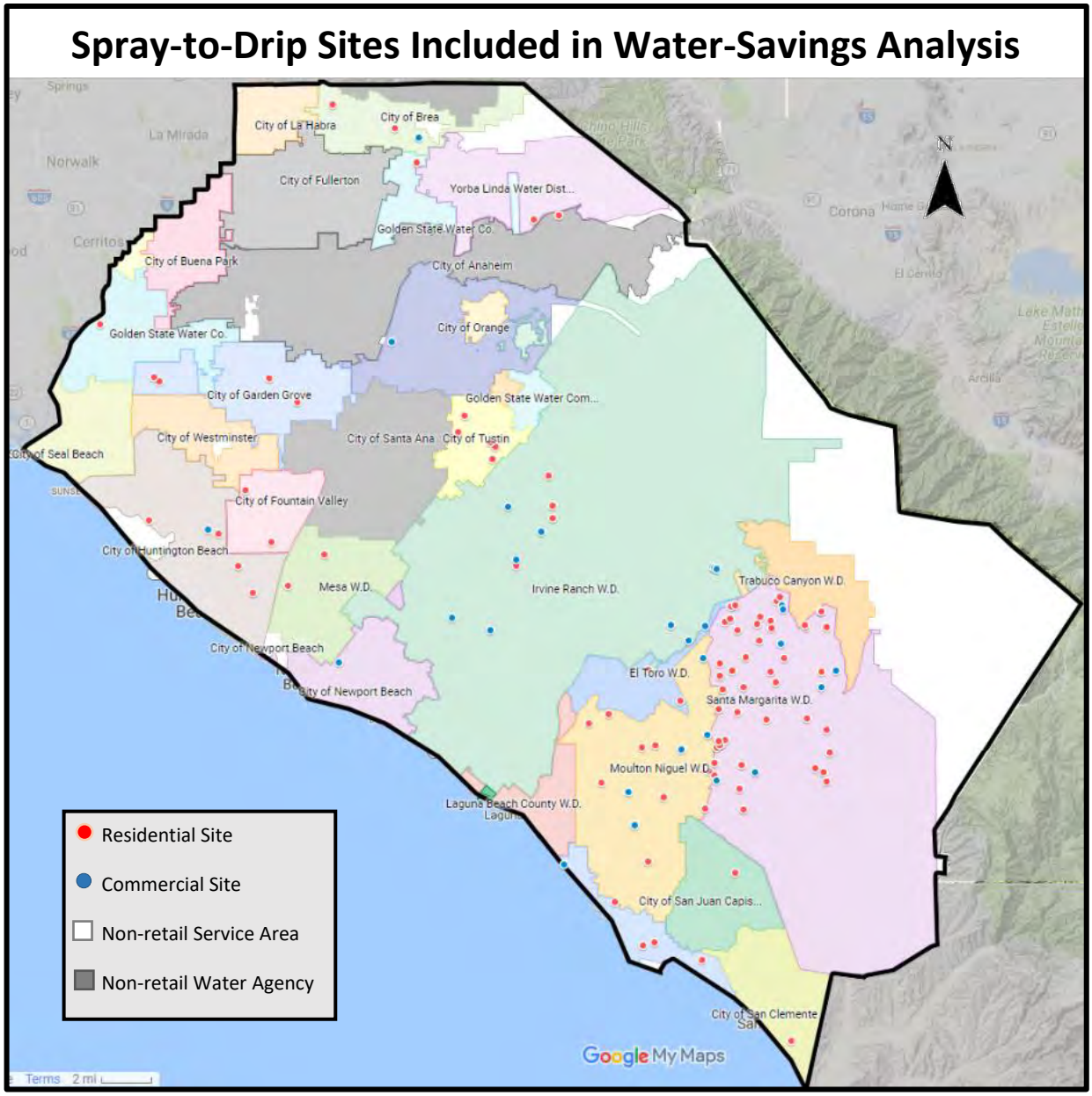


**Figure 18. Spatial distribution of sites used in water-savings statistical analysis.**

Commercial sites may have multiple meters per (accounts). Water data for each meter identified with a drip conversion project was considered for this analysis. Commercial sites will be referenced as accounts, as each site or application may have multiple accounts used in the study. Each account was evaluated independent of any relationship it may have to a sister account.

Customer data was categorized into three stages: (1) Pre-Project: Water consumption occurring before starting the project; (2) Post-Project: Consumption occurring after completing project; and (3) Project Noise: Consumption occurring near or during project implementation, including the time of application

to completion. Consumption occurring during this time is considered 'noise' that may not accurately represent typical consumption patterns due to project construction, preparation, or mediation.

The Project Noise stage was isolated for the purpose of being removed from the analysis to eliminate any interference or noise that may influence consumption patterns. The Project Noise stage is 180 consecutive days, 90 days before and 90 days after the mean of the project application and completion date (see Figure 19). A customer's Pre-Project Consumption is consumption occurring before the Project Noise, going back in time to a maximum of January 2010. Post-Project Consumption is water usage occurring after the Project Noise period up to October 2017 at the latest. Both Pre-Project and Post-Project stages are a minimum of two years (730 days). Sites which did not have enough available data to meet these requirements were disqualified from the study. Sites were disqualified only for having insufficient data and not for any other purpose. See Figure 2 for the distirubtion of sites which had data meeting these requirements.

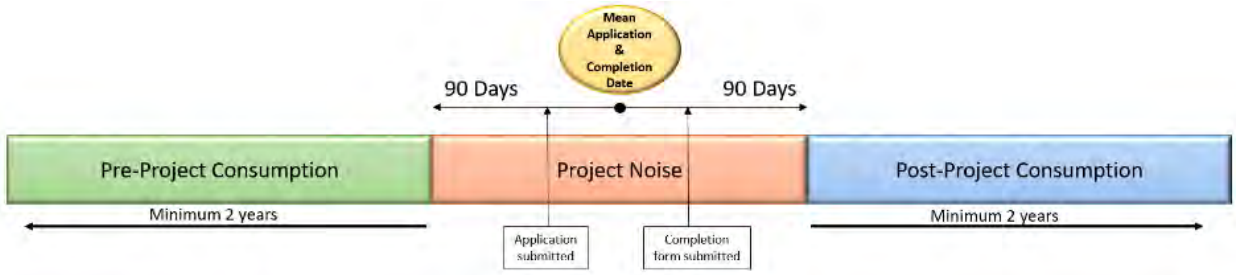


**Figure 19. Water consumption data classification method.**

## Statistical Analysis

A One-Way ANOVA compared Pre-Project Consumption to Post-Project Consumption under different variables using JMP Statistical Software. Residential and commercial data was analyzed separately. In some cases, extreme anomalies were found in the commercial data, and those outliers were excluded from tests. However, at least 97.5% of the data remained after outlier exclusion.

Using JMP, Least Squares Means values were calculated and used to establish mean Pre-Project and Post-Project Consumption. The Pre-Project and Post-Project values were used to determine a percent reduction, the percent change from Pre-Project conditions to Post-Project, and the average savings per site (Pre values minus Post values) in gpd. Mean project square footage per variable was calculated using JMP. The water-savings in gpd per square foot (gpd/sq. ft.) is the mean gpd savings per site divided by the corresponding square footage mean.

For residential sites and commercial accounts, both ANOVA and Least Squares Means was run five times to consider the following conditions: (1) With no variables, all Pre-Project Consumption was measured against all Post-Project Consumption; (2) Irrigation season; (3) Geographic location (spatial proximity to the coast); (4) Participation in the Turf Removal Program; and (5) Project size. For each variable, 100% of the sites or accounts are included in the analysis.

## Definition of Variables

The variables considered when evaluating customer water consumption are defined below. Table 2 shows the breakdown of the number of sites that were evaluated per group under each variable. Each site is categorized into one group for every analysis, meaning all sites are evaluated for every category.

**Table 2. Population per Variable Group**

| Variable | Group | n (Residential Sites) | n (Commercial Accounts) |
|---|---|---|---|
| **No Variable** | All | 62 (All) | 48 (All) |
| **Irrigation Season** | Min. Irrigation | 62 (All) | 48 (All) |
| | Peak Irrigation | 62 (All) | 48 (All) |
| **Coastal Proximity** | Coastal | 19 | 13 |
| | Non-Coastal | 43 | 35 |
| **Participation in the Turf Program** | Drip Only | 18 | 10 |
| | Drip and Turf | 44 | 38 |
| **Project Size (Residential)** | 1 Kit | 11 | - |
| | 2 Kits | 24 | - |
| | 3 Kits | 27 | - |
| **Project Size (Commercial)** | Large Site | - | 18 |
| | Small Site | - | 30 |

### *Peak Irrigation and Minimal Irrigation Seasons*

For this study, the peak irrigating season for Orange County is considered April-October, and the minimal irrigating season is considered November-March. Historically, April and October can potentially be considered in either the peak or minimal water need season. These months sit on the periphery of Orange County irrigation-need seasons and are typically transition months in and out of the dry/warm and cool/wet seasons. For this study, April and October are both considered part of the peak irrigation season based on the past three years of precipitation and temperature in Orange County (2015-2017). From 2015 to 2017, October and April months have been warmer and drier than average (see Table 3). October did see above average rainfall in 2016; however, the extreme dryness of the preceding and subsequent years sets the three-year average at almost half of the accepted average. Every April and October month from 2015-2017 was warmer than the average high, average mean, and average low temperature. This distinction is used for both residential and commercial sites. Data was observed at the Santa Ana weather station in Orange County.

**Table 3. Precipitation and Temperature for April and October in Orange County**

| (Inches) | Average Precipitation | 2017 Precipitation | 2016 Precipitation | 2015 Precipitation |
|---|---|---|---|---|
| **April** | 0.86 | 0.07* | 0.14* | 0.16* |
| **October** | 0.42 | 0.00* | 0.71 | 0.05* |
| **(°F)** | **Average High Temp.** | **2017 High Temp.** | **2016 High Temp.** | **2015 High Temp.** |
| **April** | 73.16 | 78.17* | 75.52* | 77.00* |
| **October** | 79.83 | 85.32* | 81.39* | 86.29* |
| **(°F)** | **Average Mean Temp.** | **2017 Mean Temp.** | **2016 Mean Temp.** | **2015 Mean Temp** |
| **April** | 62.36 | 67.53* | 66.35* | 66.37* |
| **October** | 68.44 | 74.02* | 71.06* | 76.31* |
| **(°F)** | **Average Low Temp.** | **2017 Low Temp.** | **2016 Low Temp.** | **2015 Low Temp.** |
| **April** | 51.60 | 56.90* | 57.08* | 55.73* |
| **October** | 57.03 | 62.71* | 60.74* | 66.32* |

*Above average temperature or below average precipitation

Irrigation season is an extremely important variable to explore because it will differentiate patterns of water consumption over two climatically distinct parts of the year and will distinguish if any water savings achieved is weighted to one season in comparison to the other. This category differs from the others in terms of how the data is separated into the category group. For the Irrigation Season variable category, every site and account is included in both category groups; however, only data covering the corresponding months is included in that group. In contrast, in the other variable category groups a site or account's complete consumption data will only be included in one group.

### *Coastal Proximity*

Sites were determined to be coastal or non-coastal based upon the geographic location of their retail water agency to evaluate potential differences in water-use and water reduction in coastal versus non-coastal areas. As mentioned previously, sites closer to the coast experience, on average, cooler temperatures and have a lower ETo than those further inland. Distinctions were made on the agency location as a whole, meaning agencies that touch the coast but have the majority of the service area inland were considered non-coastal. Coastal agencies with sites in this study include: Mesa Water District, Moulton Niguel Water District, South Coast Water District, City of Huntington Beach, City of San Clemente, and City of San Juan Capistrano. Non-coastal agencies with sites in this study include: City of Brea, City of Fountain Valley, City of Garden Grove, Golden State Water Company, Irvine Ranch Water District, City of Orange, Santa Margarita Water District, City of Tustin, and Yorba Linda Water District. This designation is the same for residential and commercial sites. See Figure 20 for coastal and non-coastal distinctions.

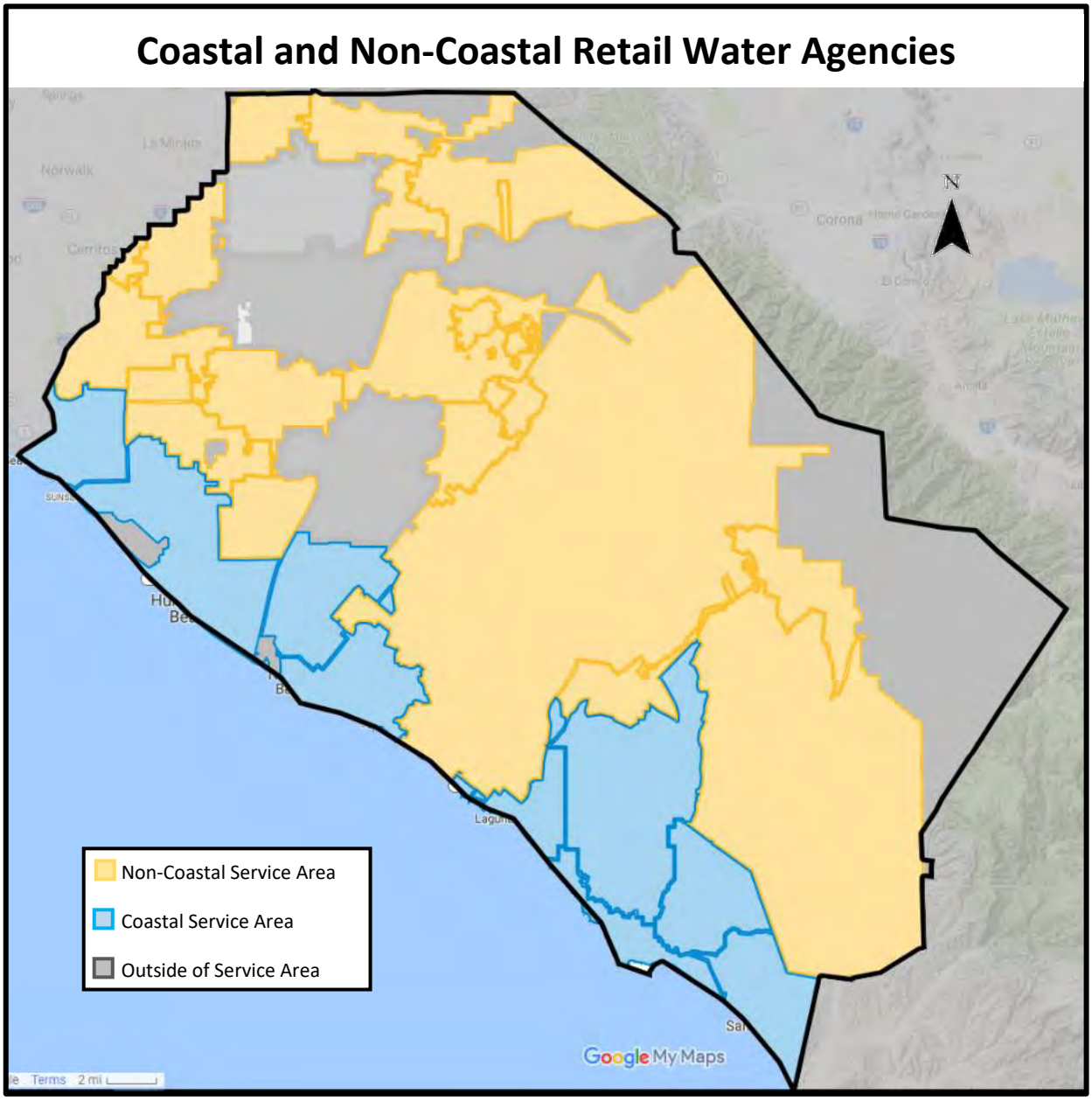


**Figure 20. Spatial distribution of coastal and non-coastal agencies.**

### *Participation in Spray-to-Drip and Turf Removal*

Many S2D Program participants also take part in the Turf Removal Program offered by MWDOC. The Turf Removal Program provides a monetary incentive for customers to convert their turf grass to a California Friendly landscape. In order to be eligible, customers must also make their Turf Removal project site permeable to air and water, install at least 3 new plants, and convert their irrigation to a low-flow system. To meet the irrigation system requirement, many customers convert to drip irrigation, prompting the simultaneous participation in the S2D Program.

It is important to separately analyze water consumption patterns of customers who participated in only S2D and those who participated in both program groups in order to evaluate the water savings achieved from converting from spray to drip irrigation without the influence of removing turf and to ensure that savings are occurring not only from removing Turf, but also from the installation of drip. A separate analysis also provides insight to how water savings may be affected by participating in both programs. Each project site and project account was identified as either participating in both programs (Drip and Turf) or only the S2D Program (Drip-only). Classification came from a comparison of both program's databases and using information provided on each customer's S2D Program application, which specifically asks if the customer is also participating in the Turf Removal Program.

### *Site Size*

The size of project sites in the S2D Program are variable and dispersed over a large range. It is important to evaluate projects grouped by size to see how project size may influence water-savings. Because residential and commercial rebates are calculated based on different metrics, there is a difference in data collection between the two. Therefore, there are two separate methodologies used to evaluate site size for Residential and Commercial accounts.

#### *Residential Size/Kits*

Residential rebates are based on a per kit basis. Analyses were performed comparing water consumption for sites with one, two, and three kits to evaluate how the number of kits installed (correlated to larger project size) may influence water consumption and reduction patterns. At the time of the post-inspection, residential sites were not measured for total project square footage. Therefore, the number of kits a customer was eligible for was also used to estimate the square footage for the project. The mean of the size range associated with each number of kits was assigned as the estimated square footage for the project. The number of kits each customer was eligible for was assigned when each application was received and reviewed, and was based upon project information provided in the application. The maximum number of kits each site could be eligible for is three, meaning the actual range for three kits is 750 square feet and above. The mean square footage for three kits is based on an extrapolated range max of 999 square feet. See Table 4 for the mean square footage and range associated with each number of kits.

**Table 4. Estimated Project Size per Number of Kits**

| # of Kits | Size Range (sq. ft.) | Mean (sq. ft.) |
|---|---|---|
| 1 | 250-499 | 375 |
| 2 | 500-749 | 625 |
| 3 | 750+ | 875 |

### *Commercial Site Size*

Commercial sites are categorized as a large or small site based on the project square footage measured at the time of the post inspection. Sites larger than the mean project size, 7,170 square feet, are considered large sites, and those less than or equal to the mean project size are considered small sites. For applications that had multiple meters/accounts per application, total project square footage was divided by the number of accounts/meters per application, so each account associated with the project has an equal piece of the total project site as the sister account(s).

# Results

## Residential

### *Overall Water Savings*

A statistically significant reduction in customer water consumption can be seen Post-Project in comparison to Pre-Project Consumption (see Table 5). Overall, average residential water consumption was reduced by 85 gpd per site, a 24% reduction. Outdoor irrigation is estimated to be 50% of water consumption, meaning that outdoor water use was approximately cut in half when converting from traditional spray heads to drip irrigation. The average residential project size is 702 square feet, translating to an average savings of 0.121 gpd/sq. ft.

**Table 5. Overall Residential Water Consumption**

| | Mean Pre Project (gpd) | Mean Post Project (gpd) | Savings Per Site (gpd) | Percent Reduction | Est. Mean Site Size (sq. ft.) | Savings Estimate (gpd/ sq. ft.) | P-Value |
|---|---|---|---|---|---|---|---|
| **All Consumption** | 349 | 264 | 85 | 24% | 702 | 0.121 | <0.0001* |

*Statistical significance

Figure 21 represents Pre-Project and Post-Project Consumption by month. Each month, water consumption decreased in terms of mean, median, and upper quartile ranges. Median water consumption in June and September had the largest reductions, while November had the smallest. In May, June, July, and September, median Post-Project Consumption dropped below the 1st quartile of Pre-Project Consumption. In June, July and September the Post-Project upper quartile was less than the Pre-Project median for that month. The trend lines show that mean water consumption was consistently reduced every month, with the largest reductions occurring during summer months.

### *Water Savings by Irrigation Season*

When analyzed by irrigation season, there is a statistically significant reduction from Pre-Project Consumption to Post-Project Consumption in both the peak and minimal irrigation seasons (see Table 6). Statistical reductions in both seasons implies that the savings occurring in the peak season are not solely responsible for the reduction in consumption. Water-savings occurred in both seasons; however, savings were higher during the peak irrigation months. During the minimal irrigation season (November through March), mean consumption was reduced by 61 gpd per site or 22% of total water consumption. During peak irrigation months (April through October), consumption was reduced by 103 gpd per site, or 26% of total water consumption. When considering project size, the average savings in the peak irrigation season was 0.147 gpd/sq. ft., 1.7 times more than in the minimal irrigation season (0.085 gpd/sq. ft.)

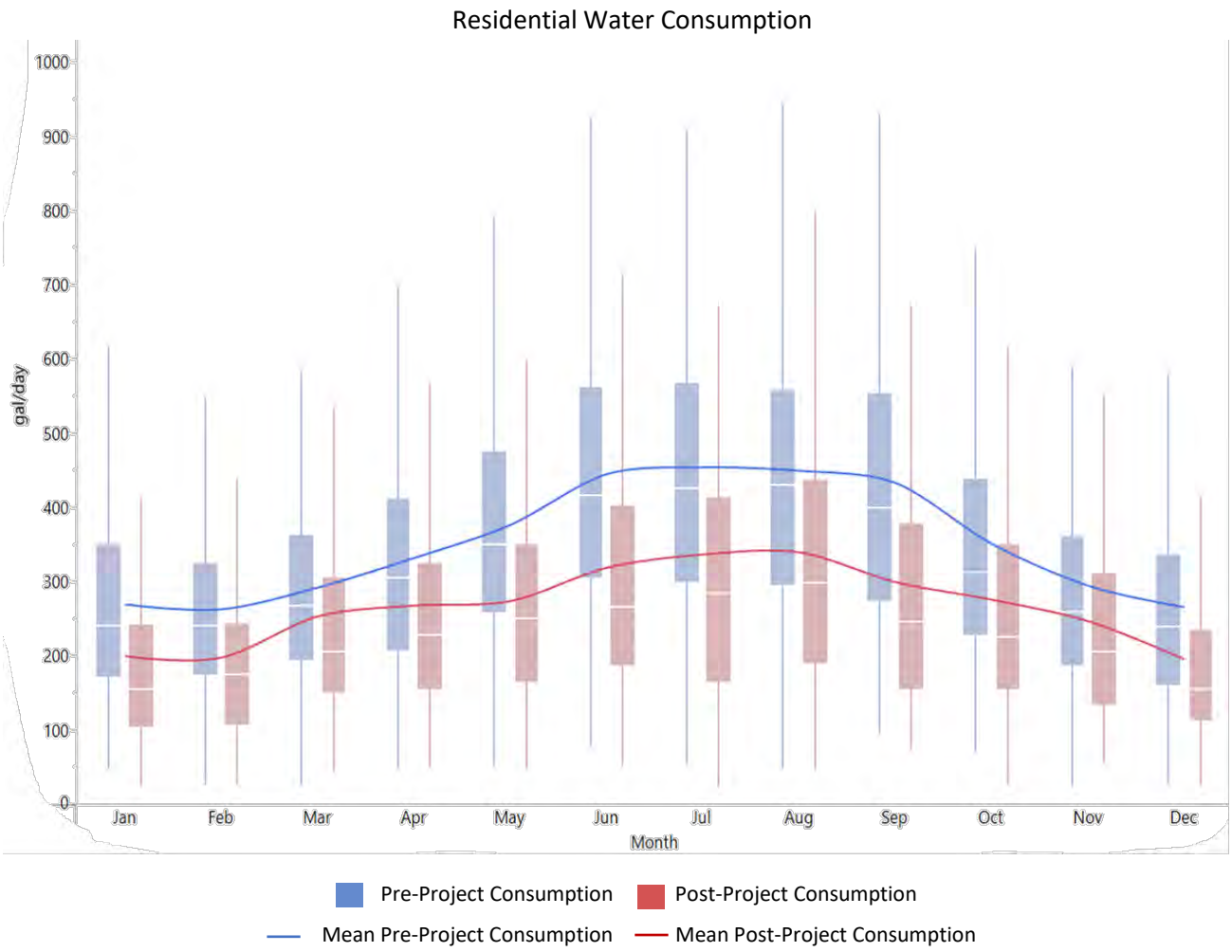


**Figure 21. Residential water consumption per month, before and after completing a S2D project. Outliers are not present on the graph.**

Water savings during peak irrigation season is greater than during minimal irrigation season in terms of gpd per site, percent reduction, and gpd/sq. ft. This is most likely related to general consumption trends associated with climate patterns – outdoor water use increases as weather becomes hotter and drier. When looking at Pre-Project Consumption, water use was approximately 1.5 times higher in the peak irrigation season than in the minimal. During the minimal irrigation season, consumption is less so there are fewer opportunities for saving water by irrigating more efficiently. During the peak irrigation season, which is over 65% of the year in Orange County, precipitation is less, temperatures are high, and customers are irrigating more, so there are more opportunities to achieve water savings through efficient irrigation.

Figure 21 displays the variations of water use month-by-month. The largest decrease between the Pre-Project trend line (blue) and the Post-Project trend line (red) is observable during the peak irrigation months, April-October, and are at the greatest difference May-September. The curve of water

consumption over the calendar year is flatter for Post-Project than Pre-Project, which suggests a decrease in outdoor water-use. Indoor use, generally, is consistent throughout the year, while outdoor use increases in the warm, dry months. The smaller range of values, especially above the third quartile, suggests that a smaller percent of water consumption is going towards outdoor use, Post-Project.

**Table 6. Residential Water Consumption by Irrigation Season**

| | Mean Pre Project (gpd) | Mean Post Project (gpd) | Savings Per Site (gpd) | Percent Reduction | Est. Mean Site Size (sq. ft.) | Savings Estimate (gpd/sq. ft.) | P-Value |
|---|---|---|---|---|---|---|---|
| **Min. Irrigation Season (November-March)** | 275 | 215 | 61 | 22% | 702 | 0.085 | <0.0001* |
| **Peak Irrigation Season (April-October)** | 402 | 299 | 103 | 26% | 702 | 0.147 | <0.0001* |

*Statistical significance

### *Water Savings by Coastal Proximity*

Both coastal and non-coastal participants saw statistically significant reductions in water consumption after completing an S2D project. Participants living in non-coastal areas saw a reduction of 98 gpd, or 28% of water use, a slightly larger reduction than customers living along the coast. Although non-coastal sites experienced higher water savings, most likely due to climate, water consumption at coastal sites still decreased by 62 gpd, 17% of total water consumption, a strong, statistically-significant reduction. Coastal sites, on average, had slightly higher Pre-Project Consumption (4% higher) and smaller project sizes (3% smaller) than non-coastal sites. Non-coastal sites experienced 36% higher water savings in terms of average gpd savings per site (see Table 7). When evaluated with project size, coastal sites had an average savings of 0.090 gpd/sq. ft., and non-coastal sites had an average of 0.138 gpd/sq. ft. Population size of the non-coastal group, n=43, is more than double the amount of coastal sites, n=19 (see Table 2).

**Table 7. Residential Water Consumption by Coastal Proximity**

| | Mean Pre Project (gpd) | Mean Post Comp. (gpd) | Savings Per Site (gpd) | Percent Reduction | Est. Mean Site Size (sq. ft.) | Savings Estimate (gpd/sq. ft.) | P-Value |
|---|---|---|---|---|---|---|---|
| **Coastal** | 358 | 296 | 62 | 17% | 690 | 0.090 | <0.0001* |
| **Non-Coastal** | 343 | 246 | 98 | 28% | 709 | 0.138 | <0.0001* |

*Statistical significance

Non-coastal areas are generally warmer than those along the coast, which prompts increased irrigation. As noted in the Irrigation Season section above, increased outdoor water consumption allows for higher water-savings through increased irrigation efficiency. As shown in Figure 22, the largest reduction in water consumption (30%) occurred during the peak irrigation season for non-coastal sites, which is most likely linked to local climate conditions as the non-coastal region of Orange County is generally warmer than the coast especially during summer months.

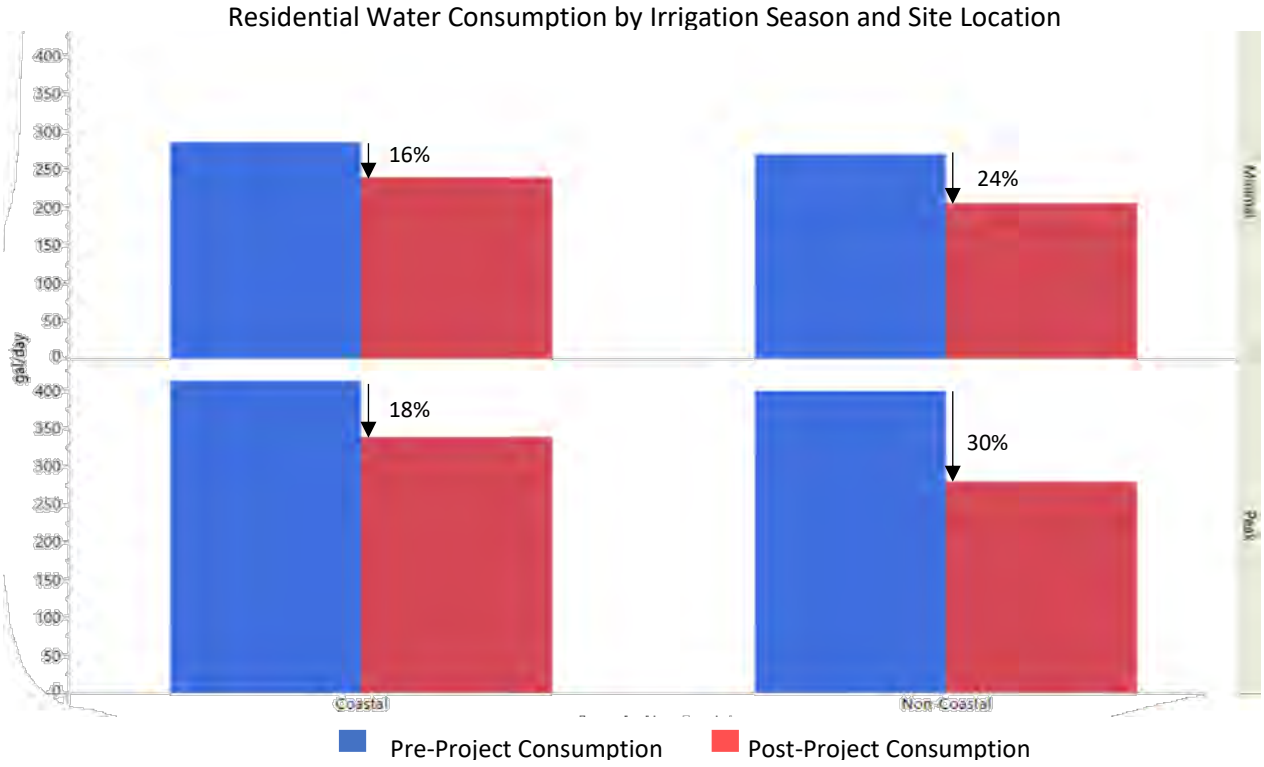


**Figure 22. Mean water consumption by season and geographic location.**

### *Water Savings by Turf Program Participation*

Customers who participated in the S2D Program only (Drip-only) and those who participated in both the S2D and the Turf Removal Programs (Drip and Turf) each saw a statistically significant decrease in water consumption (see Table 8 for P values).

Both groups experienced nearly identical water savings in terms of average gallons saved per day per site: 86 gpd for Drip and Turf sites and 85 gpd for Drip-only sites. Those who participated in both Drip and Turf saw a 26% reduction in consumption, and those who participated in Drip-only saw a 22% reduction. Based on project site size, Drip-only customers had an average 0.118 gpd/sq. ft. savings, while those who participated in both Drip and Turf Removal had a slightly higher savings average of 0.124 gpd/ sq. ft. The high water savings occurring for Drip-only customers is greatly significant as it strongly demonstrates the efficiency achieved through drip irrigation without the potential bias of a Turf Removal project.

It is important to note that the size of a customer's S2D project area may not match the size of their Turf Removal are, which is often larger. Therefore, a customer who removed more turf on their property would likely see a larger reduction in water consumption, but only the square footage of the Drip portion of the project is factored into the analysis. There are more than two times as many Drip and Turf participation sites (n=44) than Drip-only sites (n=18) (see Table 2 for population distribution).

**Table 8. Residential Water Consumption by Participation in Turf Removal**

| | Mean Pre Project (gpd) | Mean Post Project (gpd) | Savings Per Site (gpd) | Percent Reduction | Est. Mean Site Size (sq. ft.) | Savings Estimate (gpd/Sq. Ft) | P value |
|---|---|---|---|---|---|---|---|
| **Drip Only Participation** | 379 | 294 | 85 | 22% | 723 | 0.118 | <0.0001* |
| **Drip & Turf Participation** | 337 | 250 | 86 | 26% | 693 | 0.124 | <0.0001* |

***Statistical significance**

### *Water Savings by Number of Kits*

There is a statistically significant difference between Pre-Project and Post-Project Consumption for one, two, and three kit sites. Sites that were eligible for two and three kits had a stronger statistical significance than one kit sites (see Table 9). Sites with two kits saved the most water, with an average reduction of 97 gpd or 32% of their total water consumption, about double the savings of one kit sites. Those that were eligible for three kits saved 88 gpd on average (22%), and those with 1 kit saved 48 gpd (16%). When evaluated considering site size, those that were eligible for three kits saved 0.101 gpd/sq. ft., less than both the two kit sites (0.155 gpd/sq. ft.) and the one kit sites (0.128 gpd/sq. ft.).

**Table 9. Residential Consumption by Number of Kits**

| | Mean Pre Project (gpd) | Mean Post Project (gpd) | Savings Per Site (gpd) | Percent Reduction | Est. Mean Site Size (sq. ft.) | Savings Estimate (gpd/sq. ft.) | P-Value |
|---|---|---|---|---|---|---|---|
| **1 Kit** | 296 | 248 | 48 | 16% | 375 | 0.128 | 0.0002* |
| **2 Kits** | 305 | 208 | 97 | 32% | 625 | 0.155 | <0.0001* |
| **3 Kits** | 402 | 314 | 88 | 22% | 875 | 0.101 | <0.0001* |

*Statistical significance

Figure 23 shows the average consumption reduction per number of kits. Pre-project water consumption is similar for sites that installed one and two kits. Sites with two kits had exactly double the average percent reduction than one kit. Average water use is around 100 gpd more for three kit sites, suggesting

that these sites may be larger as a whole (more irrigated landscape, occupants, etc.). Because consumption reduction and number of kits installed did not have a linear relationship, this may indicate that the three kit sites have higher indoor use, which would make it harder for irrigation efficiency to be identified, and/or that after two kits the majority of water savings has occurred. Sample size is another factor to consider as the majority of sites were either two or three kit sites, 24 and 27 sites respectively. Only 11 sites installed just one kit (see Table 2).

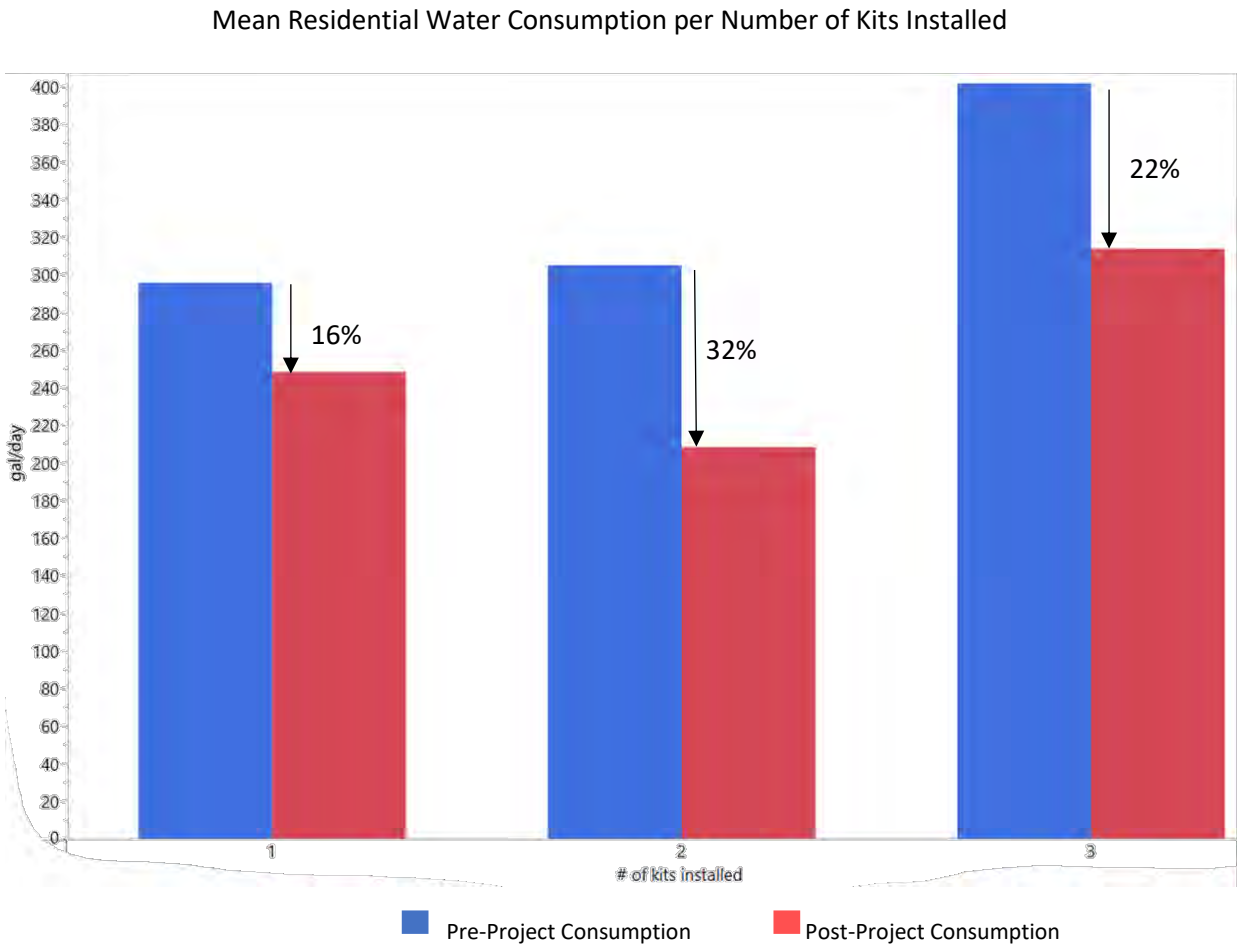


**Figure 23. Comparison of water savings by number of kits installed**

## Commercial Accounts

### *Overall Water Consumption*

There is a strong statistically significant reduction in commercial water consumption before and after completing an S2D Project. The average savings per account is 473 gpd, a 19% reduction of total water use. When considering the mean project size, an average savings of 0.066 gpd/sq. ft. occurred (see Table 10).

**Table 10. Commercial Water Consumption**

| | Mean Pre Project (gpd) | Mean Post Project (gpd) | Mean Savings Per Site (gpd) | Mean Percent Reduction | Mean Site Size (sq. ft.) | Savings Estimate (gpd/ sq. ft.) | P-Value |
|---|---|---|---|---|---|---|---|
| **Overall**** | 2,554 | 2,081 | 473 | 19% | 7,170 | 0.066 | <0.0001* |

*Statistical significance
** Outliers over 97.5% quantile excluded

Figure 24 represents Pre-Project and Post-Project Consumption by month. Monthly median consumption reduced consistently, with the exception of November, which had little to no difference. The largest reductions occurred in May, July, and August, with smaller reductions occurring during winter months. While the monthly medians decreased from Pre-Project to Post-Project, values above the upper quartile are more variable. In some cases, Post-Project maximum values (excluding outliers) exceeded Pre-Project values. The variability in values above the upper quartile affect the mean water consumption, shifting it higher than median values.

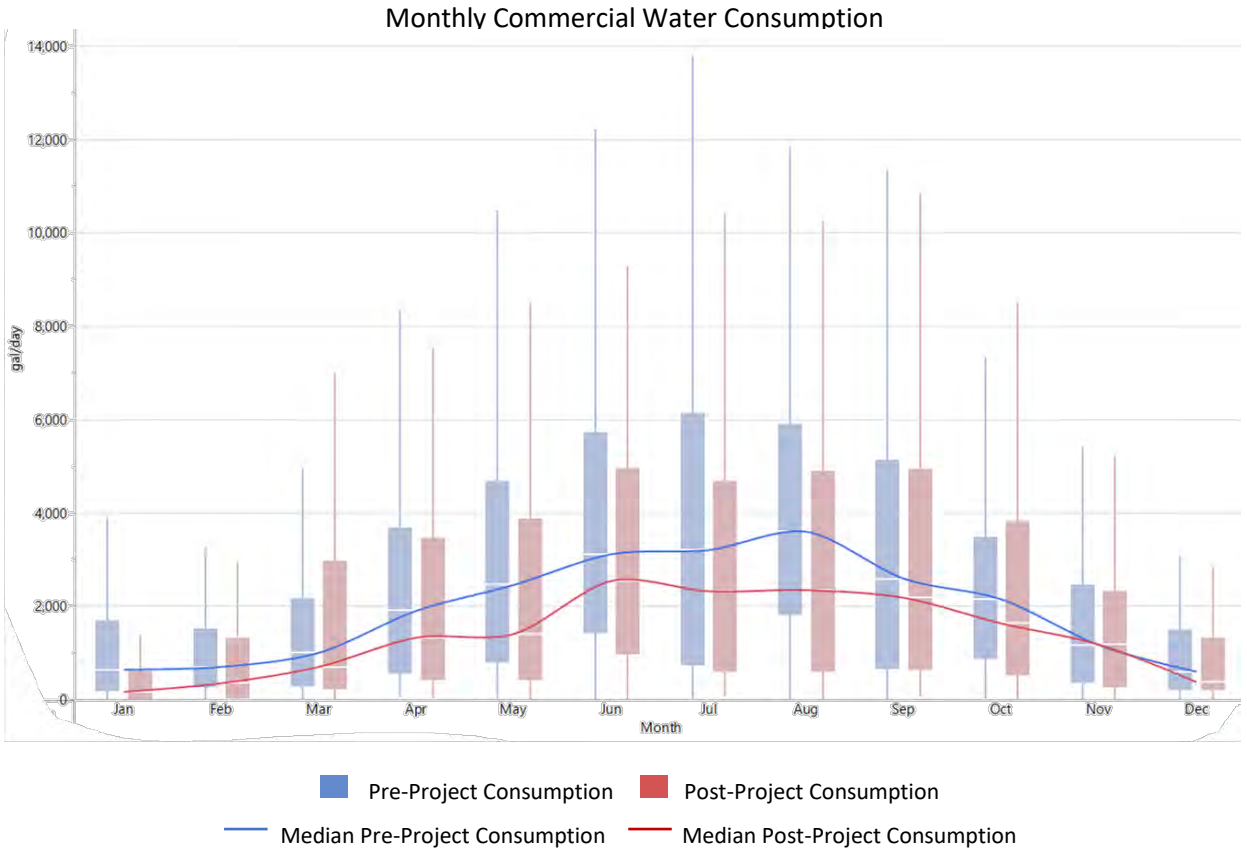


**Figure 24. Commercial water consumption by month.**

### *Water Consumption by Irrigation Season*

During both minimal and peak irrigation seasons, there is a statistically significant reduction in Pre-Project and Post-Project Consumption. There are higher water savings and a stronger significant difference between Pre-Project and Post-Project use during the peak irrigation season than the minimal use season (see Table 11.) The average reduction during the peak season was 685 gpd, a 20% decrease in total water consumption, versus 201 gpd, a 14% decrease, in the minimal irrigation season. When evaluated with site size, water savings is estimated at 0.028 gpd/sq. ft. during the minimal irrigation season and 0.096 gpd/sq. ft. during the peak irrigation season. In general, water consumption during the peak irrigation season is about 2.5 times higher than in the minimal season. However, the mean water savings per site during the peak season was about 3.5 times more than the minimal season savings. This suggests that the efficiency of drip irrigation has the greatest impact during hot, dry months. Figure 24 illustrates the seasonal range of commercial water consumption and highlights the seasonal variations in water-savings.

**Table 11. Commercial Water Consumption by Irrigation Season**

| | Mean Pre Project (gpd) | Mean Post Project (gpd) | Mean Savings Per Site (gpd) | Mean Percent Reduction | Mean Site Size (sq. ft.) | Savings Estimate (gpd/ sq. ft.) | P-Value |
|---|---|---|---|---|---|---|---|
| **Min. Irrigation Season (November-March)**** | 1,389 | 1,188 | 201 | 14% | 7,1701 | 0.028 | 0.0424* |
| **Peak Irrigation Season (April-October)**** | 3,446 | 2,760 | 685 | 20% | 7,170 | 0.096 | <0.0001* |

*Statistical significance
** Outliers over 97.5% quantile excluded

### *Water Consumption by Coastal Proximity*

Coastal and non-coastal accounts experienced similar gpd water savings per account (see Table 12). Both geographic classifications saw a 17% reduction in water consumption; coastal sites saw an average savings of 424 gpd, and non-coastal an average of 450 gpd. The reduction between Pre-Project and Post-Project Consumption was statistically significant for both coastal and non-coastal accounts; however, non-coastal accounts had a stronger significant difference. Mean project size was not evenly distributed: coastal project sites were 56% larger than non-coastal sites on average, which impacts the gpd per sq. ft. ratio. With project size is taken into account, average water savings for non-coastal sites is close to double that of coastal sites, 0.073 and 0.037 respectively.

**Table 12. Commercial Summary by Geographic Location**

| | Mean Pre Project (gpd) | Mean Post Project (gpd) | Mean Savings Per Site (gpd) | Mean Percent Reduction | Mean Site Size (sq. ft.) | Savings Estimate (gpd/ sq. ft.) | P-Value |
|---|---|---|---|---|---|---|---|
| **Coastal** | 2,462 | 2,037 | 424 | 17% | 11,328 | 0.037 | 0.0456* |
| **Non-Coastal**** | 2,607 | 2,158 | 450 | 17% | 6,149 | 0.073 | 0.0001* |

*Statistical Significance
** Outliers above the 97.5% quantile excluded

Table 13 represents mean consumption reductions in relation to both coastal proximity and irrigation season. As stated previously, these variables are linked through weather patterns as a site's geographic location influences how the minimal and irrigation season may affect water use. There is a wide variation in water savings, ranging from 628 gpd during the peak irrigation season for non-coastal sites, a 19% reduction, to an average of 56 gpd savings for coastal sites during the minimal irrigation season, a 4% reduction. Reference Figure 25 for a visual representation of this data and the relationship among irrigation season, coastal proximity, and water reductions occuring after converting to drip irrigation. Similar to residential sites, the highest water savings is associated with non-coastal locations during the peak irrigation season, the hottest and driest location and season.

**Table 13. Commercial Consumption by Season and Geography**

| | Mean Savings (GPD) | Mean % Reduction | Mean Savings (GPD) | Mean % Reduction |
|---|---|---|---|---|
| | Coastal | | Non-Coastal | |
| **Minimal Irrigation Season** | 56 | 4% | 199 | 14% |
| **Peak Irrigation Season** | 331 | 11% | 628 | 19% |

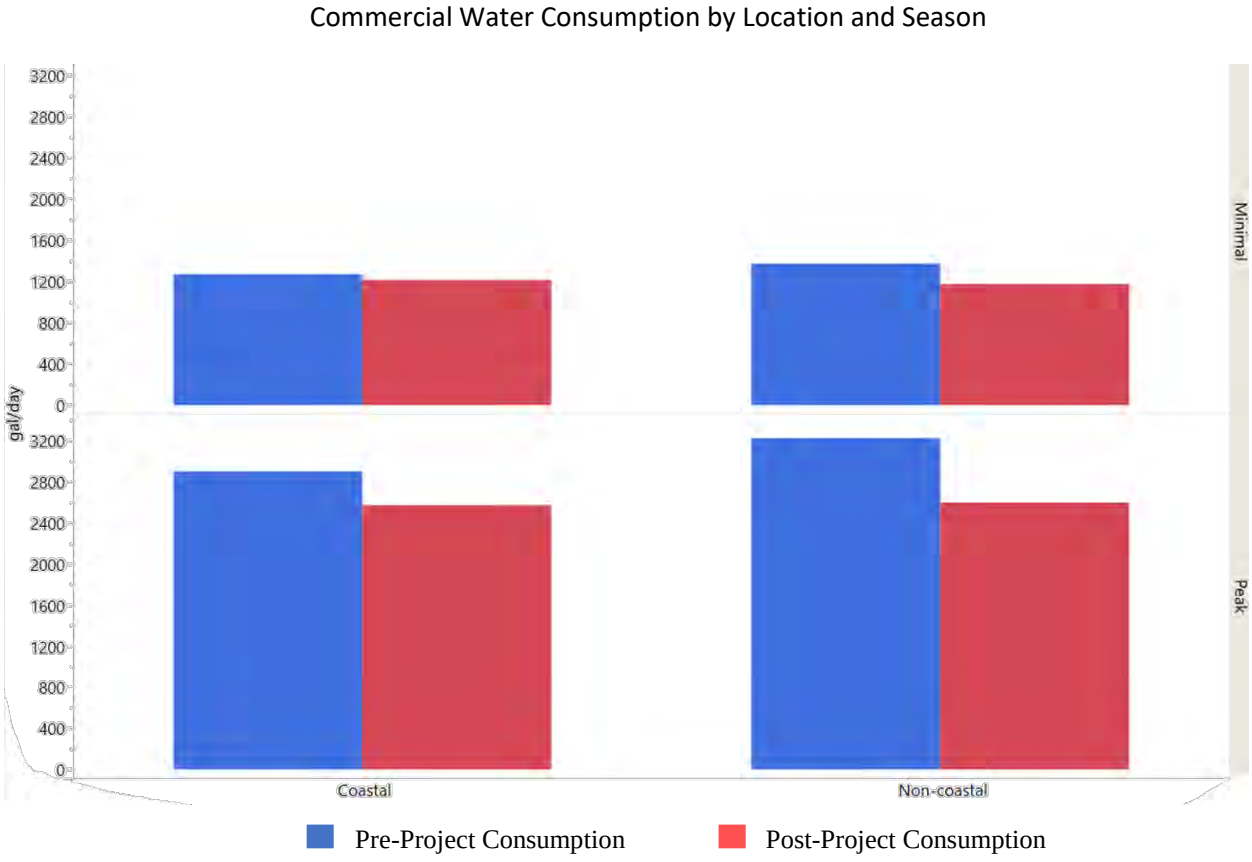


**Figure 25. Commercial reductions per season and location.**

### *Water Consumption by Participation in Turf Removal*

Accounts associated with project sites that participated in both Drip and Turf saved an average of 479 gpd per account, a 19% reduction in total water consumption per meter. Those who participated in Drip-only saw an average reduction of 401 gpd per site, a 16% reduction. The mean project size for Drip-only participants was more than double that of Drip and Turf project sizes (reference Table 14). When water reductions are considered with project size, Drip-only accounts saved an average of 0.033 gpd/sq. ft., while Drip and Turf accounts saved an average of 0.080 gpd/sq. ft. It is important to note that the mean site size only represents the size of the S2D project and does not represent the size of the Turf Removal project. Areas specific to a Turf Removal Project may be a different size than the project size for drip installations in the S2D Program.

**Table 14. Commercial Consumption by Participation in the Turf Removal Program**

| | Mean Pre Project (gpd) | Mean Post Project (gpd) | Mean Savings Per Site (gpd) | Mean Percent Reduction | Mean Site Size (sq. ft.) | Savings Estimate (gpd/ sq. ft.) | P-Value |
|---|---|---|---|---|---|---|---|
| **Drip Only Participation**** | 2,468 | 2,067 | 401 | 16% | 12,084 | 0.033 | 0.0371* |
| **Drip & Turf Participation**** | 2,519 | 2,040 | 479 | 19% | 5,968 | 0.080 | <0.0001* |

*Statistical significance
** Outliers above the 97.5% quantile excluded

It is important to see significant water consumption reductions for accounts which only participated in the S2D Program. This implies that the overall water reduction pattern is occurring because of drip irrigation and not being overshadowed by participation in the Turf Removal Program. These results do suggest customers may save more water when participating in both; however, significant reductions do occur when converting from spray to drip irrigation only, and installing drip irrigation can help maximize water savings achieved through Turf Removal.

### *Water Consumption by Site Size*

Both large and small sites had statistically significant reductions in water consumption. Small site accounts saved an average 423 gpd, a 17% reduction of water consumption. Large site accounts saved an average of 359 gpd, a 13% reduction. Pre-Project mean consumption was 11% higher for large project size site accounts. However, small project site accounts experienced 15% higher gpd savings and a stronger statistical significance (see Table 15). There is over a 14,000 sq. ft. difference between the mean large and small project site sizes. When including project size, large sites saved an average of 0.022 gpd/sq. ft., and small sites saved an average of 0.193 gpd/sq. ft.

**Table 15. Commercial Consumption by Project Size**

| | Mean Pre Project (gpd) | Mean Post Project (gpd) | Mean Savings Per Site (gpd) | Mean Percent Reduction | Mean Site Size (sq. ft.) | Savings Estimate (gpd/ sq. ft.) | P-Value |
|---|---|---|---|---|---|---|---|
| **Large (> 7,170 sq. ft.)**** | 2,857 | 2,498 | 359 | 13% | 16,107 | 0.022 | 0.0297* |
| **Small (≤ 7,170 sq. ft.)**** | 2,531 | 2,108 | 423 | 17% | 1,837 | 0.193 | 0.0067* |

*Statistical significance
** Outliers above the 97.5% quantile excluded

For the large project sizes group n=18, which is 40% less than small sites (reference Table 2). This difference in population size may impact the results. Similarly, it is possible that a small site may have actually converted more than what was included in the rebate, or participated in other water savings programs such as Turf Removal. Of the 30 small sites, 90% also participated in Turf Removal, which may increase savings and affect irrigation practices beyond the scope of the S2D project. Of the 18 large sites, 61% also participated in Turf Removal.

## Water Savings Achieved

Based on the water savings calculated in this evaluation, 0.121 gpd/sq. ft. for residential and 0.066 gpd/sq. ft. for commercial, the completed S2D projects will save 54 AFY of savings. Over the life of these projects 540 AF of water will be saved in Orange County, see Figure 26.

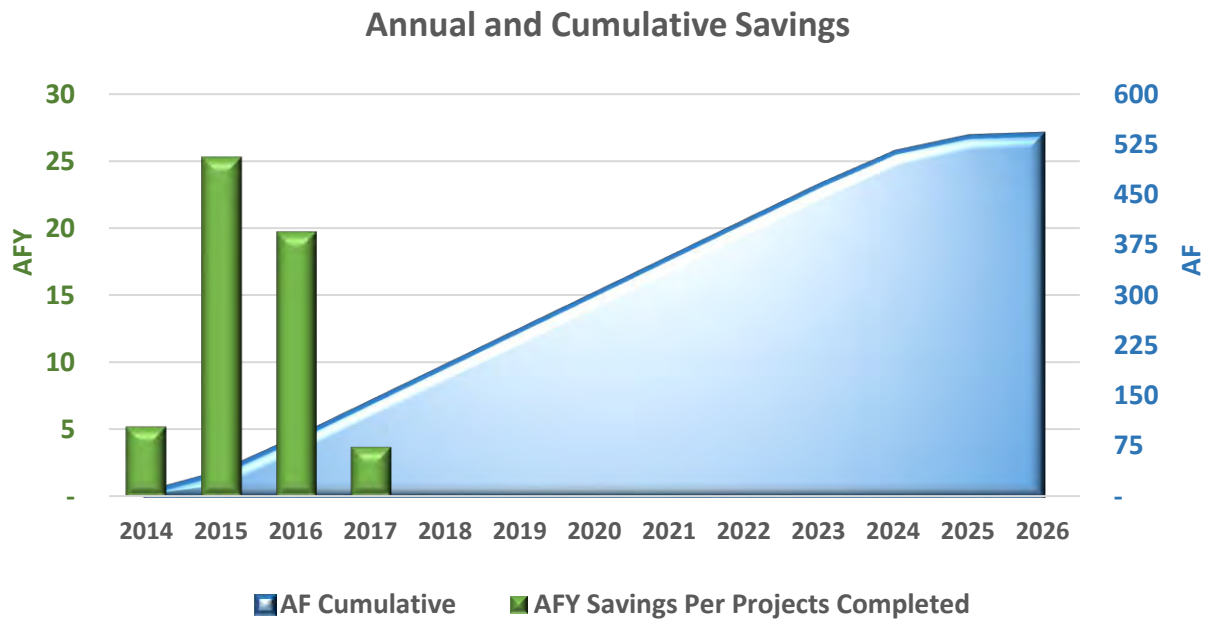


**Figure 26. Water savings occurred by completed S2D projects and cumulative savings over project life.**

# Evaluation Discussion

Overall, the S2D Program was very successful. The Process and Impact Evaluations validate each other through quantified, statistically-significant water savings, and survey responses showing that customers noticed water savings and a positive landscape change. Furthermore, some customers indicated that they installed more drip irrigation after participating in the Program, and many indicated that there was a high likelihood they would participate in another water savings rebate program due on their experience with S2D. This effect creates more water savings than accounted for in the calculations contained on the Impact Analysis. Customer feedback shows that the Program is viewed favorably and is relatively easy to participate in. The most constructive feedback suggested that the concept of the kit-based Eligible Products List may need some additional improvements.

The highest water savings were achieved during dry, hot conditions occurring in peak irrigation seasons and at non-coastal locations, however statistically significant reductions in water consumption occurred during peak and minimal irrigation seasons and across geographic locations. Customers who participated in S2D without participating in the Turf Removal Program and customers who participated in S2D and Turf Removal, both experienced statistically significant water savings. This demonstrates that customers may experience water reductions over 20% with or without being paired with a turf conversion project, and may achieve even higher water savings when the two are paired together. This further justifies the need and practicality for offering a drip conversion rebate program that can achieve substantial water savings on its own, and can also be easily paired with a landscape conversion for maximum savings.

## Rebate Incentive Recommendations

Based on the results of this Evaluation, it is suggested that a spray to drip conversion rebate program be offered at a regional level through MWD to promote the use of efficient drip irrigation, assist customers in their water conservation efforts, and promote a healthy watershed approach to landscaping by eliminating irrigation-sourced runoff. The recommended rebate incentive was calculated by the water savings metrics established in this Evaluation, 0.121 gpd/sq. ft. for residential sites and 0.066 gpd/sq. ft. for commercial sites, and MWD's price per AF of water saved, $195/AF. To see the full calculation, please reference Appendix C – Rebate Recommendation Calculation.

Within the frame of MWD's Conservation Credits Program, the recommended incentive rate is:

- $0.26/sq. ft. for residential projects
- $0.14/sq. ft. for commercial projects.

## Process Analysis Challenges

The customer survey results were positive, but also inherently contain some human error and bias. Naturally some customers seemed to have difficulty separating any feelings of dissatisfaction with program management or process from questions pertaining to perceived results from the project. For example, some respondents who indicated they finished their project and did not receive a rebate, presumably owners of a denied project, answered all or almost all questions with the most negative answer available and provided negative comments when given the opportunity. While negative

responses are not brushed off as malice and are considered when evaluating how to make improvements to the Program, it is most likely true that some participants took the survey with the intent of answering questions negatively despite what was being asked. Similarly, some customers seemed to report responses meant for the Turf Removal Program and not the S2D Program, which became apparent in the open-ended answer sections. The close relationship between S2D and Turf Removal was clear even with responses to S2D-specific questions. These factors can potentially affect survey results. However, such imperfections are to be expected with a customer survey, and the high response rate (over 100 participants) helped to minimize any anomalies.

## Impact Analysis Challenges

### Drought Response Effect

There are several factors that may potentially influence the statistical analysis results. Most prominently, the project used in the analysis were completed between 2014 and 2015 during the latest California Drought, which prompted Governor Jerry Brown to declare the drought a state of emergency in January 2014. Shortly after, water restrictions were imposed and customers throughout Orange County were asked to conserve water and were allowed to only irrigate their landscapes on specified days set by their retail water agency. During this time, a large amount of drought awareness and water conservation messaging was issued to the public, asking residents to do their part to save water and help the region make it through the drought. Because these S2D projects were completed during this time, it is possible that customer water consumption was reduced more dramatically because of the drought response messaging and restrictions. Pre-project to Post-project reductions represent water savings achieved from the S2D Program, but may also include additional savings as a result of other drought-response activities; e.g., irrigating only two days per week. However, the Program provided a clear route for customers to save water and meet the new restrictions, and it is very likely that participating in this Program was a major change implemented by customers to do their part to conserve water during the drought.

### Influence of Weather and Social Drought Response

To determine if weather variation was a significant influence on customer water use, consumption patterns were analyzed with precipitation patterns, dry year consumption was compared to wet year consumption, and ETo rates were compared over Pre-Project and Post-Project Consumption periods.

Figure 27 represents residential and commercial Pre-Project Consumption and the corresponding precipitation for that year. Pre-Project Consumption trends are similar for residential and commercial sites. Year 2010 was an extremely wet year; however, Pre-Project Consumption during this year is relatively similar to consumption in the following four years. As precipitation drops significantly, residential consumption also decreases slightly from 2010 to 2012, showing a positive and not an inverse relationship during this time. An inverse relationship is present in 2013; however, for commercial sites consumption and precipitation increased in 2014. This implies that precipitation is not a strong influence on consumption during this time period.

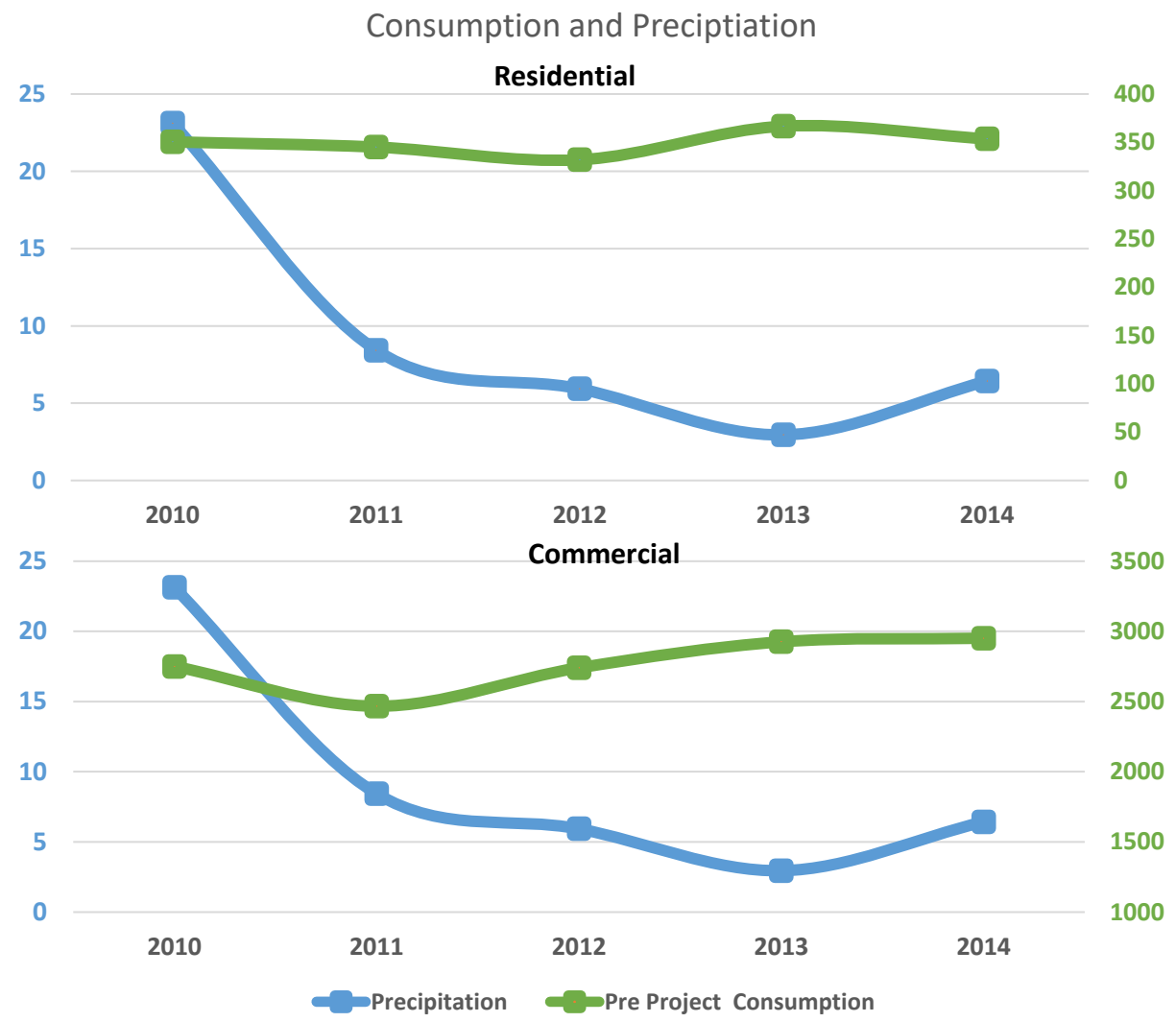


**Figure 27. Residential and Commercial Pre-Project Consumption and precipitation.**

ETo, a representation of plants' water need based on evaporation and transpiration, is also a strong representation of temperature and precipitation. When comparing ETo from a predominantly Pre-Project timeframe, 2010-1014, to the ETo of a predominantly Post-Project timeframe, 2015-2017, there is no statically significant difference between the two. This means that there is not a statistical difference between water need during the time of Pre-Project Consumption and Post-Project Consumption.

Figure 28 compares residential pre-project consumption to post-project consumption occuring during both a dry and wet year. There is a strong statistical signifigance between pre-project consumption (blue line) and wet year post-project consumption (green lines), and pre-project consumption and dry year post-project consumption (orange line). Post-project consumption covering an entire dry year is not statistically significant from an entire wet year. There is no statistcal differnce between wet and dry years during the minimal irrigation season, which is the rainy season. This suggests that customers water

their landscape similiarly during winter months regardless of weather. During the peak irrigation season, post-project consumption was statistically signifigant difference between dry and wet year consumption, with lower consumption occuring during the wet year. The wet year consumption took place during the first wetter-than-average year following several years of intense drought and may be an example of drought bounce-back. The dry year peak irrigation season consumption took place when drought messaging was high, which most likely influenced consumption.

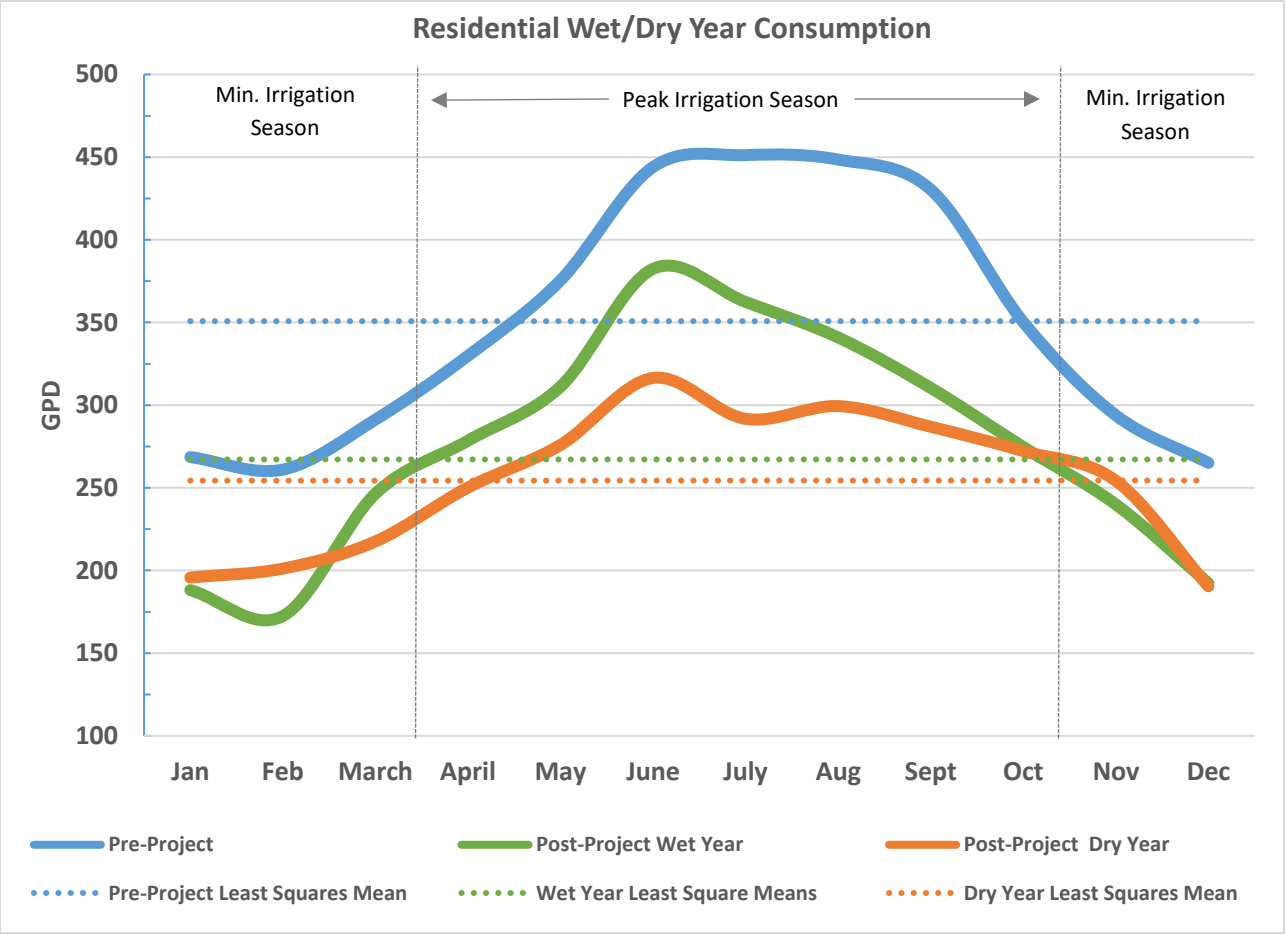


**Figure 28. Comparison of residential consumption during a wet and dry year.**

Commercial Post-Project Consumption during a dry and a wet year was evaluated with all Pre-Project data, shown in Figure 29. There is statistical significance between Pre-Project Consumption (blue) and wet year Post-Project Consumption (green), and also between Pre-Project Consumption and dry year Post-Project Consumption (orange). There is no statistical difference between consumption during a wet year and consumption during a dry year. Furthermore, there is no statistical difference between wet and year consumption specifically during the peak irrigation season, nor is there a statistical significance between consumption during a dry and wet year during the minimal irrigation season. There is, however strong statistical differences between Post-Project Consumption in the peak and minimal irrigation seasons. This suggests that irrigation season (difference of climate) is a driver of water consumption, and weather variation is not a significant influence.

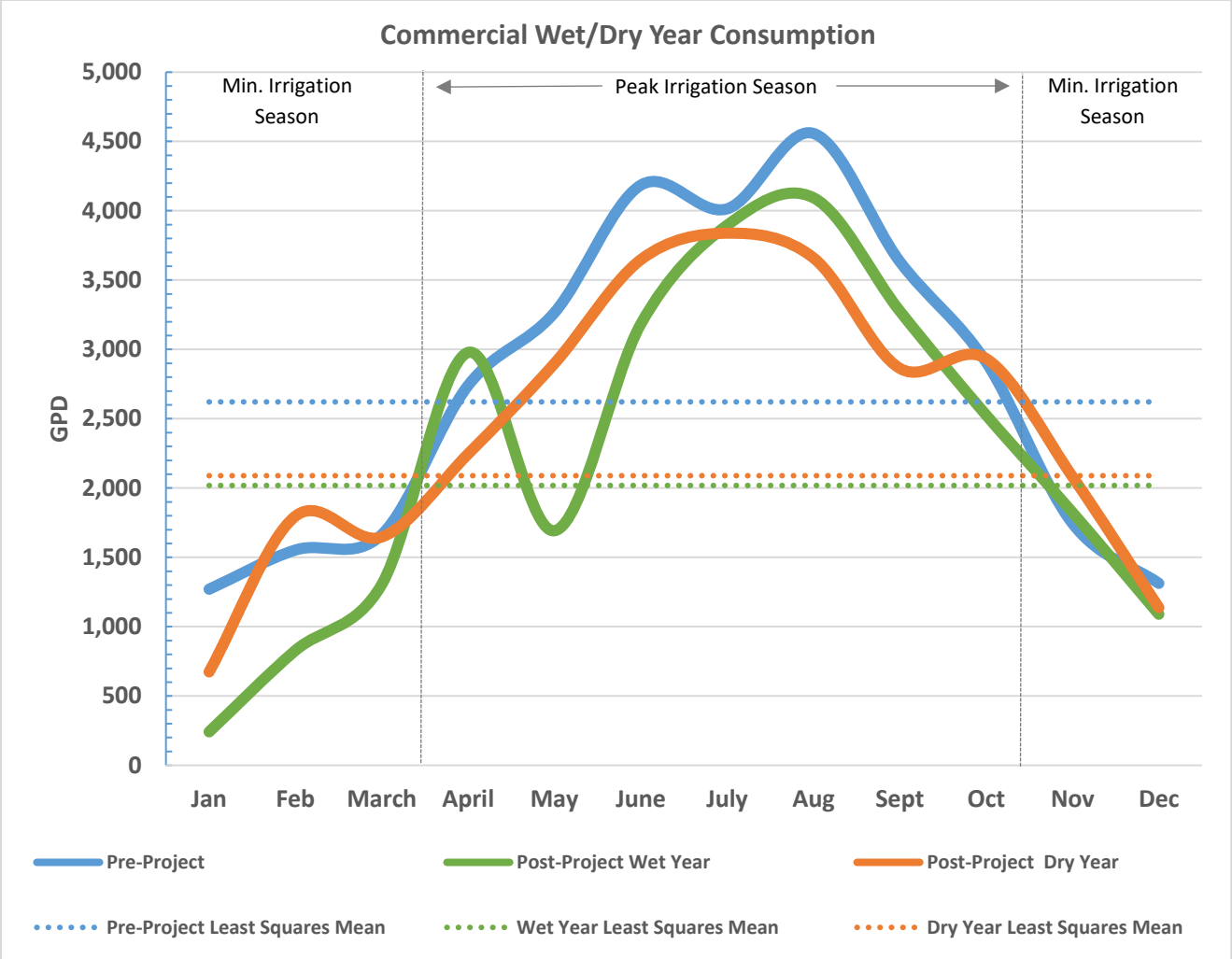


**Figure 29. Comparison of commercial consumption during a wet and dry year.**

The absence of a strong, consistent, inverse relationship between precipitation and consumption from 2010-2014, the strong statistical difference between the higher residential peak season wet year consumption and lesser dry year consumption, and the absence of a statistical difference between minimal season wet and dry consumption suggests that social factors may be more influential on residential water use than short-term weather patterns. Similarly, commercial water consumption was not statistically different between wet and dry years overall, or between wet and dry years in the peak or minimal irrigation season. Because of these factors, and the lack of statistical difference between ETo during the pre-project period and the post-project period, consumption use will not be adjusted due to ETo, which may cloud the data unnecessarily. Because climate and not weather patterns appear to be drivers of consumption patterns, consumption differences due to climate are addressed in this study by evaluating consumption by irrigation season and coastal proximity.

## Other Considerations

The data used in this study was evaluated to ensure it met a number of requirements before it was used. This determined a level of accuracy and precision; however, it did reduce the population size of the test groups. The most common reason for data to be deemed unusable was because not enough time had lapsed since the customer completed their project, meaning there was a not a full two years of post-project consumption to use in the analysis. In the future, these sites will have a longer water use history available and could be revisited to expand the population size and evaluate any consumption changes for customers included in this analysis. Reanalyzing sites used in this study in the future could be helpful in evaluating drought bounce back and how that may relate to irrigation patterns.

The difference in water savings results for commercial and residential sites is most likely related to their inherent differences in consumption patterns, management practices, and sheer volume of consumption, the precise reasons why the two classifications were evaluated separately for the analysis. Both the pre-project and post-project data on the commercial side was much more variable. Because of this, those extreme anomalies were removed from much of the commercial analysis to prevent the overall relationships and patterns from being skewed. Residential sites were much more uniform, and usage was more predictable and relatively consistent. A residential customer's indoor water usage stays relatively constant over the year, and outdoor use generally fluctuates season to season. While house size and occupancy may vary, these are small variations in the overall pattern of consumption. A commercial meter, however, as represented in the data, can have extremely variable ranges that can complicate gauging exactly how much water is being saved through drip irrigation. Additionally, many commercial sites are professionally managed and may have been watering as efficiently as possible with spray irrigation. Despite using traditional spray heads, efficient irrigation practices during the pre-project stage can make the savings achieved through drip irrigation less apparent.

## Evaluation Conclusion

The S2D Program converted 562,682 sq. ft. of inefficiently irrigated landscape to drip irrigation, decreasing water consumption and irrigation runoff. Overall, these projects save Orange County 54 AFY, and will save 540 AF over the project lifetime. Converting to drip irrigation helped save the average residential customer 85 gpd and reduced their water consumption by 24%. The average commercial customer reduced total water use by 19% and saved an average of 473 gpd. Customers noticed they were saving water and also improving the health of their landscape. Significant water savings occurred for S2D participants who did not participate in the Turf Removal Program, proving the S2D Program saves water for not only customers replacing irrigation alone, but also for those replacing their turf grass. Without the S2D Program, approximately two thirds of participants would not have implemented the conversion, and most are highly likely to participate in another water-savings rebate program. The average water savings ratio is 0.121 gpd/sq. ft. for residential customers and 0.066 gpd/sq. ft. for commercial customers. This evaluation has demonstrated the S2D Program to be effective as a means of reducing water consumption and an easy to use and a pleasurable experience for customers who participated.

# Appendix A- Eligible Products List

**SPRAY TO DRIP**
**RESIDENTIAL**
**ELIGIBLE PRODUCTS LIST**

| Manufacturer | Description | Model # |
|---|---|---|
| **All-In-One Component Bundle/Kit** | | |
| Rain Bird | Spray-to-Drip Retrofit Kit | S2DRetroKit |
| **Build-Your-Own Kit** | | |
| **Section (A)** | | |
| Rain Bird | Spray-to- Drip Retrofit Kit | 1800-RETRO |
| Rain Bird | Drip Control Zone Kit (¾" Anti Siphon Low Flow) | XACZ-075-PRF |
| Rain Bird | Inline Drip Control Zone Kit (¾" Low Flow) | XCZ-075-PRF |
| Rain Bird | Inline Drip Control Zone Kit (1" Low Flow) | XCZLF-100-PRF |
| Rain Bird | Drip Control Zone Kit (1" Anti-Siphon Medium Flow) | XACZ-100-PRF |
| Rain Bird | Inline Drip Control Zone Kit (1" Medium Flow) | XCZ-100-PRF |
| Rain Bird | Inline Drip Control Zone Kit (1" Medium Flow 2-Wire Compatible) | XCZPGA-100-PRF |
| Rain Bird | Pressure Regulating Filter (¾" PR RBY Filter) | PRF-075-RBY |
| Rain Bird | Pressure Regulating Filter (1" PR RBY Filter) | PRF-100-RBY |
| Netafim | 1" Valve with ¾" Low Flow Regulator with ¾" Filter | LVCZS8010075-LF |
| Netafim | 1" Valve with ¾" High Flow Regulator with ¾" Filter | LVCZS8010075-HF |
| Netafim | ¾" Low Flow Regulator with ¾" Filter, No Valve | LVCZNV10075-LF |
| Netafim | ¾" High Flow Regulator with ¾" Filter, No Valve | LVCZNV10075-HF |
| Hunter | ¾" PGV-ASV valve with ¾" HFR system with 25 PSI regulator | ACZ-075 |
| Hunter | 1" NPT PGV globe valve with 1" HFR system with 25 PSI regulator | PCZ-101 |
| Hunter | 1" ICV globe valve with 1" HY100 filter system with 25 PSI regulator | ICZ-101 |
| Hunter | ¾" NPT filter system and ¾" outlet with 25 PSI regulator | HFR-075-25 |
| Hunter | 1" NPT filter system and ¾" outlet with 25 PSI regulator | HFR-100-075-25 |
| Toro | 1" EZ-Flo Plus Valve, AVB, Filter, Regulator & Fittings | DZK-EZF-AS |
| Toro | 1" EZ-Flo Plus, Filter, Regulator & Fittings | DZK-EZF |
| Toro | 1" TPV, Filter, Regulator & Fittings | DZK-TPV |
| Toro | 1" 700 UltraFlow Inline Valve, Filter, Regulator & Fittings | DZK-700 |
| Toro | Drip Zone Kit Less Valve with Filter, Regulator & Fittings | DZK-X |

[Y] Alternate equivalent pressure regulation and filtration assembly components may be considered as a substution. Prior to purchase and installation, please email Spray-to-Drip@mwdoc.com with the assembly description, make, or model/sku information for consideration.

| | | |
|---|---|---|
| **Section (B)** | | |
| Rain Bird | XFD Dripline 0.6 GPH 12 inch spacing (Available in 100', 250', and 500' coil) | XFD-06-12-* |
| Rain Bird | XFD Dripline 0.9 GPH 12 inch spacing (Available in 100', 250', and 500' coil) | XFD-09-12-* |
| Rain Bird | XFD Dripline 0.6 GPH 18 inch spacing (Available in 100', 250', and 500' coil) | XFD-06-18-* |
| Rain Bird | XFD Dripline 0.9 GPH 18 inch spacing (Available in 100', 250', and 500' coil) | XFD-09-18-* |
| Rain Bird | XFS Dripline 0.4 GPH 12 inch spacing (Available in 100' and 500' coil) | XFS-04-12-* |
| Rain Bird | XFS Dripline 0.4 GPH 18 inch spacing (Available in 100' and 500' coil) | XFS-04-18-* |
| Rain Bird | XFS Dripline 0.6 GPH 12 inch spacing (Available in 100' and 500' coil) | XFS-06-12-* |
| Rain Bird | XFS Dripline 0.6 GPH 18 inch spacing (Available in 100' and 500' coil) | XFS-06-18-* |
| Rain Bird | XFS Dripline 0.9 GPH 12 inch spacing (Available in 100' and 500' coil) | XFS-09-12-* |
| Rain Bird | XFS Dripline 0.9 GPH 18 inch spacing (Available in 100' and 500' coil) | XFS-09-18-* |
| Rain Bird | XFCV Dripline 0.6 GPH 12 inch spacing (Available in 100' and 500' coil) | XFCV-06-12-* |
| Rain Bird | XFCV Dripline 0.6 GPH 18 inch spacing (Available in 100' and 500' coil) | XFCV-06-18-* |
| Rain Bird | XFCV Dripline 0.9 GPH 12 inch spacing (Available in 100' and 500' coil) | XFCV-09-12-* |
| Rain Bird | XFCV Dripline 0.9 GPH 18 inch spacing (Available in 100' and 500' coil) | XFCV-09-18-* |
| Rain Bird | 1/4 inch Landscape Dripline 0.8 GPH 6 inch spacing | LDQ0806100 |
| Rain Bird | 1/4 inch Landscape Dripline 0.8 GPH 12 inch spacing | LDQ0812100 |
| Netafim | Techline CV Dripline 0.26 GPH 12 inch spacing (Available in 100', 250, and 1000' coil) | TLCV26-12* |
| Netafim | Techline CV Dripline 0.26 GPH 18 inch spacing (Available in 100', 250, and 1000' coil) | TLCV26-18* |
| Netafim | Techline CV Dripline 0.4 GPH 12 inch spacing (Available in 100', 250, and 1000' coil) | TLCV4-12* |
| Netafim | Techline CV Dripline 0.4 GPH 18 inch spacing (Available in 100', 250, and 1000' coil) | TLCV4-18* |
| Netafim | Techline CV Dripline 0.6 GPH 12 inch spacing (Available in 100', 250, 500, and 1000' coil) | TLCV6-12* |

**SPRAY TO DRIP**
**RESIDENTIAL**
**ELIGIBLE PRODUCTS LIST**

| Manufacturer | Description | Model # |
|---|---|---|
| Netafim | Techline CV Dripline 0.6 GPH 18 inch spacing (Available in 100', 250, 500, and 1000' coil) | TLCV6-18* |
| Netafim | Techline CV Dripline 0.6 GPH 24 inch spacing (Available in 100', 250, and 1000' coil) | TLCV6-24* |
| Netafim | Techline CV Dripline 0.9 GPH 12 inch spacing (Available in 100', 250, 500, and 1000' coil) | TLCV9-12* |
| Netafim | Techline CV Dripline 0.9 GPH 18 inch spacing (Available in 100', 250, 500, and 1000' coil) | TLCV9-18* |
| Netafim | Techline CV Dripline 0.9 GPH 24 inch spacing (Available in 100', 250, and 1000' coil) | TLCV9-24* |
| Netafim | Techline DL Dripline 0.26 GPH 12 inch spacing (Available in 100', 250, and 1000' coil) | TLDL26-12* |
| Netafim | Techline DL Dripline 0.26 GPH 18 inch spacing (Available in 100', 250, and 1000' coil) | TLDL26-18* |
| Netafim | Techline DL Dripline 0.4 GPH 12 inch spacing (Available in 100', 250, and 1000' coil) | TLDL4-12* |
| Netafim | Techline DL Dripline 0.4 GPH 18 inch spacing (Available in 100', 250, and 1000' coil) | TLDL4-18* |
| Netafim | Techline DL Dripline 0.6 GPH 12 inch spacing (Available in 100', 250, 500, and 1000' coil) | TLDL6-12* |
| Netafim | Techline DL Dripline 0.6 GPH 18 inch spacing (Available in 100', 250, 500, and 1000' coil) | TLDL6-18* |
| Netafim | Techline DL Dripline 0.6 GPH 24 inch spacing (Available in 100', 250, and 1000' coil) | TLDL6-24* |
| Netafim | Techline DL Dripline 0.9 GPH 12 inch spacing (Available in 100', 250, 500, and 1000' coil) | TLDL9-12* |
| Netafim | Techline DL Dripline 0.9 GPH 18 inch spacing (Available in 100', 250, 500, and 1000' coil) | TLDL9-18* |
| Netafim | Techline DL Dripline 0.9 GPH 24 inch spacing (Available in 100', 250, and 1000' coil) | TLDL9-24* |
| Netafim | Techline EZ Dripline 0.26 GPH 6 inch spacing (Available in 300', 500, and 1000' coil) | TLEZ26-06* |
| Netafim | Techline EZ Dripline 0.26 GPH 12 inch spacing (Available in 300', 500, and 1000' coil) | TLEZ26-12* |
| Netafim | Techline EZ Dripline 0.26 GPH 18 inch spacing (Available in 300', 500, and 1000' coil) | TLEZ26-18* |
| Netafim | Techline EZ Dripline 0.4 GPH 6 inch spacing (Available in 200', 500, and 1000' coil) | TLEZ4-06* |
| Netafim | Techline DL Dripline 0.4 GPH 12 inch spacing (Available in 200', 500, and 1000' coil) | TLEZ4-12* |
| Netafim | Techline EZ Dripline 0.4 GPH 18 inch spacing (Available in 200', 500, and 1000' coil) | TLEZ4-18* |
| Netafim | Techline EZ Dripline 0.6 GPH 12 inch spacing (Available in 300', 500, and 1000' coil) | TLEZ6-12* |
| Netafim | Techline EZ Dripline 0.6 GPH 18 inch spacing (Available in 200', 500, and 1000' coil) | TLEZ6-18* |
| Netafim | Techline EZ Dripline 0.9 GPH 12 inch spacing (Available in 200', 500, and 1000' coil) | TLEZ9-12* |
| Netafim | Techline EZ Dripline 0.9 GPH 18 inch spacing (Available in 200', 500, and 1000' coil) | TLEZ9-18* |
| Hunter | Professional Landscape Dripline 0.4 GPH 12 inch spacing (Available in 250', 500' and 1,000' coil) | PLD-04-12-* |
| Hunter | Professional Landscape Dripline 0.4 GPH 18 inch spacing (Available in 250', 500' and 1,000' coil) | PLD-04-18-* |
| Hunter | Professional Landscape Dripline 0.4 GPH 24 inch spacing (Available in 250', 500' and 1,000' coil) | PLD-04-24-* |
| Hunter | Professional Landscape Dripline 0.6 GPH 12 inch spacing (Available in 100', 250', 500' and 1,000' coil) | PLD-06-12-* |
| Hunter | Professional Landscape Dripline 0.6 GPH 18 inch spacing (Available in 250', 500' and 1,000' coil) | PLD-06-18-* |
| Hunter | Professional Landscape Dripline 0.6 GPH 18 inch spacing (Available in 250', 500' and 1,000' coil) | PLD-06-18-* |
| Hunter | Professional Landscape Dripline 1.0 GPH 12 inch spacing (Available in 100', 250', 500' and 1,000' coil) | PLD-10-12-* |
| Hunter | Professional Landscape Dripline 1.0 GPH 18 inch spacing (Available in 100, 250', 500' and 1,000' coil) | PLD-10-18-* |
| Hunter | Professional Landscape Dripline 1.0 GPH 24 inch spacing (Available in 250', 500' and 1,000' coil) | PLD-10-24-* |
| Hunter | Mini Landscape Dripline 0.5 GPH 6 inch spacing (Available in 100' and 250' coil) | MLD-05-06-* |
| Hunter | Mini Landscape Dripline 0.5 GPH 12 inch spacing (Available in 100' and 250' coil) | MLD-05-12-* |
| Hunter | Subsurface Irrigation Mat (100 FT OR 295 FT ROLL) | ECO-MAT |
| Hunter | Fleece Wrapped Tubing (250 FT ROLL) | ECO-WRAP |
| Toro | Brown PC Dripline 0.53 GPH 12 inch spacing (Available in 100', 250', and 500' coil) | T-PCB1853-12-* |
| Toro | Brown PC Dripline 0.53 GPH 18 inch spacing (Available in 100', 250', and 500' coil) | T-PCB1853-18-* |
| Toro | Brown PC Dripline 1.0 GPH 12 inch spacing (Available in 100', 250', and 500' coil) | T-PCB1810-12-* |
| Toro | Brown PC Dripline 1.0 GPH 18 inch spacing (Available in 100', 250', and 500' coil) | T-PCB1810-18-* |
| Toro | DL 2000 PC Dripline with rootguard 0.5 GPH 12 inch spacing (Available in 100', 500', and 1,000' coil) | RGP-212-* |
| Toro | DL 2000 PC Dripline with rootguard 0.5 GPH 18 inch spacing (Available in 100', 500', and 1,000' coil) | RGP-218-* |
| Toro | DL 2000 PC Dripline with rootguard 1.0 GPH 12 inch spacing (Available in 100', 500', and 1,000' coil) | RGP-412-* |
| Toro | DL 2000 PC Dripline with rootguard 1.0 GPH 18 inch spacing (Available in 100', 500', and 1,000' coil) | RGP-418-* |
| Toro | Soakerline 1/4 inch Classic Dripline 0.53 GPH 6 inch spacing (Available in 100' coil) | T-SDB252-6-100 |
| Toro | Soakerline 1/4 inch Classic Dripline 0.53 GPH 12 inch spacing (Available in 100' coil) | T-SDB252-12-100 |
| Toro | DL2000 Microline with rootguard 0.53 GPH 6 inch spacing (Available in 100' coil) | T-MCRG-206 |
| Toro | DL2000 Microline with rootguard 0.53 GPH 12 inch spacing (Available in 100' coil) | T-MCRG-212 |
| | * Represents coil length | |

# Appendix B- Customer Survey

## Spray-to-Drip Customer Survey

### Municipal Water District of Orange County

**We appreciate you taking the time to provide feedback to us. Please note, this is an anonymous survey. Your response will be used only for the purpose of program improvement and will in no way affect participation in past, present, or future water conservation programs. Thank you for helping us better serve our community!**

**1. Our Records indicate you applied for the Spray-to-Drip rebate program. Did you complete your project and receive a rebate? ***

- ○ Yes, I completed the project and received a rebate
- ○ Yes, I completed the project but did not received a rebate
- ○ I am currently in the process of completing my project
- ◉ No, I did not complete the project and did not receive a rebate

(# 2 only available to those who select "No, I did not complete the project and did not receive a rebate"

**2. What prevented you from completing your proejct? ***

- ○ I changed my mind
- ○ I wanted to install a product not on the eligible products list
- ○ I could not finish in the 60 day window
- ○ Other (please specify) Please enter an 'other' value for this selection. *

(These participants then moved to #10)

**3. How did you hear about the Spray-to-Drip program? ***

- ○ Information provided with water bill
- ○ Family, friend, co-worker, or neighbor
- ○ Advertisement or flyer (not provided with water bill)
- ○ Through participation in the Turf Removal Program or other water savings rebate programs
- ○ Other (please specify) Please enter an 'other' value for this selection. *

**4. What is/are the most effective way(s) to inform you about future water savings rebate opportunities? Please select all that apply. ***

- ☐ Information included with water bill
- ☐ Facebook and/or other social media platforms
- ☐ Radio, television, and/or newspaper advertisement
- ☐ Billboards
- ☐ Flyers available at home improvement retail stores or nurseries
- ☐ Other (please specify) Please enter an 'other' value for this selection. *

**5. Have you noticed any water-savings (e.g., lower consumption on your water bill)? ***

- ○ Yes, I have noticed water savings
- ○ No, I have not noticed water savings
- ○ Unsure
- ○ Other (please specify) Please enter an 'other' value for this selection.

## The following few questions focus on your experience since you've completed the project.

**6. Have you noticed any change in your landscape?** *

- Positive change (e.g., healthier plants and soil, less runoff)
- Negative change (e.g., less healthy plants)
- No change
- Unsure

**7. Have you installed more drip irrigation since completing your project?** *

- Yes
- No
- Unsure

**8. Have you made additional modifications to your drip irrigation system since completing your project?** *

- Yes
- No
- Unsure

**9. Would you have installed drip irrigation regardless of receiving a Spray-to-Drip rebate?** *

- Yes
- No
- Unsure

## The following few questions focus on your experience with the program process (e.g., the application, website, etc.)

**10. Did you also participate in the Turf Removal Program?** *

- Yes, I participated in Spray-to-Drip and Turf Removal at the same time
- Yes, I participated in both programs, but not at the same time
- No, I did not participate in the Turf Removal Program
- No, I did not participate in the Turf Removal Program, but I plan to in the future

(#11 only available to those who selected "Yes, I participated in Spray-to-Drip and Turf Removal at the same time")

**11. How easy was it to participate in both programs at the same time?** *

- Easy to participate in both
- Moderates
- Hard to participate in both

(#12 not available to those who did not complete a project)

**12. Do you feel the 60 day window to the complete your project was an adequate amount of time?** *

- Yes, I finished with time to spare
- Yes, but it was hard to finish in 60 days
- No, I had to request more time
- No, I was unable to finish

**13. Did you need program help at any point in the process? Please check all that apply. ***

- ☐ I found all the help I needed on the website
- ☐ I found some information on the website
- ☐ I had to call customer service
- ☐ I had to call customer service multiple times
- ☐ I felt lost and help was very difficult to find
- ☐ I did not need help

**14. Please select how you feel about the following. ***

| | Very Easy | Easy | Moderate | Hard | Very Hard | Not Applicable |
|---|---|---|---|---|---|---|
| Was is it easy to find information about the program? | ○ | ○ | ○ | ○ | ○ | ○ |
| Were the program instructions easy to understand? | ○ | ○ | ○ | ○ | ○ | ○ |
| Was it easy to obtain customer support? | ◉ | ○ | ○ | ○ | ○ | ○ |

**15. What improvements would you suggest to make the program better, if any? Please specify below.**

**16. Please select how you feel about the following. 1 being the lowest, 5 being the highest ***

| | 1 (lowest) | 2 (low) | 3 (neutral) | 4 (high) | 5 (highest) | Not Applicable |
|---|---|---|---|---|---|---|
| Based on your experience with this program, how likely are you to participate in another water-savings rebate program? | ○ | ○ | ○ | ○ | ○ | ○ |
| If you called or emailed customer service, how would you rate that experience? | ○ | ○ | ○ | ○ | ○ | ○ |
| Overall, how satisfied are you with the program? | ○ | ○ | ○ | ○ | ○ | ○ |

**17. Please provide any additional comments you may wish to share.**

# Appendix C – Rebate Recommendation Calculation

The recommended Incentive Rate was calculated based on the equations below:

$$Water\ Savings\ Rate\ X\ \ Project\ Life\ X\ \frac{1\ AF}{325{,}851\ gal.}\ X\ CCP\ Rate\ = Incentive\ Rate$$

Where:

Water Savings Rate = Residential 0.121, Commercial 0.066
Project Life = 3,650 days (10 years)
CCP Rate = $195/AF of water saved

**Residential Recommendation**

$$\frac{0.121gpd}{sqft}X\ 3{,}650\ days\ X\ \frac{1\ AF}{325851\ gal}\ X\ \frac{\$195}{1\ AF} = \frac{\$0.26}{sq.ft.}$$

**Commercial Recommendation**

$$\frac{0.066gpd}{sqft}X\ 3{,}650\ days\ X\ \frac{1\ AF}{325851\ gal}\ X\ \$\frac{\$195}{1\ AF} = \frac{\$0.14}{sq.ft.}$$