



Yucaipa Valley Water District

Notice and Agenda of a Board Workshop

Tuesday, April 28, 2015 at 4:00 p.m.

MEETING LOCATION:	District Administration Building 12770 Second Street, Yucaipa
MEMBERS OF THE BOARD:	Director Ken Munoz, Division 1 Director Bruce Granlund, Division 2 Director Jay Bogh, Division 3 Director Lonni Granlund, Division 4 Director Tom Shalhoub, Division 5

I. Call to Order

II. Public Comments At this time, members of the public may address the Board of Directors on matters within its jurisdiction; however, no action or significant discussion may take place on any item not on the meeting agenda.

III. Staff Report

IV. Presentations

- A. Presentation of Sweepstakes Award-Winning Science Fair Project by Vincent Chen [[Workshop Memorandum No. 15-072 - Page 5 of 199](#)]
- B. Overview of the 7th Annual Inland Solar Challenge Competition [[Workshop Memorandum No. 15-073 - Page 6 of 199](#)]
- C. Overview of Tiered Water Rate Structures Pursuant to the Recent Ruling by the Fourth District Court of Appeal, Division Three *Capistrano Taxpayers Association v. City of San Juan Capistrano* [[Workshop Memorandum No. 15-074 - Page 9 of 199](#)]
- D. Overview of Turf Removal & Replacement Policies by the California Urban Water Conservation Council [[Workshop Memorandum No. 15-075 - Page 41 of 199](#)]
- E. Overview of California Drought Conditions and Related Regional Issues [[Workshop Memorandum No. 15-076 - Page 71 of 199](#)]
- F. Overview of Proposed State Water Resources Control Board Mandatory Restrictions to Achieve a 25% Statewide Reduction in Potable Urban Water Use [[Workshop Memorandum No. 15-077 - Page 89 of 199](#)]

Any person with a disability who requires accommodation in order to participate in this meeting should telephone Erin Anton at (909) 797-5117, at least 48 hours prior to the meeting in order to make a request for a disability-related modification or accommodation.

Materials related to an item on this agenda submitted to the Board of Directors after distribution of the workshop packet are available for public inspection during normal business hours at the District office located at 12770 Second Street, Yucaipa. Meeting material is also be available on the District's website at www.yvwd.dst.ca.us

V. Operational Issues

- A. Update on the Potential Use of the District Building at 35192 Cedar Avenue - Yucaipa (Assessor Parcel Number 0303-232-17) [[Workshop Memorandum No. 15-078 - Page 117 of 199](#)]
- B. Review of Alternative Sludge Dewatering Equipment at the Wochholz Regional Water Recycling Facility [[Workshop Memorandum No. 15-079 - Page 119 of 199](#)]

VI. Capital Improvement Projects

- A. Status Report on the Construction of a 6.0 Million Gallon Drinking Water Reservoir R-12.4 - Calimesa [[Workshop Memorandum No. 15-080 - Page 140 of 199](#)]
- B. Status Report on the Installation of an Air Conditioning System at Lift Station No. 1 [[Workshop Memorandum No. 15-081 - Page 146 of 199](#)]
- C. Status Report on the Construction of Replacement Digester Covers and Associated Piping at the Wochholz Regional Water Recycling Facility [[Workshop Memorandum No. 15-082 - Page 147 of 199](#)]
- D. Status Report on the Construction of the 8th Street and Washington Drive Replacement Pipelines [[Workshop Memorandum No. 15-083 - Page 177 of 199](#)]

VII. Administrative Items

- A. Identification and Declaration of Bad Debts for Calendar Year 2013 [[Workshop Memorandum No. 15-084 - Page 179 of 199](#)]
- B. Review of Alternative Payment Options for Customers of the Yucaipa Valley Water District [[Workshop Memorandum No. 15-085 - Page 180 of 199](#)]
- C. Discussion Regarding Draft Surplus Recycled Water Exchange Agreement Between Yucaipa Valley Water District and Beaumont Cherry Valley Water District [[Workshop Memorandum No. 15-086 - Page 181 of 199](#)]

VIII. Director Comments**IX. Adjournment**

Staff Report



Yucaipa Valley Water District

Presentations



Yucaipa Valley Water District



Date: April 28, 2015

Subject: Presentation of Sweepstakes Award-Winning Science Fair Project by Vincent Chen

At the 33rd annual Inland Science and Engineering Fair the Yucaipa and Calimesa area had a number of students recognized for their science project achievements. Three Yucaipa area students, Sunil Alexander, Vincent Chen and Zoey Zellerman were among an elite group of students who won gold in the Regional Science Fair. In addition to the gold medal winners, two Yucaipa students won Sweepstakes Awards for the outstanding project in their respective divisions. The Sweepstakes winners were: Zoey Zellman (Elementary Division) of Chapman Heights Elementary School and Vincent Chen (Junior Division) of Inland Leaders Charter School. There was a total of three Sweepstakes Awards given at the Fair and Yucaipa students earned two of them.

The District staff had an opportunity to meet Vincent Chen when he made contact with us to provide water samples for his project. The Board of Directors and the District staff always enjoy the opportunity to interact and work closely with students in our area.

The purpose of this agenda item is to receive a brief presentation by Vincent about his award-winning project.

About Vincent Chen - Vincent Chen, two-time Gold Medal winner from Yucaipa, won a number of awards at the Science Fair. Chen is a 13-year-old eighth-grade student at Inland Leaders Charter School. In addition to winning the Gold Medal, he won the prestigious Sweepstakes Award for outstanding project. Chen also earned The National Oceanographic and Atmospheric Administration Award and the Vocademy Award. His project used thamnococephalus (beavertail fairy shrimp) to analyze water quality along the Santa Ana River. He sampled sites along the Santa Ana River and Tributaries. He began collecting at the River Road Bridge in Chino all the way to the South Mount Vernon. "I contacted Yucaipa Valley Water District for help," he said. "Joe Zoba and Jennifer Aires provided me some water samples." In his conclusion he found that Chino River is the most polluted tributary to the Santa Ana River. "I was hoping for the gold medal and I was really happy when I got the gold and it really surprised me that I also received the other awards," said Chen.



Source: Yucaipa / Calimesa News Mirror



Date: April 28, 2015

Subject: Overview of the 7th Annual Inland Solar Challenge Competition

The 7th Annual Inland Solar Challenge was held on April 24-26, 2015 at the Yucaipa Regional Park. This event is made possible by the financial contributions and staff resources from:

- Arrowhead Water
- City of Colton Water Department
- City of Redlands Water Department
- Computerized Embroidery Company
- East Valley Water District
- Kasch Graphics
- Milestone Trophies
- San Bernardino Municipal Water Department
- San Bernardino Valley Municipal Water District
- San Geronio Pass Water Agency
- Water Resources Institute
- West Valley Water District
- Yucaipa Regional Park
- Yucaipa Valley Water District

Jennifer Ares served as the event Committee Chairperson this year. Jennifer received additional support from District staff members: Matthew Porras; Matthew Flordelis; John Wrobel; Bob Wall; and James Cansler.

Throughout the duration of the event, the District staff is able to work closely with staff members from other water districts. This provides a unique opportunity for staff members to work together, form stronger relationships, and discuss current and future issues. The time staff members spend together during this event have proven to provide a beneficial working relationship that enhances our ability to work together to solve regional water issues.



About the Event...

The Inland Solar Challenge gathers high school students from across the Inland Empire to build sixteen foot boats equipped with solar technology. Once built, teams race against each other.

This three day event, held at Yucaipa Regional Park, includes an endurance, slalom and sprint race. In the months before the event, teams must prepare two technical reports and a Public Service Announcement (PSA) about water conservation. Students are also required to present their PSA at the event. The team with the most points in each category wins the competition.

Prior to the event, the high schools gather together to build their boats which builds relationships between the teams. Once the boats are built, each team takes their boat back to their school, where they spend many hours fitting their boat with the required technology and fine tuning their design for the competition in April.

The cost of the event is paid for by sponsorships. The high schools provide the classroom space to work on the boats, and motivated instructors help the students get the most out of this learning experience.

2015 Participating High Schools

**Banning High School
Cajon High School
Cathedral City High School
Desert Hot Springs High School
Redlands East Valley High School
Rialto High School
Yucaipa High School**

Inland Solar Challenge Committee

Yucaipa Valley Water District
Jennifer Ares-Event Chair
Matthew Flordelis
Brant Musick
City of Redlands
Cecilia Griego-Co Chair
Chelsea Schnitger
West Valley Water District
Amanda Kasten—Treasurer
Jose Velasquez
East Valley Water District
Janett Garcia
Cecilia Contreras
City of Colton
Jennifer Shimmin—Secretary
San Bernardino Municipal Water Dept.
Devin Arciniaga
Technical Inspectors
Bob Wall
John Wrobel
Matt Porras

Inland Solar Challenge
855 W. Baseline Road
P.O. Box 920,
Rialto, CA 92377

Schedule of Events	
FRIDAY, APRIL 24TH, 2015	
Registration	8:00 a.m.— 2:00 p.m.
Lunch	12:00 p.m.— 1:00 p.m.
Inspections	8:00 a.m.— 4:00 p.m.
Dinner	5:00 p.m.— 6:00 p.m.
SATURDAY, APRIL 25TH, 2015	
Breakfast	7:00 a.m.— 8:00 a.m.
Inspections	8:00 a.m.— 9:00 a.m.
ENDURANCE RACE	
1. Yucaipa	9:00 a.m.
2. Desert Hot Springs	9:10 a.m.
3. Redlands East Valley	9:20 a.m.
4. Banning	9:30 a.m.
5. Cathedral City	9:40 a.m.
6. Cajon	9:50 a.m.
7. Rialto	10:00 a.m.
Lunch	11:45 a.m.— 12:45 a.m.
Inspections	1:00 p.m.
SLALOM RACE	
1. Rialto	1:30 p.m.
2. Redlands East Valley	1:50 p.m.
3. Banning	2:10 p.m.
4. Desert Hot Springs	2:30 p.m.
5. Yucaipa	2:50 p.m.
6. Cathedral City	3:10 p.m.
7. Cajon	3:30 p.m.
PSA PRESENTATIONS	
1. Cajon	4:30 p.m.
2. Cathedral City	4:45 p.m.
3. Redlands East Valley	5:00 p.m.
4. Desert Hot Springs	5:15 p.m.
5. Banning	5:30 p.m.
6. Rialto	5:45 p.m.
7. Yucaipa	6:00 p.m.
Dinner	6:30 p.m.

Schedule of Events	
SUNDAY, APRIL 26TH, 2015	
Breakfast	7:00 a.m.— 8:00 a.m.
Inspections	8:00 a.m.
SPRINT RACE	
1. Desert Hot Springs	9:00 a.m.
2. Cajon	9:20 a.m.
3. Yucaipa	9:40 a.m.
4. Redlands East Valley	10:00 a.m.
5. Banning	10:20 a.m.
6. Rialto	10:40 a.m.
7. Cathedral City	11:00 a.m.
Awards & Lunch	12:00 p.m.— 1:00 p.m.







Date: April 28, 2015

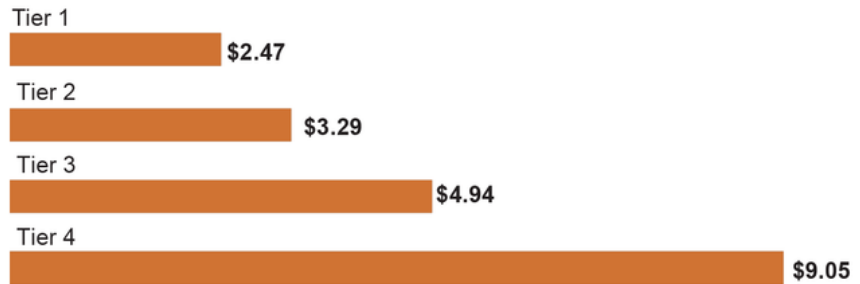
Subject: Overview of Tiered Water Rate Structures Pursuant to the Recent Ruling by the Fourth District Court of Appeal, Division Three *Capistrano Taxpayers Association v. City of San Juan Capistrano*

On Monday, April 20, 2015, the Fourth District Court of Appeal, Division Three, ruled that a city’s inclining, tiered block rate structure violated Proposition 218’s proportionality requirements (California Constitution, article XIII D, section 6). Although the opinion in *Capistrano Taxpayers Association v. City of San Juan Capistrano* held that tiered rates, or inclining block rates that go up progressively in relation to usage, are compatible with Proposition 218, in this instance, the court concluded that the City failed to demonstrate that the tiers correspond to the actual cost of providing service at a given level of usage. The court rejected reliance on article X, section 2 to promote water conservation as the sole basis for establishing tiers, holding the city had to show that the various usage tiers corresponded with its actual costs of delivering water in those increments.

Tiered prices

The city of San Juan Capistrano’s 2010 water rate schedule, which a group of residents is challenging in court.

(Cost per 748 gallons)



Source: city of San Juan Capistrano

@latimesgraphics

Specifically, the ruling contained the following elements that need to be reviewed by water agencies throughout the state.

- First, the Court of Appeal held that the City’s rates were not proportional to the cost of service because the City did not calculate the incremental cost of providing water at the level of use represented by each tier.
- Second, the court rejected the City’s argument that the rates in tiers three and four do not have to be cost justified pursuant to article X, section 2 of the California Constitution which requires conservation of the water resources.
- Finally, the appellate court sided with the City that Proposition 218 does allow public water agencies to pass on to their customers the capital costs of improvements to provide additional water, including building a recycling plant, because “each kind of water is providing the *same* service,” even if not all customers (e.g., residential) are capable of utilizing the alternate water source.

This ruling will have ramifications for most water agencies throughout the state. The Yucaipa Valley Water District utilizes tiered water rates (shown below) which are currently under review for compliance with the recent court ruling.

Potable Water Consumption (kgal)	Commodity Rate (\$/kgal)
1 – 15 Billing Units	\$1.429
16 – 60 Billing Units	\$1.919
61 – 100 Billing Units	\$2.099
101 and greater Billing Units	\$2.429

Filed 4/20/15

CERTIFIED FOR PUBLICATION

IN THE COURT OF APPEAL OF THE STATE OF CALIFORNIA

FOURTH APPELLATE DISTRICT

DIVISION THREE

CAPISTRANO TAXPAYERS
ASSOCIATION, INC.,

Plaintiff and Respondent,

v.

CITY OF SAN JUAN CAPISTRANO,

Defendant and Appellant.

G048969

(Super. Ct. No. 30-2012-00594579)

O P I N I O N

Appeal from a judgment of the Superior Court of Orange County, Gregory Munoz , Judge. Affirmed in part; reversed in part and remanded.

Colantuono & Levin, Colantuono, Highsmith & Whatley, Michael G. Colantuono, Tiana J. Murillo and Jon di Cristina; Rutan & Tucker, Hans Van Ligten and Joel Kuperberg for Defendant and Appellant.

Best, Best & Krieger and Kelly J. Salt for the Association of California Water Agencies, League of California Cities and California State Association of Counties as Amicus Curiae on behalf of Defendant and Appellant.

Mills Legal Clinic at Stanford Law School, Environmental Law Clinic and Deborah A. Sivas for Natural Resources Defense Council and Planning and Conservation League as Amicus Curiae on behalf of Defendant and Appellant.

AlvaradoSmith, Benjamin T. Benumof and William M. Hensley for Plaintiff and Respondent.

Howard Jarvis Taxpayers Foundation, Trevor A. Grimm, Jonathan M. Coupal, Timothy A. Bittle and Ryan Cogdill as Amicus Curiae on behalf of Plaintiff and Respondent.

Foley & Mansfield and Louis C. Klein for Mesa Water District as Amicus Curiae on behalf of Plaintiff and Respondent.

* * *

I. INTRODUCTION

Southern California is a “semi-desert with a desert heart.”¹ Visionary engineers and scientists have done a remarkable job of making our home habitable, and too many of us south of the Tehachapis never give a thought to its remarkable reclamation. In his brilliant – if opinionated – classic *Cadillac Desert*, the late Marc Reisner laments how little appreciation there is of “how difficult it will be just to hang on to the beachhead they have made.”²

In this case we deal with parties who have an acute appreciation of how tenuous the beachhead is, and how desperately we all must fight to protect it. But they disagree about what steps are allowable – or required – to accomplish that task. We are called upon to determine not what is the right – or even the more reasonable – approach to the beachhead’s preservation, but what is the one chosen by the state’s voters.

We hope there are future scientists, engineers, and legislators with the wisdom to envision and enact water plans to keep our beloved Cadillac Desert habitable.

¹ Walter Prescott Webb, “The American West, Perpetual Mirage,” *Harper’s Magazine*, May, 1957.
² Reisner, *Cadillac Desert*, p. 6.

But that is not the court’s mandate. Our job – and it is daunting enough – is solely to determine what water plans the voters and legislators of the past have put in place, and to determine whether the trial court’s rulings complied with those plans.

We conclude the trial court erred in holding that Proposition 218 does not allow public water agencies to pass on to their customers the capital costs of improvements to provide additional increments of water – such as building a recycling plant. Its findings were that future water provided by the improvement is not immediately available to customers. (See Cal. Const., art. XIII D, § 6, subd. (b)(4)) [no fees “may be imposed for a service unless that service is actually used by, or immediately available to, the owner of the property in question”].) But, as applied to water delivery, the phrase “a service” cannot be read to differentiate between recycled water and traditional, potable water. Water *service* is already “immediately available” to all customers, and *continued* water service is assured by such capital improvements as water recycling plants. That satisfies the constitutional and statutory requirements.

However, the trial court did not err in ruling that Proposition 218 requires public water agencies to calculate the actual costs of providing water at various levels of usage. Article XIII D, section 6, subdivision (b)(3) of the California Constitution, as interpreted by our Supreme Court in *Bighorn-Desert View Water Agency v. Verjil* (2006) 39 Cal.4th 205, 226 (*Bighorn*) provides that water rates must reflect the “cost of service attributable” to a given parcel.³ While tiered, or inclined rates that go up progressively in relation to usage are perfectly consonant with article XIII D, section 6, subdivision (b)(3) and *Bighorn*, the tiers must still correspond to the actual cost of providing service at a given level of usage. The water agency here did not try to calculate the cost of actually

³ Until *Bighorn*, there was a question as to whether Proposition 218 applied at all to water rates. In 2000, the appellate court in *Howard Jarvis Taxpayers Assn. v. City of Los Angeles* (2000) 85 Cal.App.4th 79, 83 (*Jarvis v. Los Angeles*), held that a city’s water rates weren’t subject to Proposition 218, reasoning that water rates are mere commodity charges. *Bighorn*, however, formally disapproved *Jarvis v. Los Angeles* and held that water rates *are* subject to article XIII D of the California Constitution. (*Bighorn, supra*, 39 Cal.4th at p. 217, fn. 5.)

providing water at its various tier levels. It merely allocated all its costs among the price tier levels, based not on costs, but on pre-determined usage budgets. Accordingly, the trial court correctly determined the agency had failed to carry the burden imposed on it by another part of Proposition 218 (art. XIII D, § 6, subd. (b)(5)) of showing it had complied with the requirement water fees not exceed the cost of service attributable to a parcel. That part of the judgment must be affirmed.

II. FACTS

Sometimes cities are themselves customers of a water district, the best example in the case law being the City of Palmdale, which successfully invoked Proposition 218 to challenge the rates *it* was paying to a water district.⁴ (See *City of Palmdale v. Palmdale Water Dist.* (2011) 198 Cal.App.4th 926 (*Palmdale*)). And sometimes cities are, as in the present case, their own water district. As Amicus Association of California Water Agencies (ACWA) points out, government water suppliers in California are a diverse lot that includes municipal water districts, irrigation districts, county water districts, and, in some cases, cities themselves. To focus on its specific role in this case as a municipal water supplier – as distinct from its role as the provider of municipal services which consume water such as parks, city landscaping or public golf courses – we will refer to appellant City of San Juan Capistrano as “City Water.”

In February 2011, City Water adopted a new water rate structure recommended by a consulting firm. The way City Water calculated the new rate structure is well described in City Water’s supplemental brief of November 25, 2014.⁵

⁴ For reader convenience, we will occasionally refer in this opinion in shorthand to “subdivision (b)(1),” “subdivision (b)(3),” “subdivision (b)(4),” and “subdivision (b)(5),” and sometimes even just to “(b)(1)” “(b)(3),” “(b)(4)” or “(b)(5).” Each time those references refer to article XIII D, section 6, subdivision (b) of the California Constitution. Also, all references to any “article” are to the California Constitution.

⁵ We requested supplemental briefing prior to oral argument to clarify the nature of the issues and precisely what was in, and not in, the administrative record. We are indebted to able counsel on all sides for giving us their best efforts to answer our questions.

City Water followed a pattern generally recommended by a manual used by public water agencies throughout the western United States known as the “M-1” manual. It first ascertained its total costs, including things like debt service on previous infrastructural improvements. It then identified components of its costs, such as the cost of billing and the cost of water treatment. Next it identified classes of customers, differentiating, for example, between “regular lot” residential customers and “large lot” residential customers, and between construction customers and agricultural customers. Then, in regard to each class, City Water calculated four possible budgets of water usage, based on historical data of usage patterns: low, reasonable, excessive and very excessive.

The four budgets were then used as the basis for four distinct “tiers” of pricing.⁶ For residential customers, tier 1, the low budget, was assumed to be exclusively indoor usage, based on World Health Organization (WHO) guidelines concerning the “minimum quantity of water required for survival,” with adjustments for things like “low-flush toilets and other high-efficiency appliances.” Tier 2, the reasonable budget, included an outdoor allocation based on “typical landscapes,” and assumed “use of native plants and drought-tolerant plants.” The final two tiers were based on budgets of what City Water considers excessive usages of water or overuse volumes. Using these four budgets of consumption levels, City Water allocated its total costs in such a way that the anticipated revenues from all four tiers would equal its total costs, and thus the four-tier system would be, taken as a whole, revenue neutral, and City Water would not make a profit on its pricing structure. City Water did not try to calculate the incremental cost of providing water at the level of use represented by each tier, and in fact, at oral argument

⁶ Such rate structures are sometimes called “inclining” as in the pre-Proposition 218 case, *Brydon v. East Bay Mun. Utility Dist.* (1994) 24 Cal.App.4th 178, 184 (*Brydon*). Amicus ACWA estimates that over half its members now have some sort of tiered water rate system. As we will say numerous times in this opinion, tiered water rate structures and Proposition 218 are thoroughly compatible “so long as” – and that phrase is drawn directly from *Palmdale* – those rates reasonably reflect the cost of service attributable to each parcel. (*Palmdale, supra*, 198 Cal.App.4th at p. 936.)

in this court, admitted it effectively used revenues from the top tiers to subsidize below-cost rates for the bottom tier.

Here is the rate structure adopted, as applied to residential customers:

Tier	Usage	Price
1	Up to 6 ccf ⁷	\$2.47 per ccf
2	7 to 17 ccf ⁸	\$3.29 per ccf
3	18 to 34 ccf ⁹	\$4.94 per ccf
4	Over 34 ccf ¹⁰	\$9.05 per ccf

City Water obtains water from five separate sources: a municipal groundwater recovery plant, the Metropolitan Water District, five local groundwater wells, recycled water wells, and the nearby Moulton Niguel Water District. With the exception of water obtained from the Metropolitan Water District, City Water admits in its briefing that the record does not contain any breakdown as to the relative cost of each source of supply.

The breakdown of cost from each of its various sources of water is, in percentage terms:

Source	Percent of Supply	Cost to Supply
Groundwater Recovery Plant	51.95%	Not ascertained

⁷ Ccf stands for one hundred cubic feet, which translates to 748 gallons. (See *Brydon, supra*, 24 Cal.App.4th at p. 184.)

⁸ A precise figure for the usage is complicated by an attempt in the rate structure to distinguish indoor and outdoor use. Technically, tier 2 is tier 1 + 3 extra ccfs, plus an outdoor allocation that is supposed to average out to a total of 17 ccfs, i.e., 8 ccfs are allocated (on average) for outdoor use.

⁹ Technically, tier 3 is defined as up to 200 percent of tiers 1 and 2, which, given City Water’s projected 17 ccf average, works out to be 34 ccf.

¹⁰ While the consultants distinguished between regular and large lot residential customers, the final structure made no distinction between the two.

Metropolitan Water District	28.54%	\$1,007 per acre foot ¹¹
Local Wells	7.79%	Not ascertained
Recycled Wells	6.11%	Not ascertained
Moulton Niguel Water District	5.61%	Not ascertained

Various percentages of City Water’s overhead – or fixed costs in the record – were allocated in percentages to some of the sources of water, so the price per tier reflected a percentage of fixed costs and costs of some sources.

This chart reflects those allocations:

Tier	Price	Percentage Allocation
1	\$2.47	\$1.78 to fixed costs, .62 to wells
2	\$3.29	\$1.78 to fixed, 1.46 to wells
3	\$4.94	\$1.53 to fixed, .69 to wells, .17 to the Metropolitan Water District, and 2.50 to the groundwater recovery plant
4	\$9.05	0 to fixed, 0 to wells, .53 to groundwater recovery plant, 2.53 to recycled, 3.32 to the Metropolitan Water District, and 2.64 to Penalty Set Aside

There is no issue in this case as to the process of the adoption of the new rates, such as whether they should have been voted on first under the article XIII C part

¹¹ In 2010, City Water was paying \$719 per acre foot for water from the Metropolitan Water District, and that cost was projected to increase incrementally each year until it reached \$1,007 per acre foot by 2014. One acre foot equals 435.6 ccf.

of Proposition 218. For purposes of this appeal it is enough to say City Water adopted them.¹²

In August 2012, the Capistrano Taxpayers Association (CTA) filed this action, challenging City Water's new rates as violative of Proposition 218, specifically article XIII D, section 6, subdivision (b)(3)'s limit on fees to the "cost of service attributable to the parcel." After a review of the administrative record and hearing, the trial court found the rates weren't compliant with article XIII D, noting it "could not find any specific financial cost data in the A/R to support the substantial rate increases" in the progressively more expensive tiers. In particular the trial judge found a lack of support for the inequality between the tiers.

The statement of decision also concluded that the imposition of charges for recycling within the rate structure violated the "immediately available" provision in article XIII D, section 6, subdivision (b)(4), because *recycled* water is not used by residential parcels. (City Water concedes that when the recycling plant comes on line, it will supply water to some, but not all, of its customers. Residences, for example, are not typically plumbed to receive non-potable recycled water.) City Water has timely appealed from the declaratory judgment, challenging both determinations.

III. DISCUSSION

A. *Capital Costs and Proposition 218*

We first review the constitutional text. Article XIII D, section 6, subdivision (b)(4) provides: "No fee or charge may be imposed for a service unless that service is actually used by, or immediately available to, the owner of the property in question. Fees or charges based on potential or future use of a service are not permitted.

¹² With a minor qualification that, given our disposition, it need not be addressed in too much detail. A minor issue in the briefing is whether City Water should have made its consultants' report available for taxpayer scrutiny prior to the public hearing contemplated in article XIII D, section 6, subdivision (c). Since City Water is not able to show its price structure correlates with the actual cost of providing service at the various incremental levels even *with* the consultants' report, we need not get bogged down in this issue.

Standby charges, whether characterized as charges or assessments, shall be classified as assessments and shall not be imposed without compliance with Section 4.”

The trial court ruled City Water had violated this provision by “charging certain ratepayers for recycled water that they do not actually use and that is not immediately available to them.” The trial judge specifically found, in his statement of decision, that “City [Water] imposed a fee on all ratepayers for recycled water services and delivery of recycled water services, despite the fact that not all ratepayers used recycled water or have it immediately available to them or would ever be able to use it.”

But the trial court assumed that providing recycled water is a fundamentally different kind of service from providing traditional potable water. We think not. When each kind of water is provided by a single local agency that provides water to different kinds of users, some of whom can make use of recycled water (for example, cities irrigating park land) while others, such as private residences, can only make use of traditional potable water, providing each kind of water is providing the *same* service. Both are getting water that meets their needs. Non-potable water for some customers frees up potable water for others. And since water service is already immediately available to all customers of City Water, there is no contravention of subdivision (b)(4) in including charges to construct and provide recycled water to some customers.

On this point, *Griffith v. Pajaro Valley Water Management Agency* (2013) 220 Cal.App.4th 586 (*Griffith*) is instructive. *Griffith* involved an augmentation fee on parcels that had their own wells. An objection to the augmentation fee by the well owners was that the fee included a charge for delivered water, even though some of the properties were outside the area and not actually receiving delivered water. The *Griffith* court said that even if some parcel owners weren’t receiving delivered water, revenues from the augmentation fee still benefited those parcels, since they funded “activities required to prepare or implement the groundwater management program for the common benefit of all water users.” (*Id.* at p. 602.) In *Griffith* the augmentation fee was thus

intended to fund aggressive capital investments to increase the general supply of water, including some customers receiving delivered water when other customers didn't. It was undeniable that by funding delivered water to some customers water was *freed up* for all customers. (See *Griffith, supra*, 220 Cal.App.4th at p. 602; accord, *Paland v. Brooktrails Township Community Services Dist. Bd. of Directors* (2009) 179 Cal.App.4th 1358 [customer in rural area who periodically went inactive still had water immediately available to him].)

In the present case, there is a Government Code definition of water which shows water to be part of a holistic distribution system that does not distinguish between potable and non-potable water: “‘Water’ means any system of public improvements intended to provide for the production, storage, supply, treatment, or distribution of water from any source.” (Gov. Code, § 53750, subd. (m).)

A recycling plant, like other capital improvements to increase water supply, obviously entails a longer time frame than a residential customer's normal one-month billing cycle. As shown in *Morgan v. Imperial Irrigation District* (2014) 223 Cal.App.4th 892, the time frame for the calculation of the true cost of water can be, given capital improvements, quite long. (See *id.* p. 900 [costs amortized over a six-year period].) And, as pointed out by amici Howard Jarvis Taxpayers Association, Water Code section 53756 contemplates time frames for water rates that can be as much as five years.¹³ There is no need, then, to conclude that rates to pay for a recycling plant have to be figured on a month-to-month basis.

The upshot is that within a five-year period, a water agency might develop a capital-intensive means of production of what is effectively *new* water, such as

¹³ Water Code section 53756 provides in relevant part:
 “An agency providing water, wastewater, sewer, or refuse collection service may adopt a schedule of fees or charges authorizing automatic adjustments that pass through increases in wholesale charges for water, sewage treatment, or wastewater treatment or adjustments for inflation, if it complies with all of the following:
 “(a) It adopts the schedule of fees or charges for a property-related service for a period *not to exceed five years* pursuant to Section 53755.” (Italics added.)

recycling or desalinization, and pass on the costs of developing that new water to those customers whose marginal or incremental extra usage requires such new water to be produced. As amicus Mesa Water District points out, Water Code section 31020 gives local water agencies power to do acts to “furnish sufficient water for any present or *future* beneficial use.” (Wat. Code, § 31020, italics added.) The trial court thus erred in concluding the inclusion of charges to fund a recycling operation was, by itself, a violation of subdivision (b)(4).

However, the record is insufficient to allow us to determine at this level whether residential ratepayers who only use 6 ccf or less – what City Water considers the super-conservers – are being required to pay for recycling facilities that would not be necessary but for above-average consumption. Proposition 218 protects lower-than-average users from having to pay rates that are *above the cost of service for them* because those rates include capital investments their levels of consumption do not make necessary. We note, in this regard, that in *Palmdale, supra*, one of the reasons the court there found the tiered pricing structure to violate subdivision (b)(3) was the perverse effect of affirmatively penalizing conservation by some users. (See *Palmdale, supra*, 198 Cal.App.4th at pp. 937-938; see accord, *Brydon, supra*, 24 Cal.App.4th at p. 202 [“To the extent that certain customers over-utilize the resource, they contribute disproportionately to the necessity for conservation, and the requirement that the District acquire new sources for the supply of domestic water.”].)

There is a case with an analogous lacuna, the Supreme Court case of *California Farm Bureau Federation v. State Water Resources Control Bd.* (2011) 51 Cal.4th 421 (*Farm Bureau*). In *Farm Bureau*, the record was also unclear as to the issue of apportionment between a regulatory activity’s fees and its costs. (*Id.* at p. 428.) Accordingly, the high court directed the matter to be remanded to the trial court for such necessary findings.

That seems to us the appropriate way to complete the record in our case. Following the example of *Farm Bureau*, we remand the matter for further findings on whether charges to develop City Water's nascent recycling operation have been improperly allocated to users whose levels of consumption are so low that they cannot be said to be responsible for the need for that recycling.

B. *Tiered Pricing and Cost of Service*

1. *Basic Analysis*

We begin, as we did with the capital cost issue, with the text of the Constitution. In addition to subdivision (b)(3), the main provision at issue in this case, we also quote subdivision (b)(1), because it throws light on subdivision (b)(3). Subdivision (b) describes "Requirements for Existing, New or Increased Fees and Charges," and provides that, "A fee or charge shall not be extended, imposed, or increased by any agency unless it meets all of the following requirements: [¶] (1) Revenues derived from the fee or charge *shall not exceed the funds required to provide the property related service.* [¶] . . . [¶] (3) *The amount of a fee or charge imposed upon any parcel or person as an incident of property ownership shall not exceed the proportional cost of the service attributable to the parcel.*" (Italics added.)

In addition to these two substantive limits on fees, article XIII D, section 6, subdivision (b)(5) puts an important procedural limit on a court's analysis in regard to the burden of proof: "In any legal action contesting the validity of a fee or charge, the burden shall be on the agency to demonstrate compliance with this article." The trial court found City Water had failed to carry its burden of proof under subdivision (b)(5) of showing its 2010 tiered water fees were proportional to the cost of service attributable to each customer's parcel as required by subdivision (b)(3).

As respondent CTA quickly ascertained, the difference between Tier 1 and Tier 2 is a tidy 1/3 extra, the difference between Tier 2 and 3 is a similarly exact 1/2 extra, and the difference between Tier 3 and Tier 4 is precisely 5/6ths extra. This

fractional precision suggested to us that City Water did not attempt to correlate its rates with cost of service. Such mathematical tidiness is rare in multi-decimal point calculations. This conclusion was confirmed at oral argument in this court, when City Water acknowledged it had not tried to correlate the incremental cost of providing service at the various incremental tier levels to the prices of water at those levels.

In voluminous briefing by City Water and its amici allies, two somewhat overlapping core thoughts emerge: First, they contend that when it comes to water, local agencies do not have to – or should not have to – calculate the cost of water service at various incremental levels of usage because the task is simply too complex and thus not required by our Constitution. The second core thought is that even if agencies are required to calculate the actual costs of water service at various tiered levels of usage, such a calculation is necessarily, as City Water’s briefing contends, a legislative or quasi-legislative, discretionary matter, largely insulated from judicial review. We cannot agree with either assertion.

The appropriate way of examining the text of Proposition 218 has already been spelled out by the Supreme Court in *Silicon Valley Taxpayers’ Assn., Inc. v. Santa Clara County Open Space Authority* (2008) 44 Cal.4th 431, 448 (*Silicon Valley*): “We ““must enforce the provisions of our Constitution and “may not lightly disregard or blink at . . . a clear constitutional mandate.””” [Citation.] In so doing, we are obligated to construe constitutional amendments in a manner that effectuates the voters’ purpose in adopting the law. [Citation.] [¶] Proposition 218 specifically states that ‘[t]he provisions of this act shall be *liberally construed to effectuate its purposes of limiting local government revenue and enhancing taxpayer consent.*’ (Ballot Pamp., *supra*, text of Prop. 218, § 5, p. 109; Historical Notes, *supra*, at p. 85.) Also, as discussed above, the ballot materials explained to the voters that Proposition 218 was designed to “constrain local governments’ ability to impose assessments; place extensive requirements on local governments charging assessments; shift the burden of demonstrating assessments’

legality to local government; *make it easier for taxpayers to win lawsuits; and limit the methods by which local governments exact revenue from taxpayers without their consent.*” (*Silicon Valley, supra*, 44 Cal.4th at p. 448, italics added.)

If the phrase “proportional cost of service attributable to *the* parcel” (italics added) is to mean anything, it has to be that article XIII D, section 6, subdivision (b)(3) assumes that there really *is* an ascertainable cost of service that can be attributed to a specific – hence that little word “the” – parcel. Otherwise, the cost of service language would be meaningless. Why use the phrase “cost of service to the parcel” if a local agency doesn’t actually have to ascertain a cost of service to that particular parcel?

The presence of subdivision (b)(1) of section 6, article XIII D, just a few lines above subdivision (b)(3), confirms our conclusion. Constitutional provisions, particularly when enacted in the same measure, should be construed together and read as a whole. (*Bighorn, supra*, 39 Cal.4th at p. 228.) The “proportional cost of service” language from subdivision (b)(3) is part of a general subdivision (b), and there is an additional reference to costs in subdivision (b)(1). Subdivision (b)(1) provides that the total revenue from fees “shall not exceed the funds required to provide *the property* related service.” (Italics added.)

It seems to us that to comply with the Constitution, City Water had to do more than merely balance its total costs of service with its total revenues – that’s already covered in subdivision (b)(1). To comply with subdivision (b)(3), City Water also had to correlate its tiered prices with the actual cost of providing water at those tiered levels. Since City Water didn’t try to calculate the actual costs of service for the various tiers, the trial court’s ruling on tiered pricing must be upheld simply on the basis of the constitutional text.

We find precedent for our conclusion in the *Palmdale* case. There, a water district obtained its water from two basic sources: 60 percent from a reservoir and the state water project, and the 40 percent balance from the district’s own area groundwater

wells. Most (about 72 percent) of the water went to single family residences, with irrigation users accounting for 5 percent of the distribution. (*Palmdale, supra*, 198 Cal.App.4th at p. 928.) For the previous five years, the district had spent considerable money to upgrade its water treatment plant (\$56 million) but revenues suffered from a “decline in water sales,” so its reserves were depleted. The district wanted to issue more debt for “future capital projects.” (*Id.* at pp. 928-929.) Relying on consultants, the water district adopted a new, five-tiered rate structure, which progressively increased rates (for the top four tiers) for three basic categories of customers: residences, businesses, and irrigation projects. The tiered budgets for irrigation users were more stringent than for residential and commercial customers. (*Id.* at p. 930.) The way the tiers operated, all three classes of customers got a tier 1 budget, but irrigation customers had less leeway to increase usage without progressing to another tier. Thus, for example, the tier 2 rates for residential customers did not kick in until 125 percent of the budget, but tier 2 rates for irrigation customers kicked in at 110 percent of the budget. The tiered rate structure was itself based on a monthly allocated water budget. (*Ibid.*)

Two irrigation users – the city itself and its redevelopment agency – sought to invalidate the new rates. The trial court had the advantage of the newly-decided Supreme Court opinion in *Silicon Valley*, which had clarified the standard of review for Proposition 218 cases. There, the high court made it clear that in Proposition 218 challenges to agency action, the agency had to bear the burden of proof of demonstrating compliance with Proposition 218, and both trial and reviewing courts are to apply an independent review standard, not the traditional, deferential standards *usually* applicable in challenges to governmental action. (*Silicon Valley, supra*, 44 Cal.4th at p. 448.) More directly, said *Silicon Valley*, it is not enough that the agency have substantial evidence to support its action. That substantial evidence must itself be able to withstand independent review. (See *id.* at pp. 441, 448-449 [explaining why substantial evidence to support the

agency action standard was too deferential in light of Proposition 218’s liberal construction in favor of taxpayer feature].)

With this in mind, the *Palmdale* court held the district had failed to carry its burden of showing compliance with Proposition 218. (*Palmdale, supra*, 198 Cal.App.4th at pp. 937-938.) The core of the *Palmdale* court’s reasoning was twofold. First, there was discrimination against irrigation-only customers, giving an unfair price advantage to those customers in other classes who were inclined to inefficiently use – or, for that matter, waste – outdoor water. (The opinion noted the perfect exemplar of water waste: hosing off a parking lot.) Thus an irrigation user, such as a city providing playing fields, playgrounds and parks, was disproportionately impacted by the inequality in classes of users. (*Palmdale, supra*, 198 Cal.App.4th at p. 937.) Second, the discrimination was gratuitous. The district’s own consultants had proposed a “cost of service” option that they considered Proposition 218 compliant, but the district did not choose it because it preferred a “fixed” option providing better “rate stability.” In fact the choice had the perverse effect of entailing a “weaker signal for water conservation” for “small customers who conserve water.” (*Palmdale, supra*, 198 Cal.App.4th at pp. 937-939, italics added.)¹⁴

We recognize that *Palmdale* was primarily focused on inequality between classes of users, as distinct from classes of water rate tiers. But, just as in *Palmdale* where the district never attempted to justify the inequality “in the cost of providing water” to its various classes of customers at each tiered level (*Palmdale, supra*, 198 Cal.App.4th at p. 937), so City Water has never attempted to justify its price points as based on *costs of service for those tiers*. Rather, City Water merely used what it thought was its legislative, discretionary power to attribute percentages of total costs to the various tiers. While an interesting conversation might be had about whether this was

¹⁴ As described by the court, the fixed cost option was really a “fixed variable” option, with fixed charges being 60 percent of total costs, the balance being variable. (*Palmdale, supra*, 198 Cal.App.4th at p. 929.)

reasonable or wise, we can find no room for arguing its constitutionality. It does not comply with the mandate of the voters as we understand it.

2. *City Water's Arguments*

a. *Article X, section 2*

In supplemental briefing prior to oral argument, this court pitched a batting practice fastball question to City Water, intended to give the agency its best chance of showing that the prices for its various usage tiers, particularly the higher tiers (e.g., \$4.94 for all usage over 17 ccf to 34 ccf, and \$9.04 for usage over 34 ccf) corresponded with its actual costs of delivering water in those increments. We were hoping that, maybe, we had missed something in the record that would demonstrate the actual cost of delivering water for usage over 34 ccf per month really is \$9.04 per ccf, and City Water would hit our question into the upper deck.

What we got back was a rejection of the very idea behind the question. As would later be confirmed at oral argument, City Water's answer was that there does not have to be a correlation between tiered water prices and the cost of service. Its position is that the "cost-of-service principle of Proposition 218" must be "balance[d]" against "the conservation mandate of article X, section 2." In short, City Water justifies the lack of a correlation between the marginal amounts of water usage represented by its various tiers and the actual cost of supplying that water by saying the lack of correlation is excused by the subsidy for low usage represented by tier 1, on the theory that subsidized tier 1 rates are somehow *required* by Article X, section 2. While we agree that low-cost water rates do not, in and of themselves, offend subdivision (b)(3) (see *Morgan, supra*, 223 Cal.App.4th at p. 899), we cannot adopt City Water's constitutional extrapolation of that point.

We quote the complete text of article X, section 2 in the margin.¹⁵ Article X, section 2 was enacted in 1928 in reaction to a specific Supreme Court case decided two years earlier, *Herminghaus v. South. California Edison Co.* (1926) 200 Cal. 81 (*Herminghaus*). The *Herminghaus* decision, as Justice Shenk wrote in his dissent there, allowed downstream riparian land owners – basically farmers owning land adjacent to a river – to claim 99 percent of the flow of the San Joaquin River even though they were actually using less than 1 percent of that flow.¹⁶ To compound that anomaly, the downstream riparian land owners’ claims came at the expense of the efforts of an electric utility company to generate electricity for general, beneficial use by building reservoirs at various points upstream on the river. (See *id.* at p. 109.) In the process of upholding the downstream landowners’ “riparian rights” over the rights of the electric company to use the water to make electricity, the *Herminghaus* majority invalidated legislation aimed at preserving water in the state for a reasonable beneficial use, thereby countenancing what Justice Shenk perceived to be a plain waste of good water. (*Herminghaus, supra*, 200 Cal. at p. 123 (dis. opn. of Shenk, J.)) As our Supreme Court would describe *Herminghaus* about half a century later: “we held not only that riparian rights took priority over appropriations authorized by the Water Board, a point which had always

¹⁵ “It is hereby declared that because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare. The right to water or to the use or flow of water in or from any natural stream or water course in this State is and shall be limited to such water as shall be reasonably required for the beneficial use to be served, and such right does not and shall not extend to the waste or unreasonable use or unreasonable method of use or unreasonable method of diversion of water. Riparian rights in a stream or water course attach to, but to no more than so much of the flow thereof as may be required or used consistently with this section, for the purposes for which such lands are, or may be made adaptable, in view of such reasonable and beneficial uses; provided, however, that nothing herein contained shall be construed as depriving any riparian owner of the reasonable use of water of the stream to which the owner’s land is riparian under reasonable methods of diversion and use, or as depriving any appropriator of water to which the appropriator is lawfully entitled. This section shall be self-executing, and the Legislature may also enact laws in the furtherance of the policy in this section contained.”

¹⁶ “In order to have the beneficial use of less than one per cent of the maximum flow of the San Joaquin River on their riparian lands the plaintiffs are contending for the right to use the balance in such a way that, so far as they are concerned, over ninety-nine per cent of that flow is wasted. This is a highly unreasonable use or method of the use of water.” (*Herminghaus, supra*, 200 Cal. at p. 123 (dis. opn. of Shenk, J.))

been clear, but that as between the riparian and the appropriator, the former's use of water was not limited by the doctrine of reasonable use." (*National Audubon Society v. Superior Court* (1983) 33 Cal.3d 419, 442 (*Audubon-Mono Lake*)).

The voters overturned *Herminghaus* in the 1928 election by adopting article X, section 2, then denoted article XIV, section 3. (See *Gin S. Chow v. City of Santa Barbara* (1933) 217 Cal. 673, 699 (*Gin Chow*)). In the 1976 Constitutional revision, old article XIV, section 3, was recodified *verbatim* as article X, section 2. (See Gray, "*In Search of Bigfoot*": *The Common Law Origins of Article X, Section 2 of the California Constitution* (1989) 17 Hastings Const. L. Q. 225 (hereinafter "*Origins of Article X, Section 2*"),¹⁷

The purpose of article X, section 2 was described in *Gin Chow*, the first case to reach the Supreme Court in the wake of the adoption of what is now article X, section 2, in 1928. Justice Shenk, having been vindicated by the voters on the point of a perceived need to prevent the waste of water by letting it flow to the sea, summarized the new amendment in terms emphasizing beneficial use: "The purpose of the amendment was stated to be 'to prevent the waste of waters of the state resulting from an interpretation of our law which permits them to flow unused, unrestrained and undiminished to the sea', and is an effort 'on the part of the state, in the interest of the people of the state, to conserve our waters' without interference with the beneficial uses to which such waters may be put by the owners of water rights, including riparian owners. That such purpose is reflected in the language of the amendment is beyond question. Its language is plain and unambiguous. In the main it is an endeavor on the part of the people of the state, through its fundamental law, to conserve a great natural resource, and thereby render available for beneficial use that portion of the waters of our rivers and streams which, under the old riparian doctrine, was of no substantial benefit to

¹⁷ Professor Gray's article is an exceptionally valuable source on the origins of article X, section 2.

the riparian owner and the conservation of which will result in no material injury to his riparian right, and without which conservation such waters would be wasted and forever lost.” (*Gin Chow*, *supra*, 217 Cal. at p. 700.)

The emphasis in the actual language of article X, section 2 is thus on a policy that favors the beneficial use of water as against the waste of water for non-beneficial uses. That is what one would expect, consistent with both Justice Shenk’s dissent in *Herminghaus* and his majority opinion in *Gin Chow*. (See Gray, *supra*, *Origins of Article X, Section 2*, 17 Hastings Const. L. Q. at p. 263 [noting emphasis in text on beneficial use].) The word “conservation” is used in the introductory sentence of the provision in the context of promoting beneficial uses: “the conservation of such waters is to be exercised *with a view to the reasonable and beneficial use thereof* in the interest of the people and for the public welfare.” (Gray, *supra*, *Origins v. Article X, Section 2*, p. 225, italics added.)

But nothing in article X, section 2, requires water rates to exceed the true cost of supplying that water, and in fact pricing water at its true cost is compatible with the article’s theme of conservation with a view toward reasonable and beneficial use. (See *Palmdale*, *supra*, 198 Cal.App.4th at pp. 936-937 [reconciling article X, section 2 with Proposition 218]; accord, *Brydon*, *supra*, 24 Cal.App.4th at p. 197 [noting that incremental rate structures create an incentive to reduce water use].) Thus it is hard for us to see how article X, section 2, can be read to trump subdivision (b)(3). We would note here that in times of drought – which looks increasingly like the foreseeable future – providing water can become very pricey indeed.¹⁸ And, we emphasize, there is nothing at all in subdivision (b)(3) or elsewhere in Proposition 218 that prevents water agencies

¹⁸ It was recently noted that Santa Barbara is dusting off a desalinization plant built in the 1990’s to provide additional water for the city in the current drought. (See Covarrubias, *Santa Barbara Working to Reactive Mothballed Desalinization Plant* (March 3, 2015, L.A. Times < <http://www.latimes.com/local/california/la-me-santa-barbara-desal-20150303-story.html>> (as of March 30, 2015) [noting, among other things, that desalination can be expensive].)

from passing on the incrementally higher costs of expensive water to incrementally higher users. That would seem like a good idea. But subdivision (b)(3) does require they figure out the true cost of water, not simply draw lines based on water budgets. Thus in *Palmdale*, the appellate court perceived no conflict between Proposition 218 and article X, section 2, *so long as* article X, section 2 is not read to allow water rates that exceed the cost of service. Said *Palmdale*: “California Constitution, article X, section 2 is not at odds with Article XIII D *so long as, for example, conservation is attained in a manner that ‘shall not exceed the proportional cost of the service attributable to the parcel.’* (Art. XIII D, § 6, subd. (b)(3).)” (*Palmdale, supra*, 198 Cal.App.4th at pp. 936-937, italics added.) And as its history, and the demonstrated concern of the voters in 1928 demonstrates, article X, section 2 certainly does not require above-cost water rates.

In fact, if push came to shove and article X, section 2, really were in irreconcilable conflict with article XIII D, section 6, subdivision (b)(3), we might have to read article XIII D, section 6, subdivision (b)(3) to have carved out an *exception* to article X, section 2, since Proposition 218 is both more recent, and more specific. (*Greene v. Marin County Flood Control & Water Conservation Dist.* (2010) 49 Cal.4th 277, 290 [“As a means of avoiding conflict, a recent, specific provision is deemed to carve out an exception to and thereby limit an older, general provision.”]; *Izazaga v. Superior Court* (1991) 54 Cal.3d 356, 371 [same].)

Fortunately, that problem has not arisen. We perceive article X, section 2 and article XIII D, section 6, subdivision (b)(3) to work *together* to promote increased supplies of water – after all, the main reason article X, section 2 was enacted in the first place was to ensure the *capture and beneficial use*, of water and prevent its wasteful draining into the ocean. As a pre-Proposition 218 case, *Brydon, supra*, 24 Cal.App.4th 178 observed, one of the benefits of tiered rates is that it is reasonable to assume people will not waste water as its price goes up. (See *id.* at p. 197 [noting that incremental rate structures create an incentive to reduce water use].) Our courts have

made it clear they interpret the Constitution to allow tiered pricing; but the voters have made it clear they want it done in a particular way.

b. *Brydon and Griffith*

We believe the precedent most on point is *Palmdale*, and we read *Palmdale* to support the trial court's conclusion City Water did not comply with the subdivision (b)(3) requirement that rates be proportional to cost of service. The two cases City Water relies on primarily for its opposite conclusion, *Brydon and Griffith*, do not support a different result.

Brydon was a pre-Proposition 218 case upholding a tiered water rate structure as against challenges based on 1978's Proposition 13, rational basis, and equal protection challenges. Similar to the case at hand, the water district promulgated an "inclining block rate structure." (*Brydon, supra*, 24 Cal.App.4th at p. 182; see p. 184 [details of four-tier structure].) Proposition 218 had not yet been enacted, so the opponents of the block rate structure did not have the "proportional cost of the service attributable to the parcel" language in subdivision (b)(3) to use to challenge the rate structure. They relied, rather, on the theory that Proposition 13 made the rate structure a "special tax," requiring a vote. As a backup they made traditional rational basis and equal protection arguments. They claimed the rate structure was "arbitrary, capricious and not rationally related to any legitimate or administrative objective" and, further, that the structure unreasonably discriminated against customers in the hotter areas of the district. (*Brydon, supra*, at p. 182.) The *Brydon* court rejected both the Proposition 13 and rational basis/equal protection arguments.

But *Brydon* – though it might still be read as evidence that tiered pricing not otherwise connected to cost of service would survive a rational basis or equal protection challenge – simply has no application to post-Proposition 218 cases. In fact, the construction of Proposition 13 applied by *Brydon* was based on cases Proposition 218

was designed to overturn.¹⁹ The best example of such reliance was *Brydon's* declination to follow *Beaumont Investors v. Beaumont-Cherry Valley Water Dist.* (1985) 165 Cal.App.3d 227 (*Beaumont*) on the issue of the burden of proof. *Beaumont* had held it was the agency that had the burden of proof to show compliance with Proposition 13. *Brydon*, however, said the burden was on the taxpayers to show lack of compliance. In coming to its conclusion, *Brydon* invoked *Knox v. City of Orland* (1992) 4 Cal.4th 132. *Knox*, said *Brydon*, had “cast substantial doubt” on the “propriety of shifting the burden of proof to the agency.” (*Brydon, supra*, 24 Cal.App.4th at p. 191.) But, more than a decade later, our Supreme Court in *Silicon Valley* recognized that *Knox* itself was one of the targets of Proposition 218. (See *Silicon Valley, supra*, 44 Cal.4th at p. 445.²⁰) In the wake of *Knox's* fate (see in particular subdivision (b)(5) [changing burden of proof]), it seems safe to say that *Brydon* itself was part of the general case law which the enactors of Proposition 218 wanted replaced with stricter controls on local government discretion.

As the *Silicon Valley* court observed, Proposition 218 effected a paradigm shift. Proposition 218 was passed by the voters in order to *curtail* discretionary models of local agency fee determination. (See *Silicon Valley, supra*, 44 Cal.4th at p. 446 [“As further evidence that the voters sought to curtail local agency discretion in raising funds

¹⁹ Two examples of early, post-Proposition 13 cases that took a strict constructionist view of the provision are *Los Angeles County Transportation Com. v. Richmond* (1982) 31 Cal.3d 197 (*Los Angeles County v. Richmond*) [strictly construing Proposition 13's voting requirements to avoid finding a transportation commission was a “special district”]; *City and County of San Francisco v. Farrell* (1982) 32 Cal.3d 47, 54 [strictly construing words “special tax” used in section 4 of Proposition 13 as ambiguous to avoid finding municipal payroll and gross receipts tax was a “special tax”].) *Brydon* expressly relied on *Los Angeles County v. Richmond*. (See *Brydon, supra*, 24 Cal.App.4th at p. 190.) Proposition 218 effectively reversed these cases with a liberal construction provision. (See *Silicon Valley, supra*, 44 Cal.4th at p. 448.)

²⁰ Here is the relevant passage from *Silicon Valley*: “As the dissent below points out, a provision in Proposition 218 shifting the burden of demonstration was included in reaction to our opinion in *Knox*. The drafters of Proposition 218 were clearly aware of *Knox* and the deferential standard it applied based on *Dawson [v. Town of Los Altos Hills* (1976)] 16 Cal.3d 676.”

. . . .”].)²¹ Allocation of water rates might indeed have been a purely discretionary, legislative task when *Brydon* was decided, but not after passage of Proposition 218.

The other key case in which City Water’s analysis of this point is *Griffith*. There, the fee itself varied according to the location of the property, e.g., whether the parcels with wells were coastal and metered, non-coastal and metered, or residential and non-metered. Objectors to the fee asserted certain tiers in the fee, *based on the geographic differences in the parcels covered by the fee*, were not proportional to the cost they were paying. One objector in particular complained the fee was improperly established by working backwards from the overall amount of the project, subtracting other revenues, the balance being the augmentation charge, which was then apportioned among the users. (*Griffith, supra*, 220 Cal.App.4th at p. 600.) This objector argued that the proportional cost of service had to be calculated prior to setting the rate for the charge.

The court noted the M-1 industry manual recommends such a work-backwards-from-total-cost methodology in setting rates, and held that the objectors did not attempt to explain why such an approach “offends Proposition 218 proportionality.” (*Griffith, supra*, 220 Cal.App.4th at p. 600.) The best the objectors could do was to point to what *Silicon Valley* had said about *assessments*, namely, agencies cannot start with “an amount taxpayers are likely to pay” and *then* determine their annual spending budget from that. (*Ibid.*, quoting *Silicon Valley, supra*, 44 Cal.4th at p. 457.) The

²¹ Here and there in City Water’s briefing there are references to a discretionary, legislative power in regard to local municipal water agencies conferred by article XI, section 9, which was a 1970 amendment to the Constitution, though one can trace it back to the Constitution of 1879. Basically, article XI, section 9, gives cities the right to go into the water supply business. We quote its text, unamended since 1970: “(a) A municipal corporation may establish, purchase, and operate public works to furnish its inhabitants with light, water, power, heat, transportation, or means of communication. It may furnish those services outside its boundaries, except within another municipal corporation which furnishes the same service and does not consent. [¶] (b) Persons or corporations may establish and operate works for supplying those services upon conditions and under regulations that the city may prescribe under its organic law.”

Article XI, section 9 obviously does not *require* municipal corporations to establish fees in excess of their costs, so there is no incompatibility between it and the later enacted Proposition 218.

Griffith court distinguished the language from *Silicon Valley*, however, by saying the case before it did not entail any what-the-market-will-bear methodology. (*Griffith, supra*, 220 Cal.App.4th at p. 600.)

The objectors had also relied on *Palmdale* for the proposition that “Proposition 218 proportionality compels a parcel-by-parcel proportionality analysis.” (*Griffith, supra*, 220 Cal.App.4th at p. 601.) The *Griffith* court rejected that point by stating “[A]pportionment is not a determination that lends itself to precise calculation,” for which it cited a pre-Proposition 13, pre-Proposition 218 case, *White v. County of San Diego* (1980) 26 Cal.3d 897, 903, without any explanation. (*Griffith, supra*, 220 Cal.App.4th at p. 601.)

When read in context, *Griffith* does not excuse water agencies from ascertaining the true costs of supplying water to various tiers of usage. Its comments on proportionality necessarily relate only to variations in property location, such as what side of a water basin a parcel might fall into. That explains its citation to *White*, which itself was not only pre-Proposition 218, but pre-Proposition 13. Moreover, while the *Griffith* court may have noted that the M-1 manual generally recommends a work-backwards approach, we certainly do not read *Griffith* for the proposition that a mere manual used by utilities throughout the Western United States can trump the plain language of the California state Constitution. The M-1 manual might show working backwards is reasonable, but it cannot excuse utilities from ascertaining cost of service now that the voters and the Constitution have chosen cost of service.

To the extent *Griffith* does apply to this case, which is on the (b)(4) issue, we find it helpful and have followed it. But trying to apply it to the (b)(1) and (b)(3) issues is fatally flawed.

c. Penalty Rates

A final justification City Water gives for not tying tier prices to cost of service is to say it doesn’t make any difference because the higher tiers can be justified as

penalties not within the purview of Proposition 218 at all. (In the context of article X, section 2, City Water euphemistically refers to its higher tiered rates as conservation rates as if such a designation would bring them within article X, section 2 and exempt them from subdivision (b)(3), but as we have explained, article X, section 2, does not require what article XIII D, section 6, subdivision (b)(3) forbids) and designating something a “conservation rate” is no more determinative than calling it an “apple pie” or “motherhood” rate.

City Water’s theory of penalty rates relies on the procedural first part of Proposition 218, specifically article XIII C, section 1, subdivision (e)(5). This part of Proposition 218 defines the word “tax” to exclude fines “imposed by” a local government “as a result of a violation of law.”²² That is hardly a revelation, of course. We may take as a given that Proposition 218 was never meant to apply to parking tickets.

But City Water’s penalty rate theory is inconsistent with the Constitution. It would open up a loophole in article XIII D, section 6, subdivision (b)(3) so large it would virtually repeal it. All an agency supplying *any* service would need to do to circumvent article XIII D, section 6, subdivision (b)(3), would be to establish a low legal base use for that service, pass an ordinance to the effect that any usage above the base amount is illegal, and then decree that the penalty for such illegal usage equals the incrementally increased rate for that service. Such a methodology could easily yield rates that have no relation at all to the actual cost of providing the service at the penalty levels. And it would make a mockery of the Constitution.

IV. CONCLUSION

All of which leads us to the conclusion City Water’s pricing violates the constitutional requirement that fees “not exceed the proportional cost of the service

²² The relevant text from article XIII C, section 1, subdivision (e)(5) is:
“(e) As used in this article, “tax” means any levy, charge, or exaction of any kind imposed by a local government, except the following: [¶] . . . [¶] (5) A fine, penalty, or other monetary charge imposed by the judicial branch of government or a local government, as a result of a violation of law.”

attributable to the parcel.” This is not to say City Water must calculate a rate for 225 Elm Street and then calculate another for the house across the street at 226. Neither the voters nor the Constitution say anything we can find that would prohibit tiered pricing.

But the tiers must be based on usage, not budgets. City Water’s Article X, section 2 position kept it from explaining to us *why* it cannot anchor rates to usage. Nothing in our record tells us why, for example, they could not figure out the costs of given usage levels that require City Water to tap more expensive supplies, and then bill users in those tiers accordingly. Such computations would seem to satisfy Proposition 218, and City Water has not shown in this record it would be impossible to comply with the Constitutional mandate in this way or some other. As the court pointed out in *Howard Jarvis Taxpayers Ass’n v. City of Fresno* (2005) 127 Cal.App.4th 914, 923, the calculations required by Proposition 218 may be “complex,” but “such a process is now required by the California Constitution.”

Water rate fees to fund the costs of capital-intensive operations to produce more or new water, such as the recycling plant at issue in this case, do not contravene article XIII, section 6, subdivision (b)(4) of the Constitution. While that provision precludes fees for a service not immediately available, both recycled water and traditional potable water are part of the same service – water service. And water service most assuredly is immediately available to City Water’s customers now.

But, because the record is unclear whether low usage customers might be paying for a recycling operation made necessary only because of high usage customers, we must reverse the trial court’s judgment that the rates here are *necessarily* inconsistent with subdivision (b)(4), and remand the matter for further proceedings with a view to ascertaining the portion of the cost of funding the recycling operation attributable to those customers whose additional, incremental usage requires its development.

By the same token, we see nothing in article XIII, section 6, subdivision (b)(3) of the California Constitution that is incompatible with water agencies passing on

the true, marginal cost of water to those consumers whose extra use of water forces water agencies to incur higher costs to supply that extra water. Precedent and common sense both support such an approach. However, we do hold that above-cost-of-service pricing for tiers of water service is not allowed by Proposition 218 and in this case, City Water did not carry its burden of proving its higher tiers reflected its costs of service. In fact it has practically admitted those tiers don't reflect cost of service, as shown by their tidy percentage increments and City Water's refusal to defend the calculations. And so, on the subdivision (b)(3) issue, we affirm the trial court's judgment.

Given the procedural posture the case now finds itself in, the issue of who is the prevailing party is premature. That question should be first dealt with by the trial court only after all proceedings as to City Water's rate structure are final. Accordingly, we do not make an appellate cost order now, but reserve that matter for future adjudication in the trial court. (See *Neufeld v. Balboa Ins. Co.* (2000) 84 Cal.App.4th 759, 766 [deferring question of appellate costs in case being remanded until litigation was final].)

BEDSWORTH, ACTING P. J.

WE CONCUR:

MOORE, J.

THOMPSON, J.



California Officials Propose Higher Electricity Rates For Some

April 21, 2015 9:31 PM

SAN FRANCISCO (AP) — California households that use the least electricity would start paying more for it under a proposal put before state utility regulators on Tuesday intended to bring the prices charged for electricity more in line with its actual costs.

Critics contended the rate proposal by state administrative law judges would raise rates for 70 percent of customers of the state's three largest utilities, and cut financial incentives to reduce electricity use.

"Two things are going to happen" if the state Public Utility Commission decides to adopt the proposal, argued Evan Gillespie, a deputy director for energy-monitoring programs by the Sierra Club environmental group. "Conservation efforts are going to struggle...and families in California who can least afford to see their bills go up are going to see their bills go up."

The proposal is meant to narrow a tiered rate structure that currently has customers of the state's largest utility, Pacific Gas & Electric Co., paying anywhere between 13.2 cents and 36.4 cents per kilowatt hour, depending on how much power they use.

California froze electricity rates for low-use customers amid the state's 2000-2001 blackout-ridden energy crisis. The gap between prices charged to power-sipping and power-guzzling households has only grown since then. Regulators say high-use households now pay well over the true cost of electricity.

The longer the disparity in electricity prices continues, "the harder it is to move back to fair rates that reflect costs and allow customers to make smart decisions," the state administrative law judges said in their rate-restructure proposal.

The proposal would bring the rates charged low-use households more in line with high-use ones, authorize utility regulators to consider more fixed fees on monthly power bills, and eventually move toward a rate system that rewards families for using power at times of day when demand on the power grids are lowest.

Utilities have supported more fixed fees on electricity bills, while environmental groups and others have opposed them. Making fixed charges a bigger part of monthly utility bills

will discourage households from adding rooftop solar panels in an effort to lower their bills, opponents of the proposed added fees charge.

California Gov. Jerry Brown has called for the state to step up support for renewable energy, so that 50 percent of the state's energy comes from solar, wind and other renewable sources by 2030.

Tiered rates are a tricky topic legally and politically in California.

On Monday, an appellate court struck down a Southern California water agency's attempt to encourage water conservation by tiering rates according to water use. Brown spoke out against that ruling, saying it put a "straitjacket" on officials as they search for ways to encourage water conservation in the state's four-year drought.

The governor's office did not immediately return a request for comment on the proposal Tuesday to move away from tiered rates for electricity.

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Source: <http://losangeles.cbslocal.com/2015/04/21/california-officials-propose-higher-rates-for-some/>



Date: April 28, 2015

Subject: Overview of Turf Removal & Replacement Policies by the California Urban Water Conservation Council

A new report from the California Urban Water Conservation Council, *Turf Removal and Replacement: Lessons Learned*, describes program implementation and estimated water savings. The report offers qualitative and quantitative context for turf-removal programs, describes the challenges of program implementation and provides guidance to optimize program outcomes.

As public agencies continue to support, fund and implement turf removal programs during this drought, it is important to review as much information as possible to ensure these policies are implemented in a manner that fully protect the funds ratepayers entrust us with.

WHEN ALL **THINK** ALIKE,
THEN NO ONE IS THINKING

-WALTER LIPPMAN-





Turf Removal & Replacement: Lessons Learned

March, 2015
Author: Briana Seapy



California
Urban Water
Conservation
Council

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~Acknowledgements~

Thank you to all Council member agencies for making this report possible through your annual dues. Thank you also to the ten water agencies that contributed data and invaluable anecdotal lessons to inform this report. Your contributions will help guide water distributors looking to start or improve their own turf removal programs.



Turf Removal & Replacement: Lessons Learned

Introduction

A thirsty California uses over half of its urban water deliveries on landscape irrigation. Water intense turf grasses are the historical foundation of California landscaping. Water shortages, among other catalysts, are pushing California away from traditional turf grass landscapes towards sustainable landscaping. Sustainable landscaping intends a holistic, watershed-based approach to landscaping that transcends water-use efficiency to address the related benefits of cost savings, run-off reduction, green waste reduction, pesticide and fertilizer reduction, habitat improvement, and energy/greenhouse gas (GHG) reductions.

The transition from a turf-based landscape involves two steps. Turf removal is the first step, turf replacement the second. Customers' aesthetic preferences, geographic location, and bank accounts, along with product market availability, influence both turf removal and turf replacement decisions. Statewide, water agencies¹ are managing turf removal programs that stipulate replacement requirements, incentivizing a California landscaping transformation. These programs vary in size, scope, and specifications. The following report takes both a closer look at lessons learned from existing turf removal programs as well as a cursory glance at turf replacement options and implications.

Turf Removal Programs

Turf Removal Rebate Programs

Turf removal rebate programs offer rebates to end-users for removal and replacement of water-intensive turf lawns. Local and regional agencies are adopting these turf removal programs, anticipating that their upfront investment in rebates will yield long-term outdoor water savings dividends for years to come. For example, the Metropolitan Water District (MWD) spearheads a large-scale regional 'Cash for Grass' lawn conversion program. Currently, MWD provides water distributors within its service area a \$2 per square foot (sq. ft.) turf rebate subsidy. Agencies can add to this rebate as they desire. MWD has earmarked over \$85 million in funding for the rebate programs. Statewide, rebates range from \$0.50/sq. ft. to \$3.75/sq. ft.

Rebate Program Strategies

In general, rebate programs offer customers a dollar amount per square foot of turf removed. More specifically, individual programs require compliance with any number of turf replacement specifications;

¹ This report only includes information from local government water suppliers, referred to throughout as 'agencies.'

from pre- and post-removal inspections, to updated irrigation systems; in order to qualify for the rebate. To maximize the 'bang for their buck,' agencies invoke rebate qualification strategies to foster program growth and sustainability and to maximize water savings. Common rebate qualification policies include:

- Requiring well-documented rebate applications with historical water bills, landscape 'before' photos, and other documentation of maintained turf landscape
- Requiring attendance at a landscaping/irrigation workshop/class before submitting an application
- Requiring landscape design submission before property inspection
- Prohibiting re-installation of turf on rebated property under the same owner
- Prohibiting spray irrigation on converted landscapes
- Requiring drip or point source irrigation, micro-spray irrigation, low precipitation-rate nozzle spray irrigation, or hand-watering; requiring pressure regulators and filters for point source irrigators; requiring a smart irrigation controller
- Rebating only properties with evidence of living, maintained turf within a specified number of months prior to turf removal
- Rebating only properties that use sprinkler irrigation systems
- Rebating only areas that are visible to the public
- Requiring a specific percentage (e.g., 25%) of replacement landscape to be re-planted with water-efficient, or drought-tolerant plants
- Requiring sheet mulching to a specified number of inches (e.g., 2-4 in.) on all landscaped ground
- Rebating parkways (the strips of land between sidewalk and curb) separately and under different rebate terms and conditions
- Offering partial rebates for lawn removal, irrigation updates, and sheet mulching; offering complete rebates after planting appropriate plants in appropriate seasons (i.e., not mid-summer)
- Requiring replacement landscape to be made up of native, climate appropriate, or California-Friendly plants
- Requiring a specified percentage of pre-conversion property, or landscaped area (sq. ft.), to be made up of turf in order to qualify for a rebate
- Requiring California-licensed landscape contractors to convert landscapes if the property owners do not re-landscape themselves
- Requiring design consultation for do-it-yourselfers
- Prohibiting or restricting specific turf replacement options such as synthetic turf, concrete, permeable hardscapes, and gravel
- Setting a dollar or square foot rebate minimum
- Setting a dollar or square foot rebate maximum
- Requiring pre- and post-replacement inspections
- Setting a due date for landscape replacement completion
- Accepting only residential properties
- Accepting only CII properties.

Water distributors employ any number of these strategies with the intention of maximizing program cost-effectiveness and long-term water savings, while maintaining or increasing program participation. In the following section, data collected from water agencies across the state reveal a number of quantitative turf rebate program results, as calculated or estimated by the water agencies themselves.

Rebate Program Data Summary

Turf removal rebate program data collected from nine agencies are summarized in the table below. The data presented in the following table come from the following agencies, variable in size and geographic location: City of Long Beach, City of Roseville, City of Sacramento, City of Santa Cruz, City of Santa Rosa, Contra Costa Water District, Los Angeles Department of Water and Power, Municipal Water District of Orange County, and San Diego County Water Authority.² These agencies are neither a random sample nor a statistically significant grouping; rather they are agencies that run well-known turf rebate programs and that have a wealth of insights to share.

The data collected, presented in Table 1 below, covers the following parameters: year started, rebate cost then, rebate cost now, total removals to date, average expected water savings, rebate costs to date, customer participation and breakdown by customer category, minimum and maximum rebates, and large landscape participation.

Table 1 demonstrates the challenge of objectively and quantitatively reviewing turf rebate removal programs. Fundamentally, this challenge stems from the absence of widely shared, consistent data collection standards. Additional variability comes from other factors. For example, not all agencies submitted data for all parameters presented below. In addition, both retail and wholesale agencies participated. The size and geographic location of participating agencies varies broadly, as well as the program years for which data was available. And finally, agencies use different calculation methodologies to report their program results, even for the same program parameter. Keep these caveats in mind while reviewing Table 1.

² The Metropolitan Water District of Southern California (MWD) shared its program information, but its service area includes other water agencies that volunteered data for this report. Consequently, MWD's data is not included in Table 1 to prevent double-counting rebate data.

Table 1: Average, median, minimum, and maximum turf rebate program statistics from nine California water agencies.³

	Year Started	Rebate Then (\$/sq. ft.)	Rebate Now (\$/sq. ft.)	Total Removals to date (sq. ft.)	Total Removals to date (# program participants)	Average Expected Water Savings (gal/sq.ft./yr)	Rebate Cost to Date	Total Program Cost to Date	Average \$/AF saved
Average	2010	\$1.00	\$1.44	2,316,107	1,308	31	\$1,754,187	\$1,798,895	\$2,011
Median	2010	\$1.00	\$1.00	543,838	883	34.0	\$721,517	\$931,692	\$1,413
Min	2007	\$0.50	\$0.50	57,556	138	13.5	\$33,461	\$478,472	\$354
Max	2014	\$2.50	\$3.75	11,872,491	4,103	46	\$3,800,000	\$3,986,520	\$5,840
Response Rate	100%	100%	100%	100%	100%	89%	56%	33%	56%

	Residential Customer % (SF)	Commercial Customer % (MF, CII)	Minimum Rebate Residential (sq. ft.)	Maximum Rebate Residential (sq. ft.)	Minimum Rebate CII (sq. ft.)	Maximum Rebate CII (sq. ft.)	% Participation made up by Large Landscapes (CII, MF, and > 1 acre)
Average	93%	7%	300	1214	500	6500	9%
Median	92%	8%	275	1000	250	5500	7%
Min	88%	0%	250	500	250	5000	0%
Max	100%	12%	400	2000	1000	10000	30%
Response Rate	89%	89%	100%	100%	100%	100%	78%

Table 1 offers a general quantitative context for existing turf rebate programs. It is evident that turf rebate programs are relatively new to California, launching within the last decade. Though average rebate value has increased over time and though the maximum rebates offered are roughly 50% higher now than at the start of these programs, there are still successful programs that offer the minimum \$0.50 rebate. In fact, median rebate value has stayed consistent over time for this sample of agencies. Cumulative program turf removals by area and by participants vary widely and correlate strongly with agency size and available funding. Anticipated water savings trend with agency climate - the warmer the climate, the greater the water savings - and range from 13.5 to 46 gallons per square foot of turf removal per year. Associated rebate costs and overall program costs vary by rebate levels, program participation, and cost calculation methodology. Agencies estimate that their costs for every acre-foot (AF) of water saved on account of the rebate program, pro-rated over an assumed 10-year program life, are anywhere from \$354 to \$5,840 (see *Rebate Program Cost-Effectiveness* below for further details on the \$/AF metric). Program participation breakdowns hover around 90% residential and 10% commercial, as measured by number of participants and not by rebated area. In general, large landscapes make up less than 10% of overall program participants. Minimum and maximum rebated areas typically increase for commercial customers when

³ Note the following five data annotations: 1) of the nine agencies, seven are retail, two are wholesale; 2) of the nine agencies, four receive external program funding, five do not receive external program funding; 3) no statistically significant outliers were found in the data used to develop Table 1; 4) no numeric data was entered for the 'Minimum and Maximum Rebate' categories for agencies with no defined minimum or maximum rebate restrictions; 5) 'Total Program Cost to Date' had the lowest parameter response rate - agencies did not have the information available, they were unwilling to share the information, and/or their information did not include third-party contractor time, pre- and post- rebate inspection time, and/or retail agency administration time.

compared with residential customers. These general data conclusions are to be taken with a grain of salt given the inconsistent data quality and verification; to draw any further detailed and specific quantitative conclusions from the presented data would be imprudent given the quantity, quality and consistency of available data.

Rebate Program Challenges & Risks

The wide variability in the data reported in Table 1 makes it difficult to draw precise, quantitative lessons. Nevertheless, the program managers interviewed for this survey have developed a body of anecdotal information regarding the array of expected and unexpected challenges and risks they have faced while administering turf rebate programs. Agencies contemplating a new, expanded or simply continued program can take advantage of this information to anticipate the challenges and risks and to design their programs to improve the odds of success. The following list details the ten most prevalent challenges and risks faced by existing rebate programs.

1. **Rebate Funding** – Approximately half of the agencies interviewed depended on external funding to run their turf rebate program. External funding has pros and cons. On the positive side, it enables a water agency to run a program that it otherwise might have been unable to run. On the flip side, once the funding has run out, the program must be put on hold. Indeed, the more popular the program, the sooner the funds run out. External funding also requires compliance with grant terms. Funders can impose restrictions or requirements on funding that complicate a program's implementation or popularity. For example, a grant might require all converted landscapes to include specific features like drip irrigation or 50% plant coverage.

Things are not necessarily easier for the half of surveyed agencies that rely solely on internal funding. On the positive side, internal program management streamlines funding processes and allows program managers to pace the distribution and continuation of funding as they deem fit. On the negative side, it can be difficult to find the money for rebate programs, especially absent sufficient political will.

2. **Non-Savers** – One risk common to all turf rebate programs is the chance that participants will undertake lawn transformations that ultimately do not save water. See [Non-Savers](#) below for an elaboration.
3. **Behavioral Limitations on Water Savings** – Regardless of the number of requirements and stipulations an agency establishes to maximize water savings, the actual water savings realized are subject to a factor out of agency control – end user behavior. Even super efficient irrigation systems are prone to improper use or failure absent proper maintenance.
4. **Staff Time & Resources** – Considering the standard stages of a rebate process – customer application, review, and acceptance; pre-inspection; customer guidance; and post-inspection – an internally managed rebate program is time-intensive. For example, one agency designates one

Full Time Equivalent staff person solely to its turf rebate program. To mitigate these staff costs, some agencies hire third party management consultants to help run the programs. While most of the agencies that follow this path still formally approve refund applications internally, the ability to outsource many of the rebate program tasks has proved cost effective for larger agencies.

5. **Growth Capacity** – Overall rebate program participation appears largely predictable, but managing the sometimes dramatic fluctuations in participation requires foresight. Agencies consistently note big jumps in program participation over periods as short as a few months. For example, one agency experienced a 600% increase in participation from one month to the following (50 to 300 participants). See *Application Trends* in the following section for participation triggers.
 6. **DIY Landscapers** – Eager participants that wish to convert their lawns but lack sustainable landscaping knowledge and the will or funds to hire a designer or contractor can produce aesthetically displeasing landscapes. These landscapes leave negative impressions on neighbors and the public and can deter others from participating. Of course, not all do-it-yourselfers are guilty of 'ugly' outcomes, but agencies throughout the survey consistently identified 'ugly' outcomes that hurt rather than helped their programs.
 7. **Savings Calculations** – Quantifying water savings attributable to the rebate program can challenge water agencies, especially those without Automated Meter Infrastructure (AMI). To accurately capture water savings, an agency must account both for weather variations and for water use patterns that are not directly attributable to the rebate program. In addition, irrigation patterns immediately before and after a landscape conversion produce their own water use anomalies. Just before the conversion, outdoor water use generally *declines*, as property managers tend to quit watering their old lawns. In contrast, just after the conversion, outdoor water use tends to *increase* as the same property managers frequently overwater their new plants until the plants establish themselves. To compensate for water use variability and obtain statistically significant water savings calculations, water distributors need to analyze both historical water use records and records several years after the conversion. Without sophisticated metering, let alone designated landscape meters, attributing water savings directly to turf replacement can be nearly impossible.
 8. **Replacement Plant/Landscaping/Irrigation Materials & Requirements** – Programs across California lack a consensus on what to allow in replacement landscapes. Ultimately, a program encouraging holistic, sustainable landscaping may have stricter stipulations than a program simply seeking maximum water savings. Where each agency decides to land on the spectrum of replacement landscape requirements is left to a number of factors. These include funding obligations, geographic restrictions, customer and political will, and individual program managers. Managers face particularly hard decisions when deciding program requirements that require due-diligence research. For example, one Southern California agency removed permeable hardscapes from its
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list of acceptable replacement options because it was observing the failure of certain permeable pavers. Other agencies continue to permit permeable pavers. They point to research that shows long-term infiltration benefits, even accounting for degradation and clogging over time. Similarly, one agency found that the plants it was recommending were not available in its region, causing undue stress on landowners trying to find responsible plant materials.

9. **Collaboration** – Overlap between or proximity to other turf rebate programs can cause confusion in customers, especially when replacement requirements and rebate values vary drastically. Without proper agency alignment, 'double-dipping' is also a concern (when crafty customers seek double the rebate – one rebate from a local agency, one from a regional agency). For example, one Southern California regional distributor offered a rebate program at the same time as a city of within its jurisdiction. The agencies diligently worked together to align expectations and preempt complications; however, inevitable variation in rebate values and specifications and ultimately the abrupt end and re-start of the city's program led to customer confusion.
10. **Customer Communication** – In an effort to set clear expectations, achieve maximum water savings, and offer comprehensive customer support, agencies often overwhelm turf rebate customers with information. On the one hand, an agency's posting of detailed turf removal documents on its website (e.g., program requirements, terms and conditions, design advice, and tax warnings) risks shutting customers down with information overload. On the other hand, not posting these materials risks unclear messaging and legal vulnerabilities.

Rebate Program Take-Aways: What to Expect & How to Manage for Success

To create and manage successful turf rebate programs, agencies must learn from their peers and anticipate the trends and patterns that can predict or pre-empt program issues. The following list details 14 reasonable program expectations and management tips for mitigating associated program challenges and risks.

1. **Application Trends** – Agencies consistently observe spikes in program applications and participation immediately following three events: a drought emergency declaration; a rebate increase; and a special, landscape-focused agency event. Agencies also note that participation has held relatively high ever since the governor's emergency drought declaration in January, 2014 and the State Water Board's promulgation of emergency drought regulations in the summer of 2014.
2. **Rebate Value** – While the decision on the dollar-value of a program's rebate has real implications for customer attraction and retention, it alone does not dictate participation. For example, an agency with an eight-year-old turf rebate program recently cut its rebate value in half when funding was getting low, from \$1 to 50 cents per square foot, yet the program did not see a drop in participation. Since then, the agency has even grown its program participation and has effectively doubled its impact (i.e., the agency can double the

landscape conversion area supported by the program using the same remaining funds). Understanding local/regional costs for landscaping replacement, the marginal value of the anticipated water savings to your agency, and target customer demographics' willingness to 'pay' can help with rebate selection. Rebate levels can always be changed (unless specified otherwise by a funding entity), and many successful rebate programs have increased their rates temporarily as a 'drought' special, indicating a flexibility to adapt the value as needed.

3. **Marketing** – Agencies employ a range of marketing strategies to get the word out about turf rebate programs. These include bill inserts, direct mailings, social media, radio tags during weather and traffic announcements, Google ad-words, garden tours and landscape events and workshops, program-specific websites, and word of mouth. Most agencies indicate that three outreach and advertising strategies are most effective: a) bill inserts and direct mailings; b) annual spring garden tours or landscape workshops; and c) word of mouth via existing and aesthetically pleasing landscape conversions.
4. **Customer Care and Communication** – Many customers are completely new to landscaping, let alone to turf conversion. They require significant handholding on the program application, the landscape design, and the landscape installation. How a program 'holds' customers' hands varies from indirect strategies such as "check the website for information," to direct strategies such as "call the turf rebate program manager when needed." Though water agencies vary on how they manage continual customer need, an emerging theme suggests that kind and flexible customer service that rewards good intentions is key to successful landscape conversions and program longevity. For example, a delayed landscape conversion that fails to meet a program deadline because the customer was concerned about watering new plants in the summer may save more water than an incomplete conversion that fell-through because the customer did not comply with the program timeline and the rebate offer was revoked.

Maintaining flexibility with customers can come at the cost of increased program administration time. Streamlining and minimizing customer communication and standardizing customer expectations reduces program staff time. Agencies must seek an internal balance between customer intervention and customer independence that considers the impact on targeted outcomes such as successful conversions and water savings. Persuading customers to read available rebate parameters and conversion expectations before calling agencies with questions is a key strategy to streamline customer interaction, but as previously noted, turf rebate information can be overwhelming and daunting to the landscape novice. Clear and concise rebate program informational materials, easily understood by customers, will contribute to program efficiencies. Some agencies require customers to check a box indicating that the customer has thoroughly read and understood all the program terms and conditions before applying. This strategy may decrease agency liability, but many internet-users have been conditioned to check that box regardless of whether they have actually

reviewed the content. Implementing innovative strategies that encourage customers to do their own program research and that address multiple customer questions and concerns at the same time may pay back dividends in the rebate process by saving staff time. For example, one agency hosted a twitter chat when it first launched its program, answering many would-be participants' questions in one concerted effort.

5. **Customer Demographic Breakdown** – Generally speaking, agencies that offer rebates to both residential and commercial customers draw roughly 90% of their participants from the residential sector and 10% from the commercial sector. Spatially and financially, however, results vary, and commercial customers can far exceed residential customers in terms of acres of turf converted and rebates received. Depending on program goals (e.g., landscape awareness, magnitude of conversions, or customer relationship-building), an agency may delegate specific proportions of available funding to the residential or commercial sectors. For example, a water agency that wants to increase engagement with the CII sector can allocate more rebate funds to that sector than to the residential sector. Agencies have also noted a breakdown of roughly 15% do-it-yourself participants versus 85% hire-a-contractor participants, though this ratio is prone to vary significantly by region, program requirements, and customer demographics.
6. **The Design Phase** – Agencies have found that the landscape design component of rebate programs is instrumental in eliciting positive transformations and that most customer drop-outs occur upon facing program design hurdles. Most programs require some sort of landscape design submission to be eligible for the rebate. Some agencies will not even inspect properties until a landscape design is submitted, because they observe up to a 50% drop-out rate during the design phase. To empower customers and to encourage excellent designs, agencies adopt different strategies. Two of these are; a) customer class requirements where customers participate in a landscaping class before they apply to the program; and b) discounted design consultations where customers can receive a two-hour landscape architect consultation for a heavily reduced price.
7. **Rebate Timeline** - From the application to the final inspection, rebate processes can last anywhere from 45 days to over 4 months. Customer and agency enthusiasm can wane during this time, and participant paper trails can get lost and confused. An agency needs a consistent approach to managing the lengthy conversion processes. It also needs to capitalize on the increased customer contact that a rebate program generates by encouraging long-term customer commitments to landscape maintenance that extend beyond the rebate time-frame. For context, the average, healthy, California native garden takes two years to fully establish. Customer communication and education during the rebate time-frame is critical to the future establishment and management of replacement landscapes after the rebate process concludes.

8. **Customer Fallout** – Turf rebate program attrition rates are consistently high. Three reasons for this are: a) the lengthy conversion timeline; b) the rigorous replacement requirements; and c) landscaping's complexity. Agencies observe anywhere from 25-45% of applicants pulling out of the rebate process before they receive their rebate check – typically the last step of the process. Applicants will be rejected by the program or drop out of the rebate process for multiple reasons. These include: fatal flaws in their applications, failure to comply with the turf replacement requirements, and simple process fatigue. Programs with strict deadline cycles see most of their drop-outs leave the program right before the final deadline, because they were unable to stay on track. Programs with an involved design component see most drop-outs during the design submission phase.

Agencies use a range of strategies to minimize drop-out rates. Some agencies explicitly confirm that the customer is aware of all the program requirements by requiring attendance to a sustainable landscape class or workshop that sets explicit expectations as an application pre-requisite. Others provide design advice, tools, or professional services to applicants who are do-it-yourselfers, as these customers struggle the most with program design components.

9. **Lawn Acceptance Status** – Traditionally, agencies require lawns to be well-maintained prior to a rebated conversion in order to realize real water savings. California's lasting drought, however, has stressed lawns. Agencies can no longer expect perfectly watered and manicured lawns upon rebate program pre-inspection. With drought watering restrictions and increased conservation ethics, it is more common to find homeowners these days who are willing to 'let their lawn go.' Some agencies realize that to follow the watering restrictions is to see some decrease in lawn health. Other agencies do not wish to punish homeowners for good behavior. Still others view lawn conversions as a long-term investment that may not yield immediate savings, but will ultimately realize long-term water conservation. For all these reasons, some agencies have relaxed their pre-inspection lawn status requirements and are accepting rebate applications for less-than-perfect lawns. Agencies are particularly willing to overlook a stressed lawn during pre-inspection if seasonal and historical billing data or aerial imagery is available to prove that the property was recently fully irrigated. Accessing historical water use data to support claims of historic irrigation is easier for districts with automated metering infrastructure and dedicated irrigation meters. Even then, the records must be normalized for weather.

10. **Replacement Requirements** – What an agency chooses to allow or prohibit within its turf replacement requirements can determine the cost and feasibility of successful conversions. Agencies who make the requirements too strict will find that fewer people will apply to the program or comply with the terms and conditions. Those who make them too loose will find that the resulting landscapes will not meet agency expectations. When designing rebate program requirements, agencies with existing turf rebate programs suggest five points: a) align

with near-by rebate program requirements; b) focus on the aesthetics of early conversions to boost program popularity; c) offer specific climate-appropriate and native plant suggestions and work with local nurseries and plant retailers to make sure suggested plants are available; d) require irrigation system upgrades; and e) specifically address - through required educational opportunities - the behavioral and educational barriers to water conservation. These include irrigation management and sustainable landscaping practices.

11. **Social Norms** – Powerful in their ability to attract or dissuade customers to a rebate program, social norms can make or break a program's success. For example, agencies have seen that one to two stunning conversions in a neighborhood can catalyze an entire neighborhood's transformation. Conversely, a single ugly conversion can discourage a neighborhood from participating in a rebate program. Agencies suggest that managers of new programs do whatever it takes to promote a neighborhood's beautification, and not its 'uglification.'
12. **From Early Adopters to High Water Users** – Existing turf rebate programs have shown that a water district's most water-conscious customers will undertake the initial lawn conversions. Over time and with successful conversions, agencies have found that the program ultimately attracts the less-conscious, high-water users.
13. **Cross-Agency Collaboration** – Two rebate program situations involving multiple agencies in the same geographic area have led to customer confusion. First, some retail water agencies fall within the jurisdiction of a regional wholesaler. Second, many retail agencies have service area boundaries contiguous with one or more other retailers. In either case, customers can be confused by the existence of multiple turf rebate programs, and agencies can experience cross-agency program conflict. To minimize confusion and avoid conflict, regional programs must generate buy-in from member agencies and stakeholders early on in the program design process. Similarly, independent retailer rebate programs should seek alignment with other regional or proximate agency programs to provide their customers with consistent and clear expectations.
14. **Wisdom Over Time** – As with any new program, there is a learning curve to turf rebate programs. Though this report hopes to help flatten that curve, existing programs are learning new "lessons" daily. Agencies starting new programs should consult directly with well-established turf rebate programs. Additionally, agencies with existing programs recommend trying small scale pilots before launching large scale rebate programs. These pilots allow agency staff to work out program hiccups and save significant time and money down the road. For example, one agency piloted its turf rebate program with a small subset of customers before implementing it on a large scale. Based on the pilot, this agency ultimately decided to only require commercial entities to submit conversion plans, not residential homes; that agency had found that the otherwise required conversion plan 'homework' significantly deterred residential participation.

Landscape Conversion Water Use Impacts

Water Savings

Water savings attributable to landscape conversions - with or without irrigation system upgrades - vary between regions and between neighbors. Geographic climate differences, programmatic variability in landscape and irrigation replacement options, and capricious human behavior complicate water savings predictions and reduce the transferability of reported results. Studies across California measure, model, and/or predict average turf-replacement water savings of anywhere from 18% to 83%. In gallons per square foot converted area per year (g/sq ft/yr), agencies estimate and calculate a water savings metric that ranges from 13 to 70+ g/sq ft/yr. Southern California agencies consistently report savings of around 45 g/sq ft/yr. Table 1 below summarizes percent water savings attributable to landscape conversions as measured, modeled, or predicted by a variety of California and non-California sources and studies.

Table 2: Percent water savings attributable to landscape conversions; Single Family (SF), Commercial Institutional and Industrial (CII)

Source	Water Savings Average	Conditions
UC Davis Study	60% City-Wide	Student model of replacing turf areas with native plants, City of Davis, CA
Metropolitan Water District Study	18% SF 24% CII	Sample of CII and SF turf conversions within MWD Cash for Grass rebate program; water usage from agency billing data
Santa Monica City Garden-Garden Case Study	83% SF	Controlled, side-by-side, Single Family Residence case study in Santa Monica, CA
Council 'Turf Removal PBMP'	35-75% per capita use	Range identified via literature review of 'typical residential' site replacing cool season turf grass in CO ⁱ and NV ⁱⁱ
AWE Outdoor Water Savings Research Initiative	33-76%	Range identified via literature review of landscape conversions in FL ⁱⁱⁱ and NM ^{iv}

Water Savings Caveats

Replacing turf grass with low water-demand ground cover is not solely responsible for the quantifiable changes in outdoor water use before and after landscape conversion. In part, water savings may be attributable to other factors such as fluctuating climates, customer behavioral change, decaying irrigation system upgrades, expanded knowledge and awareness of landscape managers, and decreased ET from a reduced canopy cover immediately following a conversion. Some of these factors are intentionally captured in program design to reduce water use. It would be informative to separate out the quantitative value of water savings attributable to each program requirement, but for water distributors, it is often more important to include as many water-saving program requirements as is realistic to maximize program value. An improved understanding of the percentage of conversion water savings attributable to specific program results such as irrigation system updates or behavioral change would help to refine program

design and to achieve the highest water saving potential. For example, if a rebate program's plant coverage replacement requirement yielded negligible water savings, and 99% of actualized water savings were attributable to customer behavioral change, then rebate programs could increase their cost-effectiveness by emphasizing the components of their programs that most impact property owner behavior. Of course, water savings are not the only benefit achieved from landscape conversions. Indeed, the multiple benefits associated with turf replacement projects such as GHG emission reduction and native habitat creation will complement water savings in the bigger watershed picture.

Non-Savers

As mentioned above in *Rebate Program Challenges & Risks*, some rebate customers see no water savings despite replacing their turf. Anecdotally, water agency employees observe negligible initial water savings on many turf conversions. They note that while climate appropriate and native landscapes require different irrigation techniques, they still use roughly the same quantity of water as efficiently-watered turf grasses upon *installation*. Once established, however, they need less water.

The Southern Nevada Water Authority (SNWA) presented on this 'non-saver' phenomenon during the 2014 WaterSmart Innovations conference. In SNWA's presentation, 'The Non-Savers: An Evaluation of Turf Conversion Properties That Don't Save Water,' presenters concluded that approximately 10% of customers increase their water use after a landscape conversion and 10% neither increase nor decrease their water use after a landscape conversion. The study found few statistically significant factors predicting differences between non-savers and savers. It did, however, note three interesting differences: 1) non-savers converted a lower percentage of their landscaped area or house lot area; 2) non-savers had a higher minimum percent plant cover pre-conversion; and 3) non-savers had newer home construction and/or more valuable property. Qualitatively, sites ranked as having 'very poor' pre-conversion turf quality were also more likely to fall into the non-saver category than program participants with higher pre-conversion turf quality.

These results are intuitive – smaller conversion projects on plots with significant pre-existing plant coverage and newer construction (and therefore newer irrigation) with stressed turf conditions may show lower water savings post conversion than their counterparts. Creatively designed rebate program requirements can help to minimize the number of non-savers and maximize water savings. Even non-savers, however, can still benefit programs by expanding the visibility of sustainable landscapes and increasing the level of customer awareness of sustainable landscaping practices.

Turf Replacement Cost-Effectiveness

Both turf rebate programs and third parties have quantified the value of water savings attributable to rebated conversions. Their results show that for every acre-foot (AF) of water saved, pro-rated over an assumed program lifetime of 10 years, water distributors and their funders typically pay anywhere from

\$1,000 to \$1,700⁴. Quantified cost outliers approach \$400/AF and \$5,900/AF. Among other factors, this cost-effectiveness metric (\$/AF saved over 10 years) depends on rebate values, program administrative costs, regional water savings potential, and end user behavior. Compared with other conservation strategies, an average lawn conversion rebate program, as it is valued now, is one of the most costly conservation and supply augmentation approaches that a water agency can undertake (see [Appendix A](#) for details).

The \$/AF saved ratios may change over time. On the one hand, savings attributable to conversions may increase over time as the climate appropriate plants mature and require less water or as hotter and drier climates increase turf grass water needs disproportionately to drought-tolerant-plant water needs. On the other hand, water savings attributable to rebate programs may decrease over time due to property management changes, irrigation system decay, or decreased end-user water consciousness in post-drought years. Water savings may also stay constant over time. A Nevada-based study on xeriscape lawn conversions (see [Climate Appropriate Landscapes](#) below for the meaning of Xeriscape) found that water savings did not significantly change over time. This study used only Nevada Xeriscapes limiting the transferability of the study results, but it does suggest stabilized water savings as a third possible outcome.^v The degree of change over time in water savings will ultimately determine the return on turf rebate program investments. Extensive program cost analyses that capture additional externalities from turf conversions, positive or negative, such as waste generation, maintenance time, and habitat value, are not readily available. Future studies should consider the multiple effects of landscape conversion when calculating cost-effectiveness metrics.

The Future of Turf Replacement Rebate Programs

Turf rebate programs have an uncertain future. Program success over the past year, as measured by dramatic participant growth, could foreshadow a future in which the programs continue to grow exponentially, both expanding in popularity and shaping social norms. On the flip side, the rapid growth could give way to saturated target demographics, insufficient funding for continued programming, or calculated cost-benefit decisions to end programs.

In the long term, California cannot afford to spend \$3 per square foot to replace the roughly 2.5 million acres of turf grass (1.089e+11 square feet) in the state. Given that current expenditures are unsustainable, existing programs should be considered loss-leaders. They should seek a defensible and repeatable proof of concept that substantiates the value (economic, aesthetic, environmental, and health) of turf removal and sustainable landscaping on a state-wide scale. The following seven program considerations stand out as top priority program improvements to support water savings, improve fiscal investments, increase program defensibility, and generate streamlined rebate processes:

⁴ These values were calculated and estimated using a wide range of methodologies. From statistical evaluation capturing several years of water use data before and after participant conversions and controlling for confounding factors such as weather, to simplified calculations that multiply an average water savings number (e.g., 45 gallons per square foot per year - approximated and adopted by many Southern California agencies) by the area of conversions completed.

1. From the start of a turf rebate program, collect the necessary data to defensibly calculate and statistically analyze the water savings attributable to conversions. Commit to a standardized and transferable calculation methodology for measurement and verification of program outcomes.
2. Offer and/or require hands-on landscape design and irrigation guidance through classes or other means to educate and engage homeowners and to realize high-quality and sustainable conversions that expand beyond turf removal to embrace the principles of the watershed approach. (See [Appendix B](#) for an explanation of the watershed approach.)
3. Design, test, and implement innovative strategies to maximize conversion impact. Strategies could include varying rebate levels to correspond with microclimates; increasing rebates for simultaneous neighborhood conversions; or acknowledging successful conversions with yard signs that attribute beautiful new landscapes to the turf rebate program. These strategies should simultaneously maximize water savings while attracting participants and establishing social norms.
4. Use multiple post-conversion inspections to determine how conversions hold-up or change over time. For example, check the landscape immediately after a conversion completion, then check it again one year later to evaluate plant health, aesthetic appearance, and irrigation system decay. Additional inspections will also remind property owners to continually manage their own landscapes.
5. Design program finances and rebate levels to achieve the desirable degree of participation, water savings, and longevity. This process requires studying participation trends over time from similar agencies and determining how an agency can manage available funding and staff resources to implement and sustain a program. This design process may also require including additional water-saving criteria in rebate terms and conditions.
6. Emphasize long-term customer behavioral changes throughout the rebate process by:
 - o seeking customer commitment to water conservation ethics;
 - o educating participants on the multiple benefits of landscape conversion and on the practicalities of landscape maintenance;
 - o reminding customers of these topics throughout the project; and by
 - o positively reinforcing customer progress and program participation.

Importantly, a (sometimes large) portion of water savings post conversion is attributable to the increased customer knowledge and understanding of landscape irrigation and maintenance needs. Consistent customer contact and prompts that extend beyond the conversion project timeline will reinforce behavioral change and maximize water savings impacts.

7. Motivate a shift to the watershed approach to landscaping by coupling turf rebate programs with additional holistic landscape considerations and incentives. Incentivize on-site stormwater capture

and retention through all-inclusive or tiered rebates that encourage rainwater harvesting and stormwater retention in addition to turf replacement and irrigation upgrades.⁵ Seek funding from mutually benefited organizations such as stormwater agencies. Consider soil health improvements and/or the use of compost for rebate requirements or additional rebate incentives to ultimately increase water retention capacity and reduce the need for supplemental irrigation. Design variable or tiered rebates that incentivize planting new landscapes during the appropriate season. For example, offer an initial, nominal rebate for sheet-mulching a lawn during spring or summer months. Then, offer an additional rebate for new landscape planting during the fall months.

Challenging questions about rebate programs remain: do these programs only reward wasteful water users or well-off home owners who could afford the conversions without rebates? Is there social equity in rebate programs? Should California water agencies be implementing comparatively non-cost-effective conservation programs in a drought? Are there cost-effective, alternative approaches to incentivize landscape conversion (see [Appendix C](#))? These are thought-provoking, valuable questions to ask. Given the current popularity of these programs, they are likely to remain until they simply become too expensive for water distributors. Only time and a continued commitment to improving region-specific program design and data collection will reveal the true impact and potential of turf removal rebate programs.

⁵ For ideas on incentivizing stormwater retention, check out Portland Oregon's '[Clean River Rewards](#)' program and '[Downspout Disconnect](#)' program, or Seattle's [RainWise Rebates](#).

Turf Replacement Specifications

Different rebate programs permit a range of replacement ground covers. Three primary material replacements are available: climate appropriate plants, permeable hardscapes, and synthetic turf. Where one rebate program allows any of the three, another program allows only one. The following section briefly covers what each of these replacement options entail and lists their pros and cons including water use; maintenance; retention, runoff, and erosion; ecosystem services such as habitat creation, fire control, and cooling; GHG emissions and waste generation; public health; and cost effectiveness. (Please see [References & Resources](#) at the end of the report for further research.)

Climate Appropriate Landscapes

Climate appropriate, drought tolerant, and/or native plants and planting materials are a preferred turf replacement option for many water distributors. Most rebate programs require that a certain percentage of replaced landscape area consists of climate appropriate plants. Dubbed 'climate-appropriate,' these plants are better adapted to California climate zones than their water-intensive peers, and therefore, they require less irrigation. Drought tolerant plants are those specifically recognized for their ability to survive extended periods of time with little to no rain or irrigation. Not to be confused with climate-appropriate or drought tolerant plants, native plants are plants indigenous to a specific region, as identified during a specific period of history. California native plants, generally thought of as plants that existed in California prior to European settlement, are by definition climate-appropriate because they exist naturally in a climate that suits their needs. These plants have co-evolved with native animals, fungi, and microbes over long periods of time, and therefore they provide the additional benefit of habitat creation for native animals. Not all climate appropriate or California native plants, however, are drought tolerant simply because not all California climates commonly experience (or used to experience) repeated droughts. Thus, landscapers must ensure that their choice of native is appropriate for their specific micro-climates.



Image Credit: www.gopixpic.com

Among recognizable climate-appropriate landscape brands are: Xeriscape™, California-Friendly™, Bay-Friendly, River-Friendly, and Garden-Friendly.

Xeriscaping, the first widely-recognized turf alternative, gained its popularity in the arid southwestern United States. For many, it conjures images of gravel, adobe, succulents, and cactuses. In actuality, however, Xeriscaping encompasses a broader array of plant varieties selected for water efficiency and soil health.

The wide array of 'Friendly' brands indicates California

climate-appropriate and native plants. They are growing in popularity, especially since the 2014 drought emergency declaration and the growth of turf rebate programs. Gardens built using climate-appropriate plants are often also designed around watershed-approach principles such as decreased water use and

increased percolation, healthier soils, habitat creation, and hydrozones that cluster plants with similar water and sun requirements and help minimize erosion and unused runoff.

Critics disapprove of climate-appropriate and native gardens as a viable turf replacement options for four principal reasons:

1. Cost – Compared to turf grasses, native and climate appropriate gardens are typically more expensive to purchase and install.
2. Maintenance – Heterogeneous gardens often require a greater depth of landscaping knowledge and understanding; even if resulting gardens ultimately require less maintenance, the initial learning curve is steep.
3. Aesthetics – Some landscape conversions designed with native or climate-appropriate plants do not result in aesthetically pleasing front yards, offending neighbors and discouraging further conversions.
4. Property Value – The market value for homes **may** decrease based on the absence of a turf grass lawn.



Image Credit: www.californianativeflora.com

In contrast, supporters give seven reasons for favoring climate-appropriate and native gardens as a viable turf replacement option:

1. Cost – Long term cost analyses suggest that money saved on maintenance, waste removal, and water costs yield a reasonable return on investment, particularly when landscape conversions are large-scale commercial projects or when property managers receive rebates.
2. Maintenance – Property owners and managers spend fewer hours maintaining an established native or climate appropriate garden than a turf lawn.
3. Aesthetics – The plants available to native and climate-appropriate gardens vary in size, shape, and color, and can yield beautiful landscapes when designed properly.
4. Property Value – Market value for homes **may** increase based on the presence of a water efficient landscape based on native or climate-appropriate plants.
5. Water, Waste, and Energy Savings – The decreased water, fertilizer, and pesticide needs, and the decreased maintenance time associated with native and climate-appropriate gardens saves water while reducing chemical use, green waste, and GHG emissions when compared with 'mow-blow-and-go' turf grass maintenance.
6. Habitat Creation and Soil health – Native plants can create habitat for native animals, such as bees, that are key species in keeping our watersheds healthy. Native plants can also help to restore soil health through habitat creation by incorporating animal byproducts into the soil.
7. Stormwater Management – Well-designed native gardens retain stormwater, allowing it to percolate to subsurface aquifers, filter pollutants, and avoid at-capacity sewer lines.

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Permeable Hardscapes



Image Credit:
<http://www.santacruz.watersavingplants.com/>

Permeable hardscapes are ground covers constructed above drainable soils or stone aggregates. When compared to traditional solid concrete, brick, or asphalt pavers, permeable hardscapes reduce runoff and erosion. Permeable hardscapes vary widely in permeability. They include: gravel; gridded or interlocking pavers with gravel or dirt infill; cobblestones; and porous, pervious, or permeable pavers (e.g., porous asphalt and pervious concrete).

Critics disapprove of permeable hardscapes as a viable turf replacement option for five reasons:

1. Failure Over Time – Anecdotal evidence has led some agencies to remove permeable hardscapes as an allowable alternative to turf grass. These agencies note that property managers/owners report a decrease of permeability over time, as percolation pores and grooves clog with compacted dust and grit. Research shows that after a few years of use or after poor installation practices, percolation from some 'permeable pavers' can decrease by orders of magnitude.
2. High-Maintenance – Porous pavers require a stone aggregate detention basin below the pavement surface. To maintain infiltration rates, this basin must be periodically washed out to prevent dirt and particulate build up. Some porous surfaces require vacuum sweeping to maintain infiltration rates; certain old porous surfaces can only be reclaimed as 'permeable' by drilling half-inch holes in the surface to allow water to reach the stone aggregate basin.
3. Climate- and Soil-Sensitive – Climates that experience freeze-thaw cycles frequently see damaged pavers. They crack after partially clogged pores fill with water, freeze, and then expand. Sanding surfaces for snow traction also quickly renders porous pavers ineffective by clogging pore spaces. Similarly, snow-plow piles with high sediment content can melt into pavers and clog them. Finally, regardless of a hardscape's permeability, high clay-content soils limit infiltration into aquifers and can cause pooling and runoff.
4. Heat Island – Some porous pavers are dark surfaces (e.g., porous asphalt) that increase heat absorption and contribute to the urban heat island effect.
5. Limited Environmental Benefits – In contrast to other turf replacement alternatives like climate appropriate plants, permeable hardscapes do not offer ecosystem services such as GHG sequestration, air filtration, or habitat creation.

Supporters give seven reasons for favoring permeable hardscapes as a viable turf replacement option:

1. Reduced Runoff / Increased Percolation – At least upon installation, the runoff coefficients of most porous pavers are more similar to grass (and some in far excess of grass) than to non-porous

pavements. These lower runoff coefficients mean increased infiltration into the soils and increased subsurface water storage.

2. Low-Maintenance and Functional – In contrast with plant and turf grass ground covers, hardscapes require little to no maintenance or chemical application. They also serve as a functional space for many activities.
3. Water Savings – With little to no watering requirements after installation, permeable hardscapes can reduce outdoor water usage by almost 100%.
4. Water Filtration – Stormwater pollutants are removed by filtration through the paver pores and/or in the permeable ground underneath or in-between permeable hardscape surfaces.
5. Efficient Construction – In comparison with traditional pavements, porous pavements take less time to construct and install.
6. Durability – Properly constructed pavers can last 20-40 years and maintain infiltration rates orders of magnitude higher than turf grass throughout their lifetime.
7. Low Cost – Well-installed and designed permeable pavers or other permeable hardscapes can save money over a landscape's lifetime through water savings, landscape materials applications, and maintenance opportunity cost savings. Indeed, considering just installation costs, permeable pavers are cost-competitive with both plant and synthetic turf alternatives. Permeable pavers are also cost-competitive with traditional pavers when storm water management systems are included in the cost calculations. Alternative permeable hardscapes like gravel beds cost significantly less than plant and synthetic turf coverage of a similar area.

Synthetic Turf

Artificial grasses have been around since the mid to late 1900's. Consisting of synthetic fibers, rubbery infill, and subsurface layers designed to pad, drain, filter, and ground the fibrous artificial turf, this groundcover was originally popularized in sporting arenas. It offered water and maintenance cost and time savings. Synthetic grass design has evolved over time to combat its negative reputation in the environmental and public health world, though artificial grass critics remain skeptical. Improved technologies have bettered the ergonomics of synthetic grasses to decrease the threat of athletic injury. New materials limit lead-contaminated infill and minimize heat dangers. Recently, spurred by ongoing drought and decreased water and maintenance costs, synthetic turf has gained popularity among California single family homeowners.

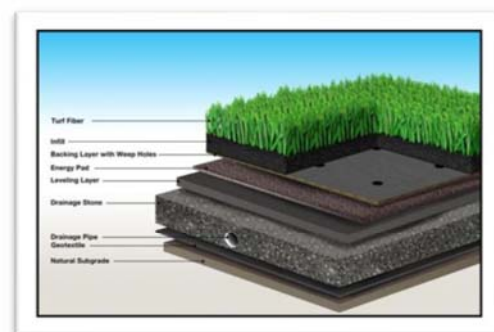


Image Credit: The Synthetic Turf Council

Critics disapprove of synthetic turf as a viable turf replacement option for six reasons:

1. Heat Risks – Surface temperatures on synthetic fields have been documented as high as 199 °F, increasing potential for heat-related health hazards and increasing the urban island effect.

2. Health Hazards – Beyond heat injuries, researchers have documented increased incidence of sports injuries, increased risk for bacterial infections, and increased asthma triggers. They have hypothesized connections between heavy metals and toxic compounds found in synthetic turf infills (and their cleaning agents) and diseases such as cancer.
3. Waste Generation – At the end of its 6-15 year lifetime, synthetic turf typically ends up in a landfill, even if it is technically recyclable.
4. Aesthetics – Wear and tear on synthetic turf materials creates damaged-looking and faded groundcover; unlike natural grasses, artificial turf cannot regenerate itself.
5. Environmental Impact – Artificial turf does not offer several environmental benefits offered by turf grass and living plant alternatives such as biofiltration, cooling effects, carbon sequestration, and habitat creation. Instead, the synthetic turf can increase runoff, leach toxins into soils, and cause soil compaction and loss of microbes.
6. Limited Water & Maintenance Savings – Hot or dirty synthetic turf surfaces require irrigation and cleaning maintenance. This increases water and time costs and occasionally requires costly specialized equipment and toxic chemical cleaning solutions. These maintenance factors can lengthen the return on investment time for synthetic turf installation well beyond the industry-supported claims of three to five years.

Supporters offer six reasons for favoring synthetic turf as a viable turf replacement option:



Image Credit: frassfakegrass.com

1. Convenience – Artificial turf can be used continuously as a functional space; no "down time" has to occur for fertilizing and cutting. In addition, synthetic lawns can be enjoyed year-around in climates that do not support continuous natural turf growth.
2. Health Benefits – Industry supporters claim modern synthetic turf technologies reduce sports injuries and control for bacteria growth.
3. Waste Reduction – Some artificial turfs are now 100% recyclable. In addition, artificial turf manufacturers themselves integrate into their product post-consumer, recycled materials such as tire rubber that would otherwise be sitting in a landfill.
4. Aesthetics – Fade-resistant, durable artificial turf products resemble a perfectly manicured lawn, year-around.
5. Environmental Impact – Artificial turf eliminates the need for fertilizers and pesticides that can run off in stormwater and leach into water tables. Artificial turf also reduces GHG emissions and green waste by eliminating 'mow-and- blow' maintenance.
6. Water & Maintenance Savings – Artificial turf requires little to no water or maintenance. This saves property owners and managers money and time. These savings mean property owners can see their purchase and installation expenses paid back within three to five years.

Conclusions

The limited quantity and quality of turf removal program data undermines conclusive program evaluation and recommendations, but anecdotal lessons learned can inform agencies as they manage new and expanding turf removal programs. Common challenges faced by program managers include limited time and money resources, customer unfamiliarity with landscaping, and undesirable conversion outcomes. Key strategies to overcome these challenges and to realize water-saving, aesthetically-pleasing landscape conversions include educational customer outreach, thorough conversion monitoring, and carefully designed program requirements.

A central component of turf removal program design are the turf replacement options. Without a complete life cycle analysis of all natural turf alternatives – i.e., climate-appropriate plants, permeable hardscape, and synthetic turf - it is difficult to quantitatively and conclusively compare the impacts of these groundcovers on financial resources as well as environmental impact. It is simpler; however, for agencies and property managers to consider the above qualitative pros and cons and choose based on what is most valuable to them as a water agency or as an individual.

Even if turf rebate programs are not a cost-effective method to augment urban water supply, there are substantial positive externalities associated with them. These include end-user education, multiple benefits from climate-appropriate landscapes, and encouragement of a general cultural shift towards understanding and accepting environmentally beneficial alternatives to turf grass. For agencies considering these programs, these non-quantifiable benefits may tip the scale and justify the investment in limited rebate programs. Program popularity with homeowners and program timeliness given California's ongoing drought indicate that these programs have the potential to catalyze broad transformations on a state-wide scale. Program design and limitations must be carefully considered to manage expectations and to generate desirable results for water agencies, customers, and the state as a whole.



References & Resources

General Turf Removal Resources

- Alliance for Water Efficiency, Jan 2015, [AWE Outdoor Water Savings Research Initiative: Phase 1](#)
- BeWaterWise, [Demonstration Gardens](#), Metropolitan Water District
- Ellen Hanak and Matthew Davis, [Lawns and Water Demand in California](#), California Economic Policy, Volume 2, Number 2. July 2006. (Jan. 20, 2015)
- Joe Berg, Tom Chestnut, [Dirt Cheap Water: The MWDOC WUE Master Plan - \\$415/AF - What?](#), Municipal Water District of Orange County, 2014 WaterSmart Innovations Conference
- Kathy Ramos, [Does Turf Removal Save Water?](#), Metropolitan Water District, 2014 WaterSmart Innovations Conference
- Kristen Shapiro, Andrew Chan, Elliot Carson, Romina Tayag, [Outdoor Water Use Conservation through Native Plants](#), UC Davis
- Melissa Baum-Haley, Unpublished, Turf Removal PBMP Report Draft, California Urban Water Conservation Council
- Metropolitan Water District of Southern California, Feb 2014, USBR Turf Water Savings Analysis: Appendix E Water Savings from Turf Replacement, Resource Analyst Unit
- Molly Peterson, Denise-Marie Guerra, Chris Keller, Jul 2014, [Cash for Grass: How Well is it Working?](#), 89.3 KPCC Southern California Public Radio
- Office of Sustainability and the Environment, [Garden-Garden](#), City of Santa Monica
- San Diego County Water Authority News Release, Jan. 8, 2015, [Customer Demand Exhausts Funds for Water Authority's Turf Replacement Program](#)
- Toby Bickmore, Hillery Francis [The Non-Savers: An Evaluation of Turf Conversion Properties That Don't Save Water](#), Southern Nevada Water Authority Conservation, 2014 WaterSmart Innovations Conference
- Tom Hudak, 2005, Converting turfgrass to xeriscape: Evaluating Southern Nevada water authority's "Water smart program," University of Nevada
- WaterSmart, 2014, [Tapping into Behavioral Science](#)

Interviews & Data Provided by the following Turf Removal Programs

- [City of Long Beach – Lawn to Garden](#)
- [City of Roseville- Cash for Grass](#)
- [City of Santa Cruz – Lawn Removal Rebate](#)
- [City of Santa Rosa – "Green Exchange" Rebate Program](#)
- [City of Sacramento – River Friendly Landscape Rebates](#)
- [Contra Costa Water District – Lawn to Garden Rebate Program](#)
- [Los Angeles Department of Water and Power](#)
- [Municipal Water District of Orange County – Orange County Turf Removal Program](#)
- [Metropolitan Water District of Southern California – Turf Removal Program](#)
- [San Diego County Water Authority – WaterSmart Turf Replacement Program](#)

Climate Appropriate Landscapes

- The California Native Plant Society, <http://www.cnps.org/>
- TreePeople, [Plant Native and Climate Appropriate](#)

Hardscapes

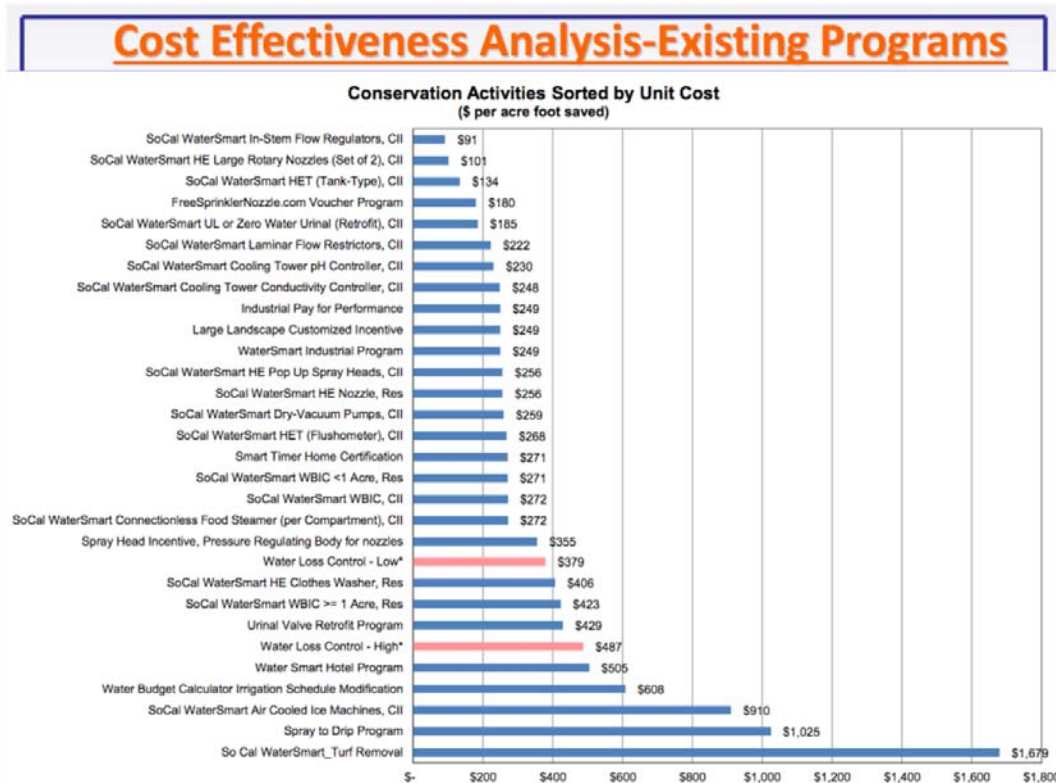
- Benjamin O. Brattebo and Derek B. Booth, 2003, [Long-Term Stormwater Quantity and Quality Performance of Permeable Pavement Systems](#), Water Resources, Elsevier Press
- Bruce K. Ferguson, 2005, [Porous Pavements: The Overview](#)
- EPA, [Pervious Concrete Pavement](#)
- Green Building Advisor, [Hardscapes: Patios and Driveways](#)
- Jared Draper, Jan 2011, [Urban Design and Stormwater Management: An Integrated Approach to Public Hardscape Design](#), Graduate Thesis, Clemson University
- Philip S. Wenz, Jun 2008, [Permeable hardscapes let the water soak in](#), SFGate, Your Ecological House

Synthetic Turf

- Aaron Patton, [Synthetic \(Artificial\) Turf vs. Natural Grass Athletic Fields](#), University of Arkansas Turfgrass Science
- Alliance for Water Efficiency, [PBMP Synthetic Turf Report](#)
- City of Santa Rosa, [Why Artificial Turf is Not Rebated](#)
- City of Santa Monica, [Why Artificial Turf is Not Rebated](#)
- Corrie Lindsay, [Synthetic Turf: Friend or Foe?](#), Bay Friendly Blog Entry,
- Debbie Arrington, [Artificial grass offers options during drought](#), The Sacramento Bee
- Environment and Human Health, [Artificial Turf: Exposures to Ground Up Rubber Tires - Athletic Fields, Playgrounds, Garden Mulch](#)
- Hannah Rappleye, 2014, [How Safe Is the Artificial Turf Your Child Plays On?](#), NBC News
- Jon Koeller, Anil Bamezai, Nov 2006, [Evaluation of PBMP: Synthetic Turf](#), California Urban Water Conservation Council
- Kevin R. Ford, et al., [Comparison of in-shoe foot loading patterns on natural grass and synthetic turf](#), Journal of Science and Medicine in Sport
- Lindsey Barton Straus, JD, [Turf Wars: Pros and Cons of Artificial Turf](#), Moms Team
- Santa Clara Valley Water District, [Field, Pilot, and Laboratory Studies for the Assessment of Water Quality Impacts of Artificial Turf](#)
- Santa Clara Valley Water District, Mar 2014, [Water Conservation Fact Sheet: Artificial Turf](#)
- Sports Turf Managers Association, [Synthetic Field Resources](#)

Appendix A: Conservation Program Cost Effectiveness

The following chart, presented by Joe Berg from the Municipal Water District of Orange County at the WaterSmart Innovations Conference 2014, details the relative cost per acre foot (AF) of water saved for various water conservation programs. The turf rebate program value is found at the bottom of the chart, indicating that it is the most expensive program alternative evaluated in this study with a cost of \$1,679/AF water saved. It should be noted that since 2014, cost effectiveness numbers may have changed.



The following are California water source costs as calculated by the Public Policy Institute of California:

Method	Annual cost per acre-foot (\$)	
	Low	High
Conjunctive use and groundwater storage	10	600
Water transfers	50	550
Agricultural water use efficiency (net)	145	240
Urban water use efficiency (gross)	230	635
Recycled municipal water	300	1,300
Surface storage (state projects)	340	1,070
Desalination, brackish	500	900
Desalination, seawater	900	2,500

Appendix B: The Watershed Approach

A watershed approach intends an integrated, holistic approach to landscape design, construction, and maintenance that transcends water-use efficiency to reflect a site's climate, geography, and soils and to address the related benefits of cost savings, run-off reduction, green waste reduction, pesticide and fertilizer reduction, habitat improvement, and energy/GHG reductions.

California's landscapes provide essential functions throughout our urban environment. They are where we recreate; capture, clean and recharge groundwater; shade and cool our buildings; enhance property values; provide wildlife habitat; create space to grow food locally; provide a sense of place and much more. The optimal design, installation, and management of these spaces are critical to enhancing California's quality of life while protecting our limited natural resources.

The transition to the watershed approach will be a system-wide upgrade to the urban environment. In addition to reducing outdoor irrigation, the transformation promotes multiple environmental benefits for municipalities:

- Increased rainwater and graywater capture, storage, and reuse
- Increased stormwater capture and infiltration, decreased stormwater runoff
- Reduced synthetic pesticide and fertilizer application and runoff
- Reduced "green waste" production
- Increased soil health and water retention capacity
- Reduced energy consumption and greenhouse gas emissions and improved air quality, and
- Increased food production and habitat for beneficial insects and wildlife, and the restoration of native biodiversity

The transformation also promotes benefits for individual property owners:

- Increased cost savings (lower water bills and upkeep costs)
- Reduced landscaping maintenance
- Healthier neighborhoods and communities
- Increased sense of place and appreciation for local resources
- Improved stewardship ethics and associated positive feelings towards self and neighborhood, and
- Increased shared values between neighbors via increased community participation in a social-norm-defining transformation.

Appendix C: Other Turf Conversions – Demonstration Gardens

Turf rebate programming is not the only approach to catalyzing landscape conversions in California. There is a need for parallel efforts that leverage shifts in cultural preferences towards sustainable landscapes.

Among existing programmatic efforts to encourage turf removal, and more specifically to redefine social norms, is the installation and advertisement of demonstration gardens. These educational garden spaces replace turf in well-visited locations. Their beautifully-designed and functional landscapes attract the passersby and their informative signage educates garden explorers. Though less tangible than cash incentives, demonstration gardens can re-define public perception of unorthodox landscapes and gradually shift the current California landscaping paradigm from turf grass towards sustainable alternatives.



*Image Credit: Big Bear Lake
Department of Water & Power*

A series of California-Friendly® garden examples are hyperlinked through the Metropolitan Water District's [BeWaterWise](#) website. Though, some are designated botanical gardens, many are specifically demonstration gardens found in public spaces like libraries and water agencies. Numerous other demonstration gardens are scattered throughout the state on public and private property. These garden spaces often host gardening tours and workshops, school field trips, and other educational events. Beyond providing educational venues in pleasant and sustainable landscapes, these gardens increase public familiarity with non-turf landscaping alternatives. This familiarity breeds comfort and acceptance. Though demonstration garden impact on turf removal is not directly quantifiable, the gardens are readying the population of California for a landscaping paradigm shift.

ⁱ Knopf, J. (2003). "Water Wise Landscaping with Trees, Shrubs and Vines: A Xeriscape Guide for the Rocky Mountain Region." Chamisa Books, Boulder, CO.

ⁱⁱ Sovocool, K. A., Rosales, J. L., & Southern Nevada Water Authority (2004). "A Five-Year Investigation Into the Potential Water and Monetary Savings of Residential Xeriscape in the Mojave Desert." Las Vegas, NV.
Sovocool, K.A. (2005). "Xeriscape Conversion Study: Final Report." Southern Nevada Water Authority. Las Vegas, NV.

ⁱⁱⁱ Boyer, M.J., M.D. Dukes, L.J. Young, and S. Wang. 2014 Irrigation conservation of Florida-Friendly Landscaping based on water billing data. *Journal of Irrigation and Drainage Engineering* 04014037.

^{iv} Price, J.I., J.m. Chermak, and J. Felardo. 2014. Low-flow appliances and household water demand: An evaluation of demand-side management policy in Albuquerque, New Mexico. *Journal of Environmental Management* 133:37-44.

^v Hudak, T. (2005) Converting turfgrass to xeriscape: Evaluation Southern Nevada water authority's "Water smart program"



Date: April 28, 2015

Subject: Overview of California Drought Conditions and Related Regional Issues

On April 1, 2015, Governor Edmund G. Brown Jr. issued an Executive Order, effective immediately, mandating specific actions to reduce water usage by 25% statewide from 2013 levels, increasing enforcement to prevent water waste, and streamlining government review of and response to drought-related measures. The Governor's order, and forthcoming regulations to implement its provisions, will significantly impact commercial, industrial and institutional property owners, real estate developers, agricultural interests, and water suppliers, as well as provide opportunities for those developing cutting-edge water efficiency technologies.

Specifically, the Executive Order requires state and local agencies to take measures to implement the following:

Mandatory Water Restrictions

- Restrictions to achieve a statewide 25% reduction in potable urban water usage as compared to 2013. Water service areas with higher per capita water usage must achieve proportionally greater reductions than areas with lower per capita use.
- A statewide initiative in partnership with local agencies to replace 50 million square feet of turf with drought tolerant landscaping.
- Restrictions requiring commercial, industrial and institutional properties, such as campuses, golf courses and cemeteries, to immediately implement water efficiency measures to reduce potable water use consistent with statewide 25% reduction targets.
- Prohibitions on outdoor irrigation with potable water at newly constructed homes and buildings, where irrigation is not delivered by drip or microspray systems, and bans on irrigation with potable water of ornamental turf on public street medians.
- Rate structures, including surcharges, fees and penalties, to maximize water conservation.

Increased Enforcement Against Water Waste

- Frequent reporting of water diversion and use by water right holders, inspections for illegal diversions or wasteful or unreasonable use of water, and enforcement actions against illegal diverters or those engaging in wasteful and unreasonable use.
- Ordinances increasing water efficiency standards for new and existing landscapes.
- Agricultural drought management plans with quantification of water supplies and demands in 2013, 2014 and 2015 to be prepared by agricultural water suppliers.

- Immediate implementation by local water agencies in high and medium priority groundwater basins of all requirements of the California Statewide Groundwater Elevation Monitoring Program under Water Code section 10933.

New Technology

- A Water Energy Technology program to accelerate use of innovative water management technologies, such as renewable energy-powered desalination, integrated on-site reuse systems, water-use monitoring software, irrigation system timing and precision technology, and on-farm precision technology.

Streamlined Government Response

- Temporary assistance for residents who must relocate due to a lack of potable water.
- Priority review and approval of infrastructure projects and programs that increase local water supplies.
- Suspension of review under the California Environmental Quality Act (CEQA) for certain of the actions required under this Order.
- Immediate consideration of voluntary crop idling water transfers and water exchange proposals of one year or less that are initiated by local agencies.
- Prioritization of new and amended safe drinking water permits that enhance water supply.
- Expedited processing of applications for amendments to power plant certifications for the purpose of securing alternate water supplies for continued plant operation.
- Consideration and, if necessary, implementation of emergency drought salinity barriers in the Delta estuary to conserve water for use later in the year.

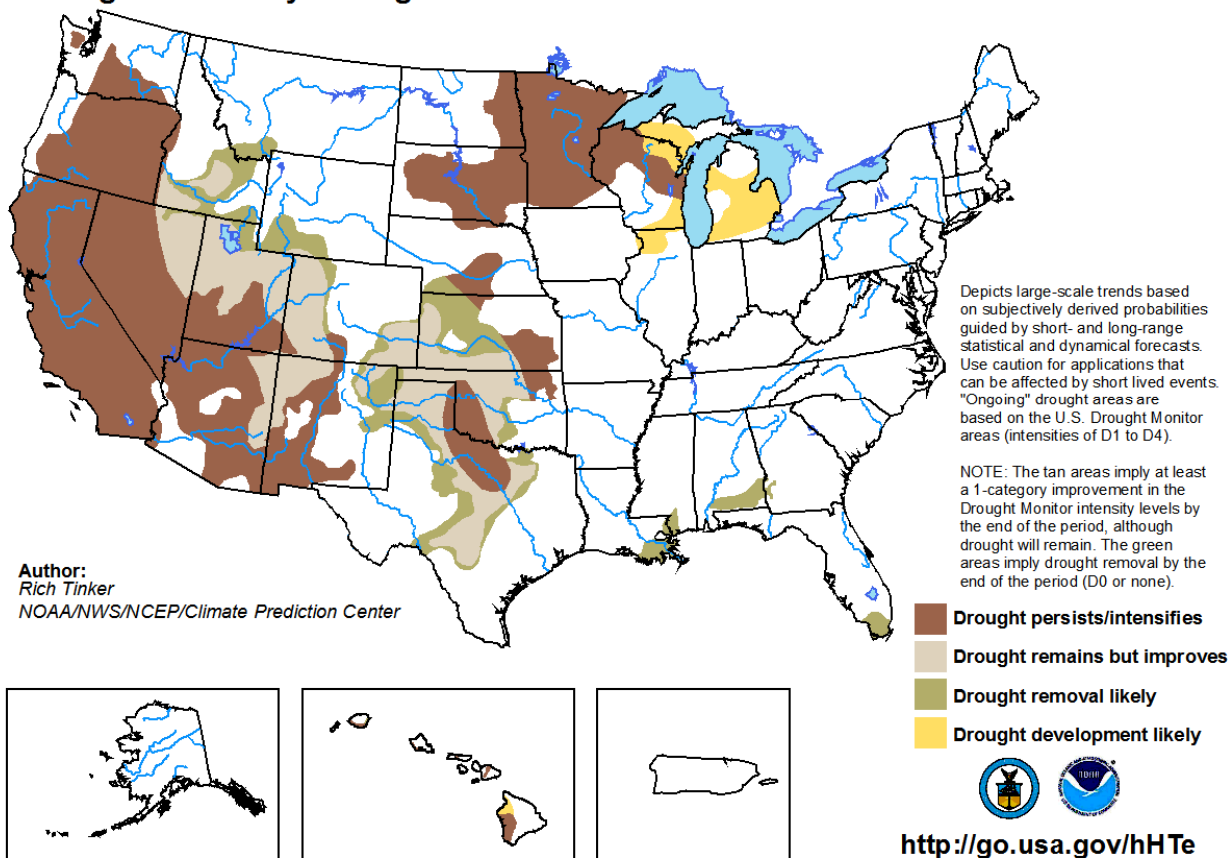
A copy of Executive Order B-29-15 is attached to this memorandum.

The District staff will continue to provide drought related updates at board workshops over the next six months to update the board members and the public about the severity and impacts of the drought in our region and throughout the state.

U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid for April 16 - July 31, 2015
Released April 16, 2015



Latest Seasonal Assessment from the National Weather Service - From mid-March to mid-April 2015, conditions improved in the southern High Plains, southern Texas, and parts of the lower half of the Mississippi Valley and central Gulf Coast region. However, dryness and drought expanded and/or intensified across the central Rockies and eastern Great Basin, the central and northern Plains, and parts of both the Northeast and Southeast. From the Ohio and lower Mississippi Rivers eastward, it was primarily abnormal dryness that expanded, with drought limited to part of the Gulf Coast and southern Florida. With above-normal rainfall expected on most time scales, these areas should be removed from the Drought Monitor before the end of July. Farther north, drought is expected to persist from the northern Plains through the Great Lakes region, with some expansion anticipated in much of Michigan and portions of Wisconsin and Illinois. Odds favor subnormal May-July precipitation there, and climatologically soil moisture content declines more often than it increases. In the northern Plains, drought may actually expand in the next few weeks, but retrenchment becomes increasingly possible as summer progresses, thus no net expansion is anticipated by the end of July, though it is expected to continue where it currently exists. Off to the south and west, above-normal May-July precipitation is favored across broad sections of the Great Basin, Intermountain West, and Plains for the 3-month period. Significant areas of improvement or removal are anticipated, but for a variety of reasons, some areas should see drought persist or perhaps intensify; specifically, south-central Nebraska and eastern Kansas (where enhanced wetness is not favored for the period as a whole), part of western Oklahoma and

adjacent Texas (where drought is more intense and entrenched than in surrounding areas), and much of the southern half of the Rockies (where long-term hydrologic impacts reduce the chances for improvement). Across the West Coast states, especially California and western Nevada, drought areas have become entrenched over the course of the past one to several years, and with the warm and drier time of year approaching, there is little if any chance for improvement. Extant areas of drought in Hawaii should persist as the drier time of year (in most areas) progresses, except in eastern Kauai, where removal is anticipated. Some expansion is possible into northwestern sections of the Big Island.

Forecaster: R. Tinker

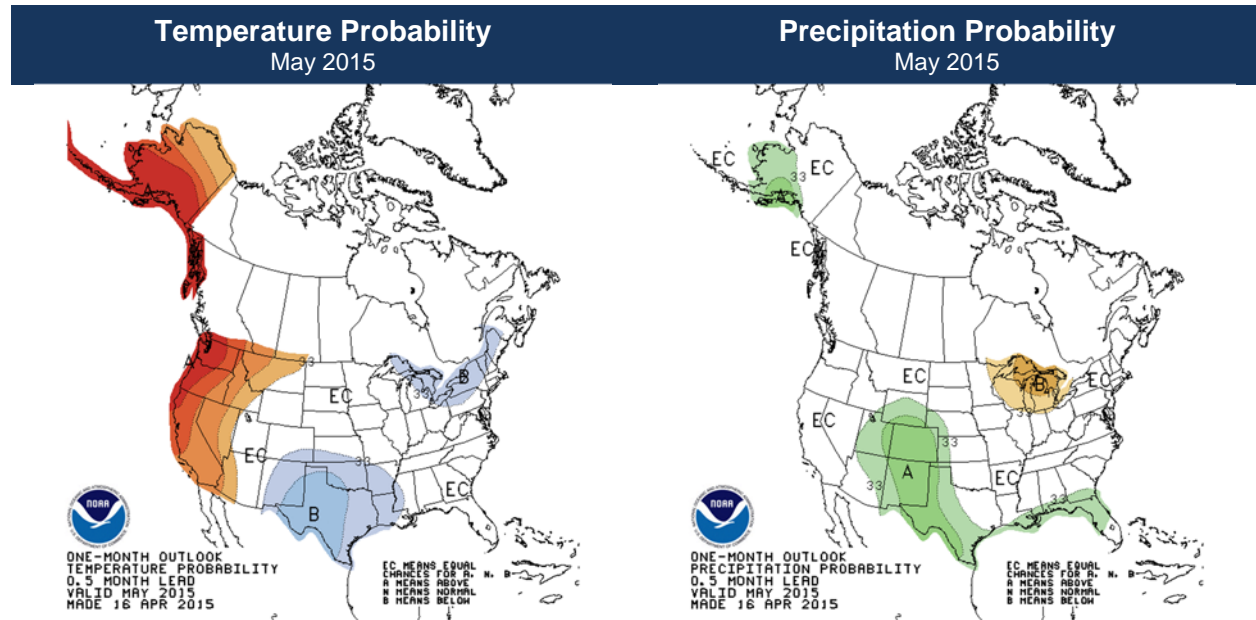
Next Seasonal Drought Outlook issued: May 21, 2015 at 8:30 AM EDT

Source: http://www.cpc.ncep.noaa.gov/products/expert_assessment/sdo_summary.html

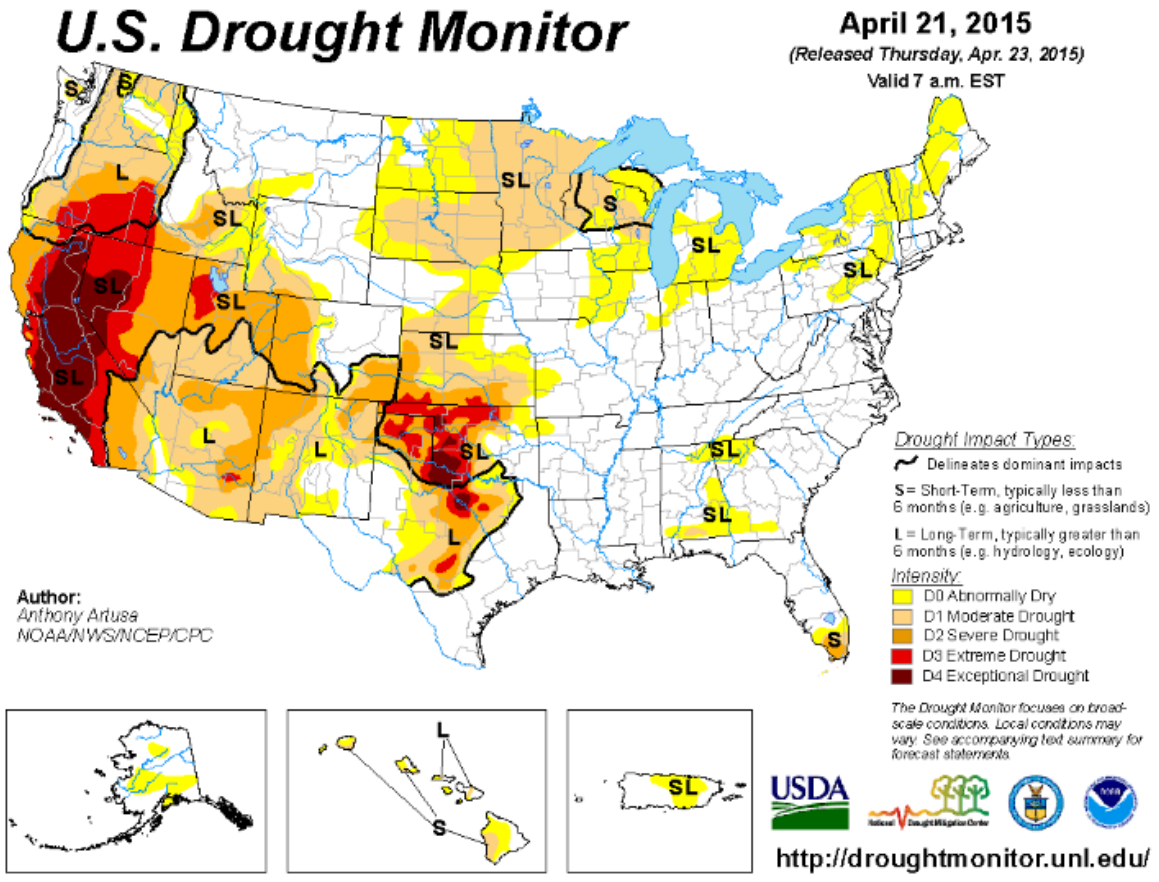
NOAA/ National Weather Service
National Centers for Environmental Prediction
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5830 University Research Court
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Page Author: Climate Prediction Center Internet Team
Page last modified: April 16, 2015

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The National Weather Service and the National Oceanic and Atmospheric Administration are predicting above average temperatures and above average precipitation patterns for southern California.

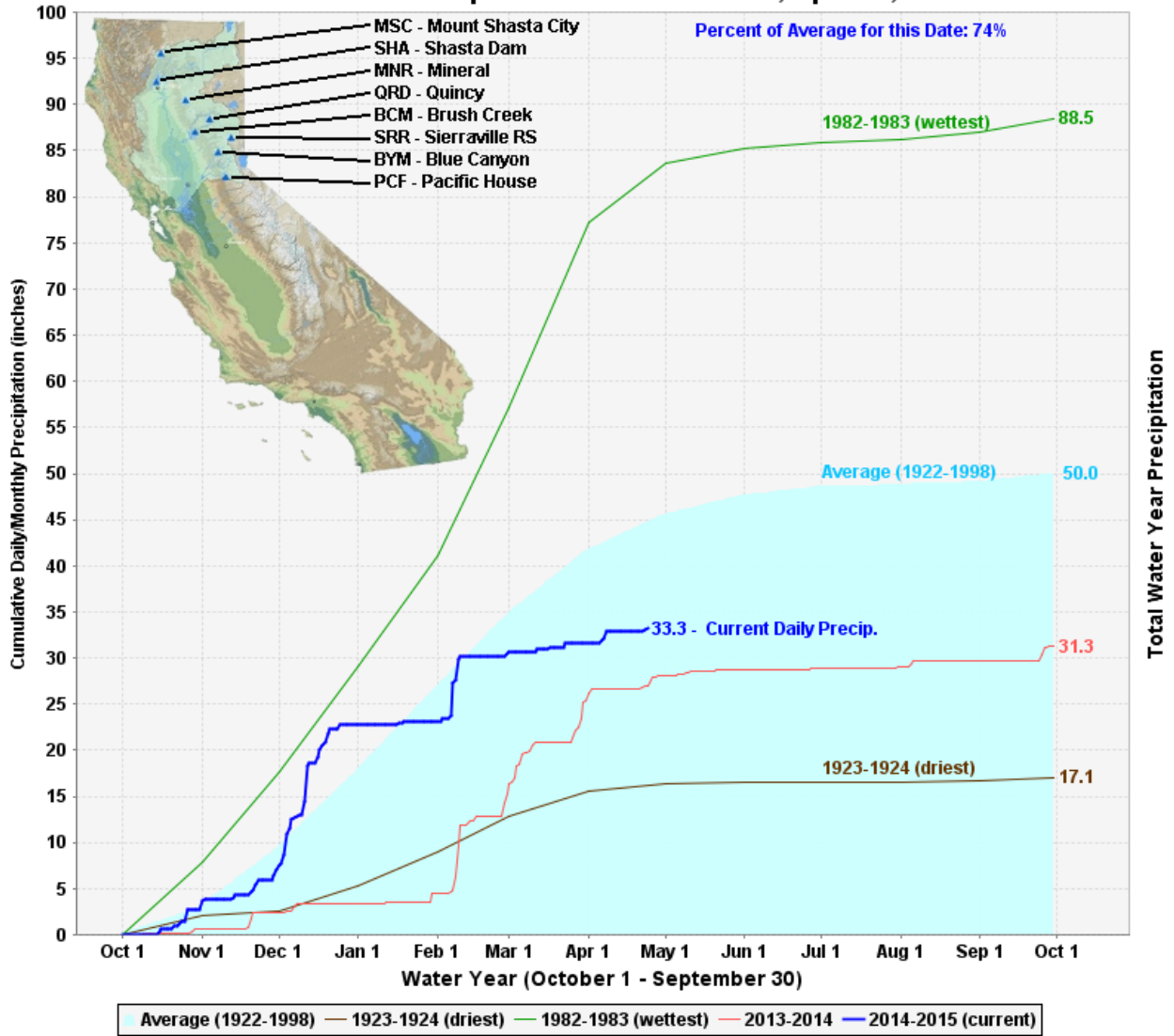


United States Drought Monitor Illustration



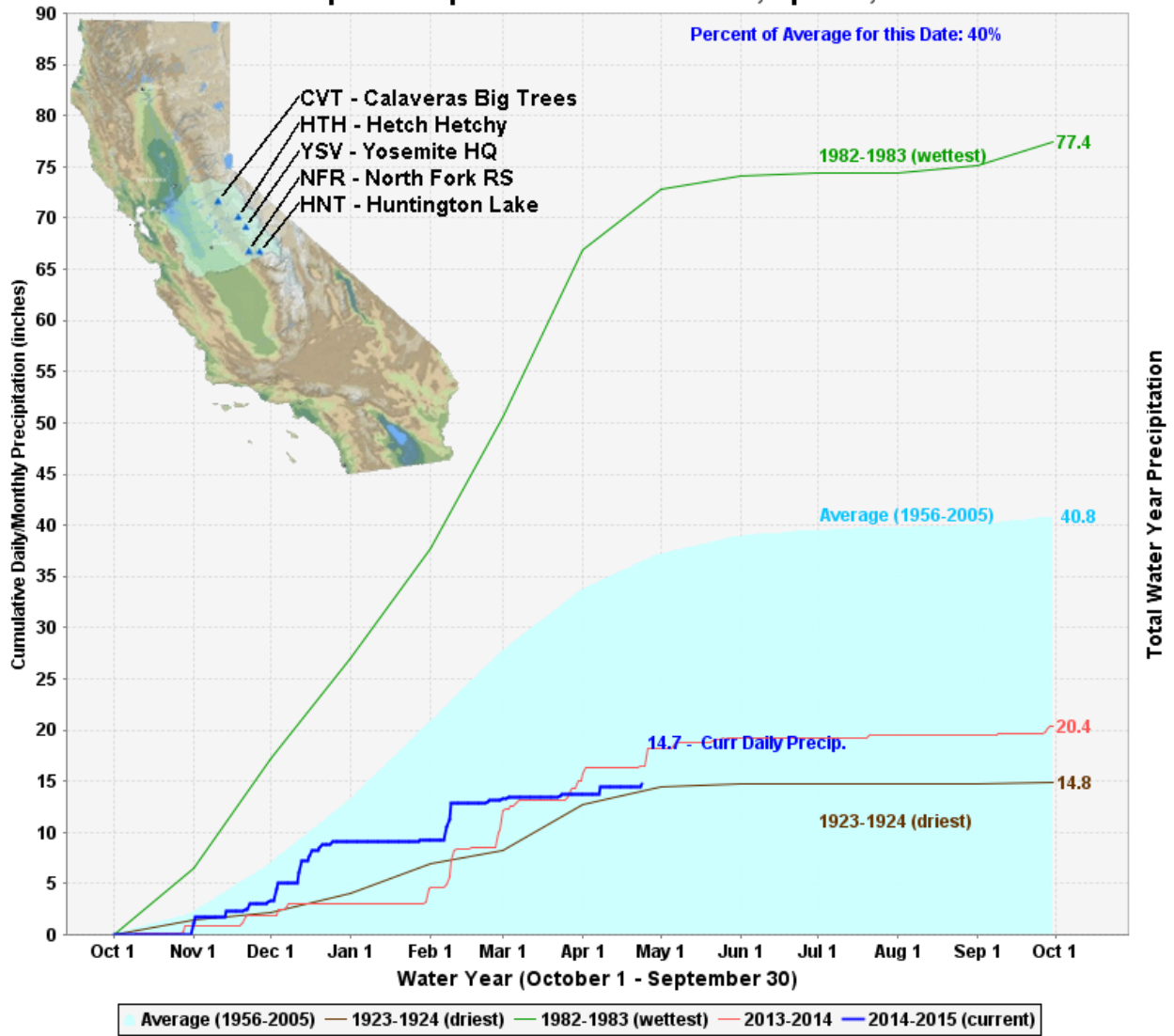
Department of Water Resources - California Data Exchange Center
Northern Sierra Precipitation

Northern Sierra Precipitation: 8-Station Index, April 24, 2015



Department of Water Resources - California Data Exchange Center
 San Joaquin Precipitation

San Joaquin Precipitation: 5-Station Index, April 24, 2015

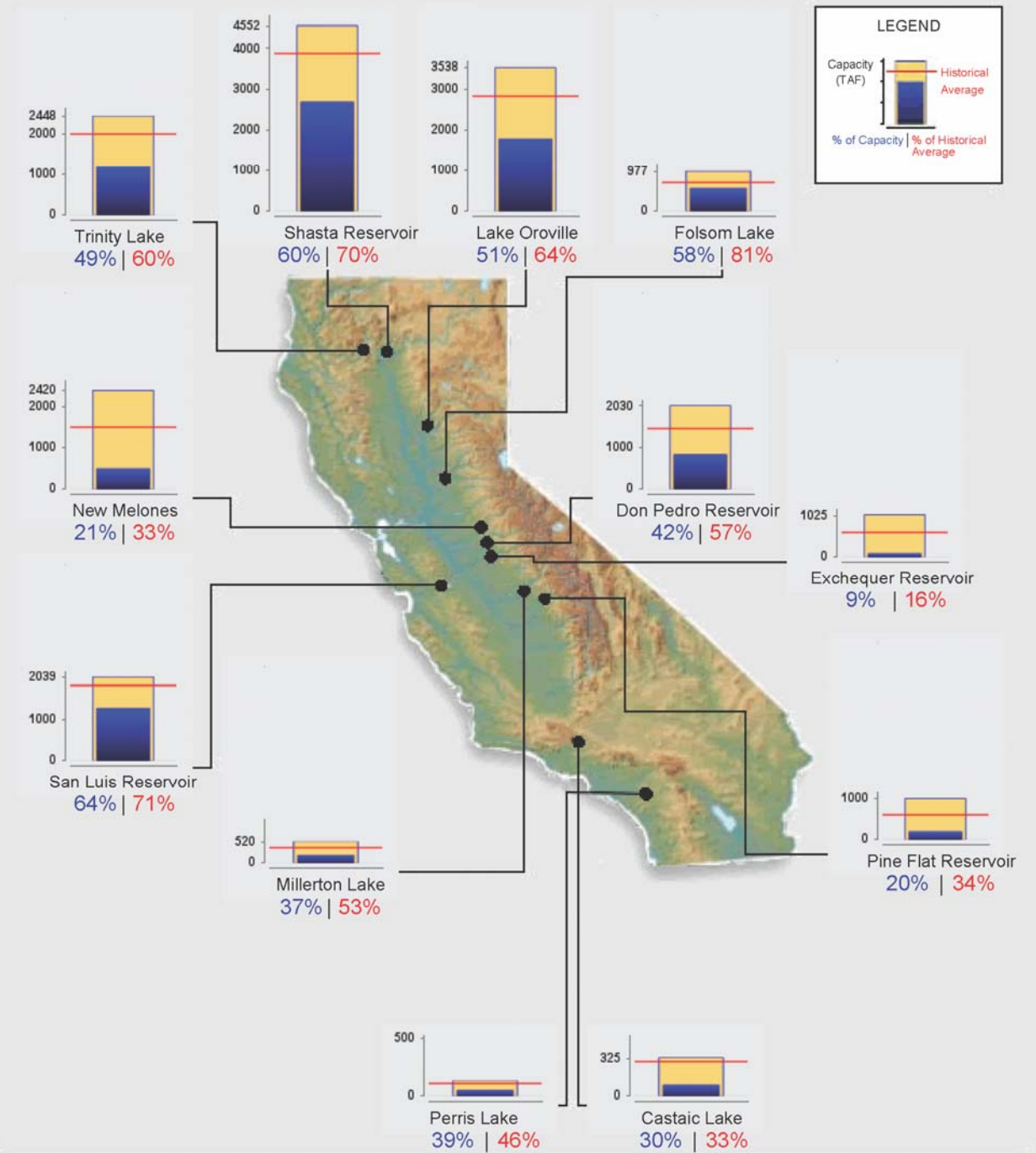




Reservoir Conditions

Ending At Midnight - April 23, 2015

CURRENT RESERVOIR CONDITIONS



Graph Updated 04/24/2015 11:15 AM



Governor Brown Directs First Ever Statewide Mandatory Water Reductions

4-1-2015

SACRAMENTO - Following the lowest snowpack ever recorded and with no end to the drought in sight, Governor Edmund G. Brown Jr. today announced actions that will save water, increase enforcement to prevent wasteful water use, streamline the state's drought response and invest in new technologies that will make California more drought resilient.

"Today we are standing on dry grass where there should be five feet of snow. This historic drought demands unprecedented action," said Governor Brown. "Therefore, I'm issuing an executive order mandating substantial water reductions across our state. As Californians, we must pull together and save water in every way possible."

High resolution photos of previous snow surveys are available [here](#).

For more than two years, the state's experts have been managing water resources to ensure that the state survives this drought and is better prepared for the next one. Last year, the Governor proclaimed a [drought state of emergency](#). The state has taken steps to make sure that water is available for human health and safety, growing food, fighting fires and protecting fish and wildlife. Millions have been spent helping thousands of California families most impacted by the drought pay their bills, put food on their tables and have water to drink.

The following is a summary of the executive order issued by the Governor today.

Save Water

For the first time in state history, the Governor has directed the State Water Resources Control Board to implement mandatory water reductions in cities and towns across California to reduce water usage by 25 percent. This savings amounts to approximately 1.5 million acre-feet of water over the next nine months, or nearly as much as is currently in Lake Oroville.

To save more water now, the order will also:

- Replace 50 million square feet of lawns throughout the state with drought tolerant landscaping in partnership with local governments;
- Direct the creation of a temporary, statewide consumer rebate program to replace old appliances with more water and energy efficient models;
- Require campuses, golf courses, cemeteries and other large landscapes to make significant cuts in water use; and

- Prohibit new homes and developments from irrigating with potable water unless water-efficient drip irrigation systems are used, and ban watering of ornamental grass on public street medians.

Increase Enforcement

The Governor's order calls on local water agencies to adjust their rate structures to implement conservation pricing, recognized as an effective way to realize water reductions and discourage water waste.

Agricultural water users - which have borne much of the brunt of the drought to date, with hundreds of thousands of fallowed acres, significantly reduced water allocations and thousands of farmworkers laid off - will be required to report more water use information to state regulators, increasing the state's ability to enforce against illegal diversions and waste and unreasonable use of water under today's order. Additionally, the Governor's action strengthens standards for Agricultural Water Management Plans submitted by large agriculture water districts and requires small agriculture water districts to develop similar plans. These plans will help ensure that agricultural communities are prepared in case the drought extends into 2016.

Additional actions required by the order include:

- Taking action against water agencies in depleted groundwater basins that have not shared data on their groundwater supplies with the state;
- Updating standards for toilets and faucets and outdoor landscaping in residential communities and taking action against communities that ignore these standards; and
- Making permanent monthly reporting of water usage, conservation and enforcement actions by local water suppliers.

Streamline Government Response

The order:

- Prioritizes state review and decision-making of water infrastructure projects and requires state agencies to report to the Governor's Office on any application pending for more than 90 days.
- Streamlines permitting and review of emergency drought salinity barriers - necessary to keep freshwater supplies in upstream reservoirs for human use and habitat protection for endangered and threatened species;
- Simplifies the review and approval process for voluntary water transfers and emergency drinking water projects; and
- Directs state departments to provide temporary relocation assistance to families who need to move from homes where domestic wells have run dry to housing with running water.

Invest in New Technologies

The order helps make California more drought resilient by:

- Incentivizing promising new technology that will make California more water efficient through a new program administered by the California Energy Commission.

The full text of the executive order can be found [here](#).

For more than two years, California has been dealing with the effects of drought. To learn about all the actions the state has taken to manage our water system and cope with the impacts of the drought, visit Drought.CA.Gov.

Every Californian should take steps to conserve water. Find out how at SaveOurWater.com.

Executive Department
State of California

EXECUTIVE ORDER B-29-15

WHEREAS on January 17, 2014, I proclaimed a State of Emergency to exist throughout the State of California due to severe drought conditions; and

WHEREAS on April 25, 2014, I proclaimed a Continued State of Emergency to exist throughout the State of California due to the ongoing drought; and

WHEREAS California's water supplies continue to be severely depleted despite a limited amount of rain and snowfall this winter, with record low snowpack in the Sierra Nevada mountains, decreased water levels in most of California's reservoirs, reduced flows in the state's rivers and shrinking supplies in underground water basins; and

WHEREAS the severe drought conditions continue to present urgent challenges including: drinking water shortages in communities across the state, diminished water for agricultural production, degraded habitat for many fish and wildlife species, increased wildfire risk, and the threat of saltwater contamination to fresh water supplies in the Sacramento-San Joaquin Bay Delta; and

WHEREAS a distinct possibility exists that the current drought will stretch into a fifth straight year in 2016 and beyond; and

WHEREAS new expedited actions are needed to reduce the harmful impacts from water shortages and other impacts of the drought; and

WHEREAS the magnitude of the severe drought conditions continues to present threats beyond the control of the services, personnel, equipment, and facilities of any single local government and require the combined forces of a mutual aid region or regions to combat; and

WHEREAS under the provisions of section 8558(b) of the Government Code, I find that conditions of extreme peril to the safety of persons and property continue to exist in California due to water shortage and drought conditions with which local authority is unable to cope; and

WHEREAS under the provisions of section 8571 of the California Government Code, I find that strict compliance with various statutes and regulations specified in this order would prevent, hinder, or delay the mitigation of the effects of the drought.

NOW, THEREFORE, I, EDMUND G. BROWN JR., Governor of the State of California, in accordance with the authority vested in me by the Constitution and statutes of the State of California, in particular Government Code sections 8567 and 8571 of the California Government Code, do hereby issue this Executive Order, effective immediately.



IT IS HEREBY ORDERED THAT:

1. The orders and provisions contained in my January 17, 2014 Proclamation, my April 25, 2014 Proclamation, and Executive Orders B-26-14 and B-28-14 remain in full force and effect except as modified herein.

SAVE WATER

2. The State Water Resources Control Board (Water Board) shall impose restrictions to achieve a statewide 25% reduction in potable urban water usage through February 28, 2016. These restrictions will require water suppliers to California's cities and towns to reduce usage as compared to the amount used in 2013. These restrictions should consider the relative per capita water usage of each water suppliers' service area, and require that those areas with high per capita use achieve proportionally greater reductions than those with low use. The California Public Utilities Commission is requested to take similar action with respect to investor-owned utilities providing water services.
3. The Department of Water Resources (the Department) shall lead a statewide initiative, in partnership with local agencies, to collectively replace 50 million square feet of lawns and ornamental turf with drought tolerant landscapes. The Department shall provide funding to allow for lawn replacement programs in underserved communities, which will complement local programs already underway across the state.
4. The California Energy Commission, jointly with the Department and the Water Board, shall implement a time-limited statewide appliance rebate program to provide monetary incentives for the replacement of inefficient household devices.
5. The Water Board shall impose restrictions to require that commercial, industrial, and institutional properties, such as campuses, golf courses, and cemeteries, immediately implement water efficiency measures to reduce potable water usage in an amount consistent with the reduction targets mandated by Directive 2 of this Executive Order.
6. The Water Board shall prohibit irrigation with potable water of ornamental turf on public street medians.
7. The Water Board shall prohibit irrigation with potable water outside of newly constructed homes and buildings that is not delivered by drip or microspray systems.



8. The Water Board shall direct urban water suppliers to develop rate structures and other pricing mechanisms, including but not limited to surcharges, fees, and penalties, to maximize water conservation consistent with statewide water restrictions. The Water Board is directed to adopt emergency regulations, as it deems necessary, pursuant to Water Code section 1058.5 to implement this directive. The Water Board is further directed to work with state agencies and water suppliers to identify mechanisms that would encourage and facilitate the adoption of rate structures and other pricing mechanisms that promote water conservation. The California Public Utilities Commission is requested to take similar action with respect to investor-owned utilities providing water services.

INCREASE ENFORCEMENT AGAINST WATER WASTE

9. The Water Board shall require urban water suppliers to provide monthly information on water usage, conservation, and enforcement on a permanent basis.
10. The Water Board shall require frequent reporting of water diversion and use by water right holders, conduct inspections to determine whether illegal diversions or wasteful and unreasonable use of water are occurring, and bring enforcement actions against illegal diverters and those engaging in the wasteful and unreasonable use of water. Pursuant to Government Code sections 8570 and 8627, the Water Board is granted authority to inspect property or diversion facilities to ascertain compliance with water rights laws and regulations where there is cause to believe such laws and regulations have been violated. When access is not granted by a property owner, the Water Board may obtain an inspection warrant pursuant to the procedures set forth in Title 13 (commencing with section 1822.50) of Part 3 of the Code of Civil Procedure for the purposes of conducting an inspection pursuant to this directive.
11. The Department shall update the State Model Water Efficient Landscape Ordinance through expedited regulation. This updated Ordinance shall increase water efficiency standards for new and existing landscapes through more efficient irrigation systems, greywater usage, onsite storm water capture, and by limiting the portion of landscapes that can be covered in turf. It will also require reporting on the implementation and enforcement of local ordinances, with required reports due by December 31, 2015. The Department shall provide information on local compliance to the Water Board, which shall consider adopting regulations or taking appropriate enforcement actions to promote compliance. The Department shall provide technical assistance and give priority in grant funding to public agencies for actions necessary to comply with local ordinances.
12. Agricultural water suppliers that supply water to more than 25,000 acres shall include in their required 2015 Agricultural Water Management Plans a detailed drought management plan that describes the actions and measures the supplier will take to manage water demand during drought. The Department shall require those plans to include quantification of water supplies and demands for 2013, 2014, and 2015 to the extent data is available. The Department will provide technical assistance to water suppliers in preparing the plans.

13. Agricultural water suppliers that supply water to 10,000 to 25,000 acres of irrigated lands shall develop Agricultural Water Management Plans and submit the plans to the Department by July 1, 2016. These plans shall include a detailed drought management plan and quantification of water supplies and demands in 2013, 2014, and 2015, to the extent that data is available. The Department shall give priority in grant funding to agricultural water suppliers that supply water to 10,000 to 25,000 acres of land for development and implementation of Agricultural Water Management Plans.
14. The Department shall report to Water Board on the status of the Agricultural Water Management Plan submittals within one month of receipt of those reports.
15. Local water agencies in high and medium priority groundwater basins shall immediately implement all requirements of the California Statewide Groundwater Elevation Monitoring Program pursuant to Water Code section 10933. The Department shall refer noncompliant local water agencies within high and medium priority groundwater basins to the Water Board by December 31, 2015, which shall consider adopting regulations or taking appropriate enforcement to promote compliance.
16. The California Energy Commission shall adopt emergency regulations establishing standards that improve the efficiency of water appliances, including toilets, urinals, and faucets available for sale and installation in new and existing buildings.

INVEST IN NEW TECHNOLOGIES

17. The California Energy Commission, jointly with the Department and the Water Board, shall implement a Water Energy Technology (WET) program to deploy innovative water management technologies for businesses, residents, industries, and agriculture. This program will achieve water and energy savings and greenhouse gas reductions by accelerating use of cutting-edge technologies such as renewable energy-powered desalination, integrated on-site reuse systems, water-use monitoring software, irrigation system timing and precision technology, and on-farm precision technology.

STREAMLINE GOVERNMENT RESPONSE

18. The Office of Emergency Services and the Department of Housing and Community Development shall work jointly with counties to provide temporary assistance for persons moving from housing units due to a lack of potable water who are served by a private well or water utility with less than 15 connections, and where all reasonable attempts to find a potable water source have been exhausted.
19. State permitting agencies shall prioritize review and approval of water infrastructure projects and programs that increase local water supplies, including water recycling facilities, reservoir improvement projects, surface water treatment plants, desalination plants, stormwater capture, and greywater systems. Agencies shall report to the Governor's Office on applications that have been pending for longer than 90 days.



20. The Department shall take actions required to plan and, if necessary, implement Emergency Drought Salinity Barriers in coordination and consultation with the Water Board and the Department of Fish and Wildlife at locations within the Sacramento - San Joaquin delta estuary. These barriers will be designed to conserve water for use later in the year to meet state and federal Endangered Species Act requirements, preserve to the extent possible water quality in the Delta, and retain water supply for essential human health and safety uses in 2015 and in the future.
21. The Water Board and the Department of Fish and Wildlife shall immediately consider any necessary regulatory approvals for the purpose of installation of the Emergency Drought Salinity Barriers.
22. The Department shall immediately consider voluntary crop idling water transfer and water exchange proposals of one year or less in duration that are initiated by local public agencies and approved in 2015 by the Department subject to the criteria set forth in Water Code section 1810.
23. The Water Board will prioritize new and amended safe drinking water permits that enhance water supply and reliability for community water systems facing water shortages or that expand service connections to include existing residences facing water shortages. As the Department of Public Health's drinking water program was transferred to the Water Board, any reference to the Department of Public Health in any prior Proclamation or Executive Order listed in Paragraph 1 is deemed to refer to the Water Board.
24. The California Department of Forestry and Fire Protection shall launch a public information campaign to educate the public on actions they can take to help to prevent wildfires including the proper treatment of dead and dying trees. Pursuant to Government Code section 8645, \$1.2 million from the State Responsibility Area Fire Prevention Fund (Fund 3063) shall be allocated to the California Department of Forestry and Fire Protection to carry out this directive.
25. The Energy Commission shall expedite the processing of all applications or petitions for amendments to power plant certifications issued by the Energy Commission for the purpose of securing alternate water supply necessary for continued power plant operation. Title 20, section 1769 of the California Code of Regulations is hereby waived for any such petition, and the Energy Commission is authorized to create and implement an alternative process to consider such petitions. This process may delegate amendment approval authority, as appropriate, to the Energy Commission Executive Director. The Energy Commission shall give timely notice to all relevant local, regional, and state agencies of any petition subject to this directive, and shall post on its website any such petition.



26. For purposes of carrying out directives 2–9, 11, 16–17, 20–23, and 25, Division 13 (commencing with section 21000) of the Public Resources Code and regulations adopted pursuant to that Division are hereby suspended. This suspension applies to any actions taken by state agencies, and for actions taken by local agencies where the state agency with primary responsibility for implementing the directive concurs that local action is required, as well as for any necessary permits or approvals required to complete these actions. This suspension, and those specified in paragraph 9 of the January 17, 2014 Proclamation, paragraph 19 of the April 25, 2014 proclamation, and paragraph 4 of Executive Order B-26-14, shall remain in effect until May 31, 2016. Drought relief actions taken pursuant to these paragraphs that are started prior to May 31, 2016, but not completed, shall not be subject to Division 13 (commencing with section 21000) of the Public Resources Code for the time required to complete them.
27. For purposes of carrying out directives 20 and 21, section 13247 and Chapter 3 of Part 3 (commencing with section 85225) of the Water Code are suspended.
28. For actions called for in this proclamation in directive 20, the Department shall exercise any authority vested in the Central Valley Flood Protection Board, as codified in Water Code section 8521, et seq., that is necessary to enable these urgent actions to be taken more quickly than otherwise possible. The Director of the Department of Water Resources is specifically authorized, on behalf of the State of California, to request that the Secretary of the Army, on the recommendation of the Chief of Engineers of the Army Corps of Engineers, grant any permission required pursuant to section 14 of the Rivers and Harbors Act of 1899 and codified in section 48 of title 33 of the United States Code.
29. The Department is directed to enter into agreements with landowners for the purposes of planning and installation of the Emergency Drought Barriers in 2015 to the extent necessary to accommodate access to barrier locations, land-side and water-side construction, and materials staging in proximity to barrier locations. Where the Department is unable to reach an agreement with landowners, the Department may exercise the full authority of Government Code section 8572.
30. For purposes of this Executive Order, chapter 3.5 (commencing with section 11340) of part 1 of division 3 of the Government Code and chapter 5 (commencing with section 25400) of division 15 of the Public Resources Code are suspended for the development and adoption of regulations or guidelines needed to carry out the provisions in this Order. Any entity issuing regulations or guidelines pursuant to this directive shall conduct a public meeting on the regulations and guidelines prior to adopting them.



31. In order to ensure that equipment and services necessary for drought response can be procured quickly, the provisions of the Government Code and the Public Contract Code applicable to state contracts, including, but not limited to, advertising and competitive bidding requirements, are hereby suspended for directives 17, 20, and 24. Approval by the Department of Finance is required prior to the execution of any contract entered into pursuant to these directives.

This Executive Order is not intended to, and does not, create any rights or benefits, substantive or procedural, enforceable at law or in equity, against the State of California, its agencies, departments, entities, officers, employees, or any other person.

I FURTHER DIRECT that as soon as hereafter possible, this Order be filed in the Office of the Secretary of State and that widespread publicity and notice be given to this Order.

IN WITNESS WHEREOF I have hereunto set my hand and caused the Great Seal of the State of California to be affixed this 1st day of April 2015.

EDMUND G. BROWN JR.
Governor of California

ATTEST:

ALEX PADILLA
Secretary of State





Date: April 28, 2015

Subject: Overview of Proposed State Water Resources Control Board Mandatory Restrictions to Achieve a 25% Statewide Reduction in Potable Urban Water Use

The State Water Resources Control Board (“SWRCB”) is in the process of developing / implementing emergency regulations to achieve a 25% statewide reduction in potable urban water use. The most proposed regulations by the SWRCB are currently under review by District staff.

The purpose of this agenda item is to discuss the proposed regulations and potential implementation strategies.

Attachments:

- Sacramento-area Water Agencies Call State Drought Program Illegal, Sacramento Bee, April 22, 2015 (Page 2 of 27)
- Yucaipa Valley Water District Comments Regarding the State Water Resources Control Board Draft Mandatory Conservation Proposed Regulatory Framework (Page 8 of 27)
- State Water Resources Control Board Fact Sheet - Mandatory Restrictions to Achieve a 25% Statewide Reduction in Potable Urban Water Use (Page 15 of 27)
- State Water Resources Control Board Fact Sheet - Draft Regulations - Implementing 25% Conservation Standard (Page 17 of 27)
- State Water Resources Control Board Proposed Text of Emergency Regulation (Page 23 of 27)

THE SACRAMENTO BEE

Sacramento-area water agencies call state drought program illegal

BY TONY BIZJAK AND JIM MILLER

TBIZJAK@SACBEE.CO

04/22/2015 1:31 PM - 04/22/2015 10:23 PM

Several suburban Sacramento water agencies on Wednesday challenged the state's latest emergency water conservation plan, calling the proposed drought reductions an illegal water grab.

In letters delivered to the State Water Resources Control Board, local water officials argued that the board is misusing its authority to impose mandatory conservation, and took issue with the notion implicit in the state's proposal that watering lawns is an unreasonable use of water.

Representatives of the Placer County Water Agency, San Juan Water District, city of Roseville and Sacramento County Water Agency, in a joint letter, took exception to being lumped in with communities that don't have strong water rights under California law and largely import their water from other regions.

"The 'tiers' do not recognize water-right priorities, population density, climatic variation or any other facts particular to water use," the agencies wrote.



California Gov. Jerry Brown talks to reporters after a three-hour meeting on the drought with agricultural, environmental and urban water agency leaders from across California, Wednesday, April 8, 2015, at his Capitol office in Sacramento. RICH PEDRONCELLI / AP

A separate letter, from the Fair Oaks Water District, was equally blunt, calling the proposed state mandates illegal and unfair. In it, district General Manager Tom Gray said water users in his area should not be required to take on the burden of conservation for people who import their water, a reference to Southern California, which relies on Northern California and Colorado River water for basic needs.

Fair Oaks, a small district, serves 13,800 accounts, mainly south of Madison Avenue, east of San Juan Avenue and north of the American River.

The letters came in response to the state's latest proposal, issued Saturday, for mandatory water cuts at urban agencies throughout California as the state enters a fourth year of deep drought. The comments appear to be the strongest pushback so far against the board's effort to carry out an emergency order by Gov. Jerry Brown that called for a 25 percent reduction in urban water use statewide.

The water board proposal divides the state's 411 urban water agencies into nine tiers, depending on their per capita water use last summer. Each tier is assigned a mandatory conservation target, ranging from a 4 percent cut in water use to a 36 percent cut, with the biggest water users targeted for the biggest cuts. Thirteen of the Sacramento area's 23 water districts fall into the highest tier and would have to cut usage 36 percent, compared with 2013.

Under the proposal, Placer and San Juan are among the agencies facing 36 percent cuts. Sacramento County faces a 32 percent cut, and Roseville faces 28 percent.

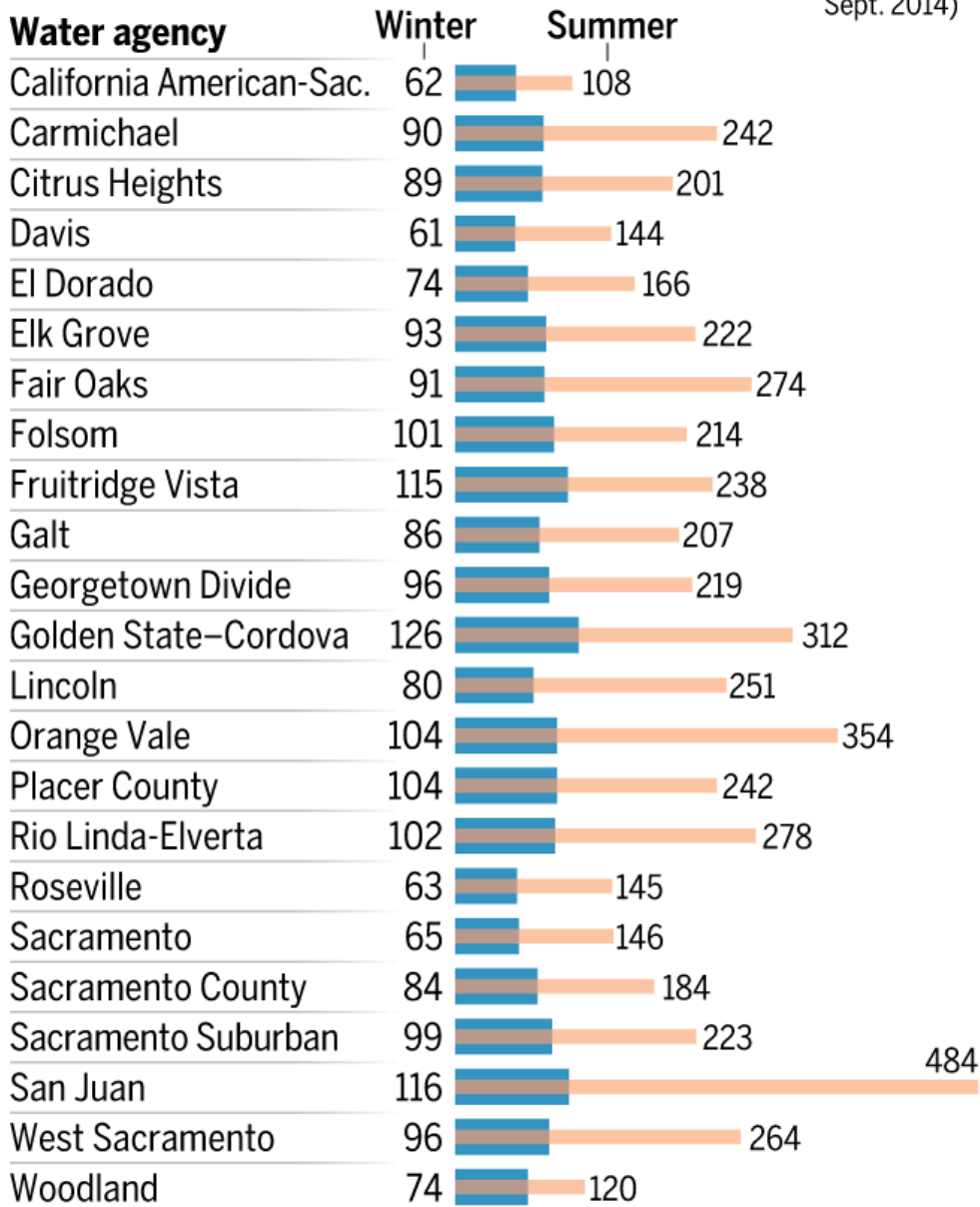
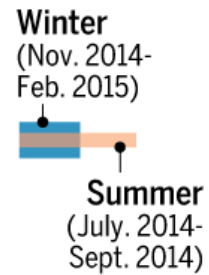
Both letters stopped short of saying the districts plan to sue the state. Instead, the agencies say they plan to "voluntarily" work to achieve the governor's conservation goals.

Water board officials declined comment on the letters, but issued a brief statement saying they believe their approach is legal.

"California is facing a devastating drought," board spokesman Andrew DiLuccia said in an email. "During such drought emergencies, the Legislature has authorized the board to adopt emergency conservation regulations. The preliminary regulations that water board staff have developed are lawful and consistent within that legislative authorization.

SUMMER VS. WINTER WATER USE

Per capita water use increases dramatically in the summer for Sacramento-area water agencies. How usage compared last summer to last winter, in gallons per person per day:



Average for winter: **76**
 Average for summer: **132**
Statewide usage:

Source: State Water Resources Control Board

The Sacramento Bee

“Nonetheless,” the statement continued, “water board staff are reviewing comments, and if they identify legal deficiencies, the staff will make appropriate revisions before making a final recommendation to the board members.”

Brown spokesman Evan Westrup defended the governor’s order, as well, saying in a statement, “The administration is confident that this order is legally sound.”

The conservation plan has fueled longstanding tensions between north and south in California’s water tug-of-war. Several Sacramento-area districts have argued they should not be measured against coastal cities whose residents use less water because of higher housing densities and cooler climates. Many also note that under California’s arcane water laws, they have superior rights to Northern California water that is shared throughout the state.

Southern California water agencies, meanwhile, say they should get credit for costly conservation efforts that have allowed them to grow for decades without increasing their water usage.

In issuing its proposed framework, the water board took a broad view of the state, essentially asking each region to cut in proportion to its per capita use in summer of 2014. The board argued that many communities, including the Sacramento region, have the ability to cut more deeply because of how much water is used to maintain large lawns and ornamental landscape.

Gray, the Fair Oaks Water District head, called the plan “punishment” for his agency. Fair Oaks relies mainly on Folsom Lake for its water, but also taps groundwater supplies. In recent years, the agency has spent \$6 million on pumps that give it more access to groundwater in dry years.

“Why is the (state) forcing the district’s ratepayers to forgo our own locally available resources to meet the needs of those that have failed to plan?” Gray asked in his letter. He cited state Water Code section 1011, arguing that any water saved by the district belongs to the district “and cannot be reallocated to others without the consent of the district.”

He also took issue with the state's baseline for determining how much water agencies are using per capita and, therefore, how much they have to cut. The state based its calculations on average per capita water use in July through September 2014 – months when Sacramento area residents tend to water heavily.

Gray noted that residents in his district use far less water in winter, when outdoor irrigation is less of a factor. Fair Oaks customers on average used 274 gallons of water per person per day last summer, putting them in the top 10 percent of urban water users in the state. The district's winter water use was 91 gallons a day, far closer to the statewide average of 76 gallons.

He asked for the state to include the winter months in its calculations for setting conservation targets.

Gray said his district does not plan to sue to stop the state's program. "We want fair consideration, that's all. We understand there is a crisis and we all need to help out. ... We will share, it is a given, but we don't want anybody stealing it, taking it, mandating it."

The Regional Water Authority, which helps coordinate Sacramento area water agencies, sent a letter to the board offering similar criticisms. The authority called for a minimum 10 percent reduction for all agencies. A handful of cities, including San Francisco, are targeted for an 8 percent cut.

Water board spokesman DiLuccia said the state had received 80 letters from water agencies and others as of Wednesday afternoon.

Water board officials have said in recent weeks that they are trying to devise the most equitable approach possible on short notice in response to the governor's order. They pleaded in recent weeks for Californians to put aside regional differences and agree to cooperate for the benefit of the state during the 270 days covered in the governor's order.

"We are in an emergency," water board Chief Deputy Director Caren Trgovcich said Saturday. "The proposed regulations reflect the urgency of the situation."

The board plans to vote on the proposed conservation mandates in early May. They would take effect June 1 and last until Feb. 28.

Felicia Marcus, chairwoman of the water board, said her agency is listening to water districts and may make more changes before the May vote.

“We are trying to find that sweet spot between making it as fair as we can and getting that water conservation,” she said.

Call The Bee’s Tony Bizjak, (916) 321-1059.



Yucaipa Valley Water District

12770 Second Street • P. O. Box 730 • Yucaipa, California 92399-0730
 (909) 797-5117 • Fax: (909) 797-6381 • www.yvwd.dst.ca.us

April 13, 2015

Sent via email to Jessica.Bean@waterboards.ca.gov

Jessica Bean
 California Environmental Protection Agency
 State Water Resources Control Board
 Post Office Box 100
 Sacramento, CA 95812-0100

Subject: Comments Regarding the Draft Mandatory Conservation Proposed Regulatory Framework dated April 7, 2015

Dear Ms. Bean:

The Yucaipa Valley Water District appreciates the opportunity to provide input to the State Water Resources Control Board (SWRCB) on the implementation of the Governor's Executive Order No. B-29-15.

On February 3, 2009, the State Water Resources Control Board adopted Resolution No. 2009-0011 setting statewide goals and objectives for the use of recycled water. This policy recognizes that the use of recycled water reduces the dependency on groundwater supplies and imported water supplies from the State Water Project. While the State Water Resources Control Board has taken steps to support the use of recycled water with both regulations and financial assistance, there is no recognition of recycled water as part of the Mandatory Conservation Proposed Regulatory Framework ("Regulatory Framework") dated April 7, 2015 (attached) with regards to the "Water Reduction in Potable Urban Use". This is a significant issue since the "Water Reduction in Potable Urban Use" may be used as a component to determine regulatory enforcement in the future.

During this unprecedented drought, the State Water Resources Control Board should clearly identify and distinguish recycled water use as part of the monthly water conservation savings calculated as a reduction in potable urban use. Communities that have implemented recycled water systems have reduced the amount of potable water applied to golf courses, center medians, schools, parks and even industrial uses.

Directors and Officers

KENNETH P. MUÑOZ
 Division 1

BRUCE GRANLUND
 Division 2

JAY BOGH
 Division 3

LONNI GRANLUND
 Division 4

THOMAS SHALHOUB
 Division 5

JOSEPH B. ZOBA
 General Manager
 and Secretary

The proposed methodology described in the Regulatory Framework is inconsistent and incorrect due to the fact that while recycled water is reflected in the Residential-GPCD calculation it is omitted from the "Reduction in Potable Urban Use" if recycled water was used prior to the 2013 baseline period. This policy creates an inequity and a regulatory disadvantage for water purveyors that have implemented recycled water systems prior to 2013 which have generating billions of gallons of drinking water savings over the past several years as compared to the preferential treatment for a water purveyor that implements a recycled water system in 2015. The water purveyor that starts a recycled water program in 2015 has saved less drinking water, but is rewarded by data generated by the Residential-GPCD calculation and the Water Reduction in Potable Urban Use calculation.

Therefore, the Yucaipa Valley Water District provides the following comment for your consideration to improve the proposed public policy formulation and support the use of recycled water throughout the State of California:

1. Recognition of Recycled Water Use - The use of recycled water is a priority for the State of California and the State Water Resources Control Board. While the calculation of Residential-GPCD is reduced for communities that have implemented recycled water programs, the calculation for the "Water Supplier Reduction" proposed by the State Water Resources Control Board pursuant to Executive Order No. B-29-15 does not reflect the amount of drinking water conserved by recycled water programs in effect prior to the 2013 baseline period.

To recognize the use of recycled water, the State Water Resources Control Board should consider calculating the Total Water Supply Reductions as follows:

Proposed Methodology Recognizing Recycled Water Use		
Drinking Water Reduction in Potable Urban Use		Recycled Water Reduction of Urban Irrigation Use
Compared to the same month in 2013 (%)	+	Percentage of total monthly water demands (%)
		=
		Total Water Supply Reduction (%)

Calculation Methodology		
[2015 Monthly Water Production] / [Comparable 2013 Monthly Water Production]	+	[Direct delivery of recycled water] / [2015 Monthly Drinking Water Production plus Direct delivery of recycled water]
		=
		Total Water Supply Reduction (%)

The State Water Resources Control Board should adjust the calculated "Water Supplier Reduction" so communities with pre-existing recycled water systems are not unjustly penalized through this unintended disincentive.

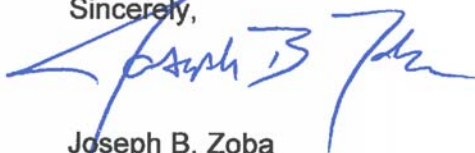
The methodology proposed by Yucaipa Valley Water District is more useful for the State Water Resources Control Board as an indicator of communities by: (1) identifying the reduction in the amount of drinking water used compared to 2013; (2) illustrating the amount of recycled water used by a community to offset potable water demands; and (3) calculating the total reduction in potable urban water use for a community.

Over the past decade, our community has made significant financial investments in the development, construction and operation of a recycled water system that includes desalination equipment necessary to meet strict water quality objectives for total dissolved solids as required by the Santa Ana Regional Water Quality Control Board and the State Water Resources Control Board.

The proposed regulatory modification suggested by the Yucaipa Valley Water District reinforces the importance of recycled water as a component in the water conservation strategy of California in a manner that is consistent with the stated goals and objectives of the Governor, the Legislature and the State Water Resources Control Board.

Please contact me directly should you have any questions at (909) 797-5119 x2.

Sincerely,



Joseph B. Zoba
General Manager

cc: Felicia Marcus, Board Chair
State Water Resources Control Board
Post Office Box 100
Sacramento, California 95812-0100

MANDATORY CONSERVATION PROPOSED REGULATORY FRAMEWORK

The Governor's [April 1, 2015 Executive Order](#) directs the State Water Board to impose restrictions to achieve an aggregate statewide 25% reduction in potable urban water use through February 2016. The Executive Order stipulates the 25% reduction in water use as compared to 2013, but proposes flexibility in how to achieve this reduction in recognition of the level of conservation already achieved by many communities around the State.

Input Requested: The State Water Board is interested in receiving feedback on these regulatory concepts as well as other ideas on how a 25% reduction could be structured. Please submit comments and ideas on the proposed framework by email to Jessica Bean at Jessica.Bean@waterboards.ca.gov by **April 13, 2015**.

Urban Water Suppliers

- I. Apportioning Water Supplier Reductions:** The Executive Order directs the State Water Board to consider the relative per capita water usage of each water suppliers' service area, and have those areas with high per capita use achieve proportionally greater reductions than those with low use. Reporting on residential per capita (R-GPCD) water use began in October 2014 for the September 2014 reporting period. Residential per capita water use is highest during the summer months when outdoor irrigation demand is high. Reported summertime water use is also generally more consistent because the weather varies less from year to year than during the winter. Accordingly, September 2014 R-GPCD serves as a reasonable basis for placement of the 411 urban water suppliers into four categories as follows:

R-GPCD Range (Sept 2014)	# of Suppliers within Range	Conservation Standard
Under 55	18	10%
55-110	126	20%
110-165	132	25%
Over 165	135	35%

The proposed breakdown of water suppliers into R-GPCD groupings with corresponding conservation standards is intended to equitably and effectively achieve a 25% aggregate statewide reduction in potable urban water use.

II. **New Reporting Requirements:** To assess compliance by commercial, industrial, and institutional (CII) sector customers and actions taken by urban water suppliers to reduce CII sector use, the following additional reporting requirements are proposed:

- Monthly commercial sector use;
- Monthly large landscape commercial customer use (e.g. golf courses, amusement parks);
- Monthly industrial sector use;
- Monthly institutional sector use; and
- Monthly large landscape institutional customer use (e.g. cemeteries, college campuses).

Reporting requirements under the [existing Emergency Regulation](#) that took effect March 27, 2015, will remain in effect.

III. **Compliance Assessment:** To determine if urban water suppliers are meeting required use reductions, water production data, as reported by each individual water supplier for the months of June 2015 through February 2016, will be compared to the same period(s) in 2013. Given the severity of the current drought, the State Water Board will assess suppliers' compliance for both monthly and cumulative water usage reductions.

IV. **Enforcement:**

The State Water Board has a variety of tools available to enforce its regulations:

- Informal enforcement, such as warning letters, can provide a clear reminder to water suppliers of the requirements and an alert that their conservation programs are not achieving the desired water savings. Warning letters would generally not be accompanied by monetary penalties
- Formal enforcement actions include Cease and Desist Orders (CDO) to stop non-compliant activity. These Orders generally contain a description of the specific actions, and a timeline for implementing them, required for the recipient to return to compliance. Non-compliance with a CDO during a drought emergency, such as the current one, can result in a complaint to assess Administrative Civil Liabilities of up to \$10,000 for each day of non-compliance.

In addition to these existing tools, other tools may be needed to ensure compliance for the short duration of the regulations. These tools would be developed through the emergency rulemaking and would remain in effect for its duration (270 days unless extended by the State Water Board). The tools include:

- Informational Orders that would enable the Board to require specific data and other facts on conservation practices if conservation targets are not being met.
- Conservation Orders that would go into effect immediately upon receipt, as opposed to CDOs that can only be issued and enforced after the State Water Board holds an evidentiary hearing, if one is requested. A conservation order would describe the specific actions required for the recipient to come into compliance with the requirements of the regulation. Issuance of a conservation order would be subject to reconsideration by the Board and violation of a conservation order would not be subject to the enhanced penalties associated with violation of a CDO during a drought emergency.

The tools will be used alone, or in combination, to address the following compliance problems:

- Failure of water suppliers to file reports as required by the regulation;
- Failure to implement prohibitions and restrictions as described in the Governor's Executive Orders and the emergency regulation; and
- Failure of water suppliers to meet the assigned water use reduction target.

Small Water Suppliers

There are over 2,600 small water suppliers (those with fewer than 3,000 service connections) that provide water to over 1.5 million Californians. Under the [existing Emergency Regulation](#) that took effect March 27, 2015, these suppliers are required to either limit outdoor irrigation to no more than two times per week or to institute measures that achieve a 20% reduction in use. Small suppliers are not required to report their water production to the Board, but are expected to have the data available on request. Small suppliers will need to contribute to achieving the statewide 25% potable urban water use reduction called for in the Executive Order.

- I. **Apportioning Water Supplier Reductions:** Up until the release of the April 1, 2015 Executive Order, all water suppliers were being asked to achieve a voluntary 20% reduction in water use. The existing emergency regulation assigns responsibilities to both larger urban water suppliers and small suppliers to restrict irrigation to achieve the 20% reduction target. Under this proposal, small water suppliers would be required to achieve a 25% water savings as compared to their 2013 water use under the new regulation.

- II. **Reporting Requirements:** To date, small water suppliers have not been required to report on their water use or conservation measures. Small suppliers would now be directed to provide a one-time report to the State Water Board, 180 days after the effective date of the new emergency regulation, addressing at a minimum:
- Potable water production from June–November 2013 and June–November 2015;
 - The number of days per week outdoor irrigation is allowed and other restrictions implemented to achieve a 25% water use reduction; and
 - Specific restrictions on CII sector use.
- III. **Compliance Assessment:** Compliance would be based upon whether small suppliers submitted the required data and met the 25% water use reduction requirement.
- IV. **Enforcement:** The State Water Board may use any of the tools discussed above, as appropriate.

Additional Prohibitions and End-User Requirements

The State Water Board's [existing emergency regulation](#) includes a number of water use prohibitions that apply to all Californians and end-user restrictions that apply to specific water users, such as restaurants and hotels. These existing restrictions will remain in effect, and consistent with the Executive Order, the following new prohibitions will be put in place:

- The use of potable water outside of newly constructed homes and buildings that is not delivered by drip or micro-spray systems will be prohibited; and
- The use of potable water to irrigate ornamental turf on public street medians will be prohibited.

The State Water Board will also consider adding requirements for large landscape users (e.g. commercial, industrial, institutional) not served by either type of water supplier discussed above to achieve the 25% statewide reduction in potable urban water use.



GENERAL INFORMATION

**MANDATORY RESTRICTIONS TO ACHIEVE A 25% STATEWIDE
REDUCTION IN POTABLE URBAN WATER USE**

With California facing one of the most severe droughts on record, Governor Brown declared a drought State of Emergency in January 2014 and issued a series of Executive Orders in April and September 2014 and January 2015, that streamline the State's drought response and makes California more drought resilient for the future.

The April 2014 Executive Order asked the State Water Board to assess voluntary conservation levels for urban water agencies and granted authority to adopt emergency conservation regulations, which the Board did in July of 2014 and updated in March of 2015. With the lowest snowpack on record and a lack of sufficient conservation to deal with the continuing drought emergency, the Governor, on April 1, 2015, directed the State Water Board to implement mandatory water reductions in urban areas to reduce potable urban water usage by 25 percent statewide. He also directed that this regulation take into account the different levels of conservation already achieved by communities based upon their relative per capita water usage.

This savings amounts to approximately 1.3 million acre-feet of water over the next nine months, or nearly as much water as is currently in Lake Oroville. To achieve these savings, the State Water Board is expediting an emergency regulation to set usage targets for communities around the State.

The Board's task is to implement a regulation which is equitable, achievable, and enforceable for every urban water supplier in the state, and which can be implemented quickly given the state of the drought and the uncertainty of when it will end. To maximize input in a short amount of time, the Board began discussions with water suppliers, stakeholder groups, and others to solicit feedback on approach on the day that the Executive Order was issued.

On April 7, 2015, the Board released a draft framework and received more than 250 comments. Suggestions from the comments were incorporated into the draft regulation issued on April 17, 2015. The Board is soliciting additional comment on the draft regulation by April 22. The draft regulation will be further refined based on comments received and the Notice of Proposed Emergency Rulemaking and accompanying documents will be released on April 28th for public comment and consideration by the Board at its May 5-6, 2015 meeting.



Content of Emergency Regulation

This emergency regulation will address the following provisions of the April 1, 2015 [Executive Order](#) :

- Ordering Provision 2: Mandatory 25% reduction in potable urban water use with recognition of past conservation achievements;
- Ordering Provision 5: Reductions in potable water use at commercial, industrial and institutional properties;
- Ordering Provision 6: Prohibition on using potable water for irrigation of ornamental turf in street medians; and
- Ordering Provision 7: Prohibition on using potable water for irrigation outside of new home construction without drip or microspray systems.

This emergency regulation does not address rate structures and other pricing mechanisms required by Ordering Provision 8, which will be developed separately.

Schedule for Adoption and Implementation of the Emergency Regulation

Stakeholder comments on the proposed emergency regulation must be submitted by **Wednesday April 22, 2015**. Staff will use those comments to finalize the draft emergency regulation, which will be published on April 28, 2015, along with supporting documents. Final public comment on the emergency regulation can be made at the Board meeting on May 5, 2015. The specific prohibitions in the emergency regulation will take effect immediately upon approval by the Office of Administrative Law. Urban water suppliers will be expected to begin implementing measures to meet their mandatory reduction targets by June 1, 2015 to ensure maximum conservation during the summer months. The schedule is listed below.

- | | |
|---|----------------|
| • Notice announcing release of draft regulation for informal public comment | April 17, 2015 |
| • Deadline for comment on draft regulation | April 22, 2015 |
| • Formal Notice of Proposed Rulemaking and written comment period | April 28, 2015 |
| • Board hearing and adoption | May 5-6, 2015 |
| • Office of Administrative Law approval | May 15, 2015 |
| • Specific prohibitions become effective | May 15, 2015 |
| • First (June) report on water production and other conservation measures due | July 15, 2015 |

How to Provide Input

Information including discussion drafts, draft regulations and related materials is available on the State Water Board's website at:

http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/emergency_mandatory_regulations.shtml .

Written comment and questions can be sent to Jessica Bean at jessica.bean@waterboards.ca.gov .



DRAFT REGULATIONS

IMPLEMENTING 25% CONSERVATION STANDARD

On April 1, 2015, Governor Jerry Brown issued the fourth in a series of Executive Orders on actions necessary to address California's severe drought conditions. With snowpack water content at a record low level of 5 percent of average for April 1st, major reservoir storage shrinking each day as a percentage of their daily average measured over the last several decades, and groundwater levels continuing to decline, urgent action is needed. The April 1 Executive Order requires, for the first time in the State's history, mandatory conservation of potable urban water use. Commercial agriculture in many parts of the State has already been notified of severe cutbacks in water supply contracted through the State and Federal Water Projects and is bracing for curtailments of surface water rights in the near-term. Conserving water more seriously now will forestall even more catastrophic impacts if it does not rain next year.

Early Input

To maximize input in a short amount of time, the State Water Board released a proposed regulatory framework for implementing the 25% conservation standard mandated by the Executive Order on April 7, 2015. This will result in water savings amounting to approximately 1.3 million acre-feet of water over the next nine months, or nearly as much water as is currently in Lake Oroville. Draft regulations are now available for informal public comment that consider and incorporate the input contained in over 250 comments submitted by water suppliers, local government, businesses, individuals, and non-governmental organizations. Key areas of comment focused on the methodology behind the assignment of conservation standards, the availability of exclusions or adjustments under defined conditions, how to approach the commercial, industrial and institutional (CII) sector, the requirements for smaller water suppliers, and the approach to enforcement.

What's Next

During this second informal comment period, we are soliciting feedback on the updated approach reflected in the draft regulation as well as comment on the specific regulatory language. Please submit comments by email to Jessica Bean at Jessica.Bean@waterboards.ca.gov by April 22, 2015. The draft regulation will be further refined based on comments received and the Notice of Proposed Emergency Rulemaking and accompanying revised regulatory language will be released on April 28th for public comment and consideration by the Board at its May 5-6, 2015 regular business meeting.



Draft Regulation - Key Provisions

Conservation Standard for Urban Water Suppliers

As drought conditions continue, all water suppliers will need to do more to meet the statewide 25% conservation standard. Many communities around the State have been conserving for years. Some of these communities have achieved remarkable results with residential water use now hovering around the statewide target for indoor water use, while others are using many times more. Everyone must do more, but the greatest opportunities to meet the statewide 25% conservation standard now exist in those areas with higher water use. Often, but not always, these water suppliers are located in areas where the majority of the water use is directed at outdoor irrigation due to lot size and other factors.

In response to comments and suggestions, the draft regulation assigns urban water suppliers to a tier of water reduction based upon three months of summer residential gallons-per-capita-per-day data (July-September). These three months reflect the amount of water used for summer outdoor irrigation, which provides the greatest opportunity for conservation savings.

The number of tiers has more than doubled, from the proposed regulatory framework, to more equitably allocate the conservation savings necessary to reach the statewide 25 percent reduction mandate. This updated approach lessens the disparities in reduction requirements between agencies that have similar levels of water consumption, but fall on different sides of dividing lines between tiers. Suppliers that were in the 35% reduction tier in the prior proposal may now be in the 32% or 28% tier if their summer 2014 R-GPCD was below 210. Adding additional tiers to the conservation framework also better reflects past conservation efforts because water suppliers that have reduced use prior to the drought will have a lower R-GPCD and lower conservation standard than water suppliers with similar climate and density factors where R-GPCD remains high.

Urban water suppliers (serving more than 3,000 customers or delivering more than 3,000 acre feet of water per year and accounting for more than 90% of urban water use) will be assigned a conservation standard, as shown in the following table:

Tier	R-GPCD Range		# of Suppliers in Range	Conservation Standard
	From	To		
1	reserved		0	4%
2	0	64.99	23	8%
3	65	79.99	21	12%
4	80	94.99	42	16%
5	95	109.99	41	20%
6	110	129.99	51	24%
7	130	169.99	73	28%
8	170	214.99	66	32%
9	215	612.00	94	36%

The Smith family of three learns that their water district must reduce water use by 12 percent. A manufacturing plant uses 20 percent of the water and cannot reduce its use. So, residents are told to reduce their use by 15 percent to meet the overall 12 percent target. The Smith family uses an average of 210 gallons per day (or about 70 gallons per person), 165 gallons for indoor use and 45 gallons for watering their small yard. To meet the 15% reduction requirement they must bring their total water use down to about 180 gallons per day. This is equivalent to about 60 gallons per person per day.



Fact Sheet

The Jones family of four learn that their water district must reduce water use by 32 percent. An oil refinery uses 10 percent of the district's water and cannot reduce its use. Their city also has many small businesses, and a golf course, which can reduce use by more than 10 percent. The residents must now reduce their use by 30 percent to meet the overall 32 percent target. The Jones family uses an average of 1,200 gallons per day (or about 300 gallons per person); 300 gallons for indoor use and 900 gallons outdoors, to irrigate a large yard that includes grass and fruit trees. To cut water use by 30 percent, the Jones' must cut their water use by 360 gallons per day to 840 gallons which is equivalent to 210 gallons per person per day.

The draft regulation describes two situations where water suppliers could request to modify their total water use or be placed into a lower conservation tier:

1. Urban water suppliers delivering more than 20 percent of their total water production to commercial agriculture may be allowed to modify the amount of water subject to their conservation standard. These suppliers must provide written certification to the Board to be able to subtract the water supplied to commercial agriculture from their total water production for baseline and conservation purposes.
2. Urban water suppliers that have a reserve supply of surface water that could last multiple years may be eligible for placement into lower conservation tier. Only suppliers meeting the eligibility criteria will be considered. These criteria relate to the source(s) of supply, precipitation amounts, and the number of years that those supplies could last.

There are no specific use reduction targets for commercial, industrial, and institutional users served by urban and all other water suppliers. Water suppliers will decide how to meet their conservation standard through reductions from both residential and non-residential users. Water suppliers are encouraged to look at their commercial, institutional and industrial properties that irrigate outdoor ornamental landscapes with potable water for potential conservation savings.

An open question is whether the draft regulation should allow multiple suppliers to join together to meet a collective conservation standard. In order to achieve a statewide 25% reduction in urban water use, the group as a whole would need to achieve the same amount of water savings as they would as individual suppliers. This approach could provide additional flexibility in achieving the conservation standard and allow for uniform messaging and implementation across contiguous service areas. There are many uncertainties, however, related to the appropriate geographic scope, group leadership, compliance assessment, accountability, and enforcement. Input is requested regarding how a collective approach could be administered that addresses these uncertainties and achieves the required reduction in water use.

Conservation Standard For All Other Water Suppliers

Under the current proposal, smaller water suppliers (serving fewer than 3,000 connections) will be required to achieve a 25% conservation standard or restrict outdoor irrigation to no more than two days per week. Commercial, industrial, and institutional users with independent supplies will also be required to reduce usage by 25% or restrict outdoor irrigation to no more than two days per week. These smaller urban suppliers serve less than 10% of Californians.



End-User Requirements

The new prohibitions in the Executive Order apply to all Californians and will take effect immediately upon approval of the regulation by the Office of Administrative Law. These include:

- Irrigation with potable water of ornamental turf on public street medians is prohibited; and
- Irrigation with potable water outside of newly constructed homes and buildings not delivered by drip or microspray is prohibited.

Commercial, industrial and institutional properties under Provision 5 of the Executive Order with an independent source of water supply (not served by a water supplier), are required under the draft regulation to either limit outdoor irrigation to two days per week or achieve a 25% reduction in water use. Often, these properties have large landscapes that would otherwise not be addressed by this regulation.

It will be very important as these provisions are implemented to ensure that existing trees remain healthy and do not present a public safety hazard. Guidance on the implementation of both prohibitions will be developed.

New Reporting Requirements

Total monthly water production and specific reporting on residential use and enforcement as laid out in the previously adopted emergency regulations will remain in effect. Because the conservation standard applies to total water production, the draft regulation expands the reporting to include information on water use in the commercial, industrial, and institutional sectors. Small water suppliers with fewer than 3,000 service connections will be required to submit a single report on December 15, 2015 that provides their water production from June-November 2015 and June-November 2013. In addition, they must report on the number of days per week outdoor irrigation is allowed.

Commercial, industrial, and institutional facilities with an independent source of supply (they are not served by a water supplier) will not be required to submit a report; however they should be prepared to demonstrate their compliance with the two day per week watering restriction or the 25% reduction in water use if requested to do so by the Board.

Compliance Assessment

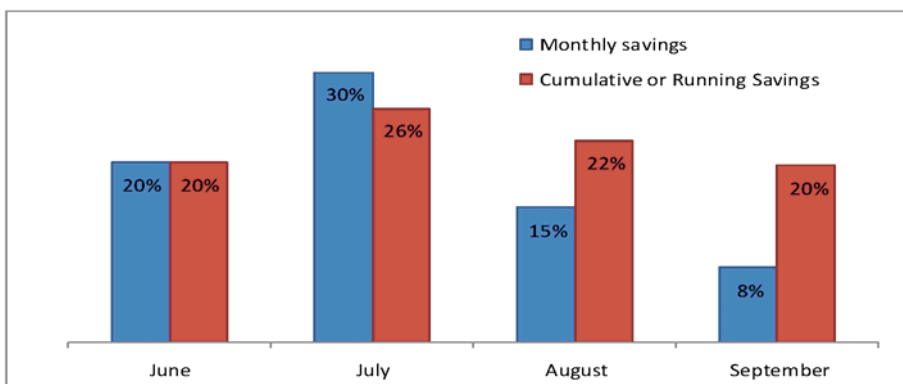
In many communities around the state, over half (and up to 80 percent) of total residential water use is for outdoor irrigation during the summer months. With summer just around the corner, bringing with it the greatest opportunity for making substantial conservation gains, immediate action is essential. As a result, the Board will begin assessing compliance with the submittal of the June monthly report on July 15, 2015.

Commenters pointed out that a month-by-month comparison of the percentage reduction in water use is confusing to the public because of the potentially wide variation in results due to temperatures, precipitation, and other factors. Several comments suggested using a 12-month rolling average; however a cumulative approach will also eliminate the wide swings that can occur in a month-by-month comparison and give a more accurate sense of progress. Beyond June, the Board will track compliance on a cumulative basis. Cumulative tracking means that conservation savings will be added together from one month to the next and compared to the amount of water used during the same months in 2013. This tracking will look like the sample graph below.



Example Comparison of Monthly Savings and Cumulative or Running Savings

	2013 Water Use	2015 Water Use	Monthly savings	Cumulative or Running Savings
June	1000	800	20%	20%
July	1500	1050	30%	26%
August	1200	1020	15%	22%
September	900	825	8%	20%



Two additional tools are included in the draft regulation to both expedite the investigation of water suppliers not meeting their conservation standard and require the implementation of actions to correct this situation. A new informational order is proposed that water suppliers would be required to respond to or face immediate enforcement. The proposed conservation order can be used to direct specific actions to correct non-compliance. Both of these tools are tailored to the emergency circumstances that the State finds itself in as a result of continuing drought conditions. Violation of an information or conservation order carries a penalty of up to \$500 per day.

The Board will work with water suppliers along the way that are not meeting their targets to implement actions to get them back on track. These actions could include changes to rates and pricing, restrictions on outdoor irrigation, public outreach, rebates and audit programs, leak detection and repair, and other measures. The Board may use its enforcement tools to ensure that water suppliers are on track to meet their conservation standards at any point during the 270 days that the emergency regulation is in effect.

In Conclusion

The Board received many comments on how to incorporate factors correlated with water use, such as climate, density, past conservation achievements, growth, and others. Many of these factors are accounted for in the State's 20x2020 conservation approach adopted in 2009, and they are relevant to a longer-term conservation policy. While the draft regulation does not directly adjust the conservation standards based on climate or other factors, the increase in the number of tiers gives many communities in the hotter, inland areas a lower conservation standard than they would have otherwise been subject to.



There were also many comments that discussed how recycled water and other new sources of water supply should factor in to the conservation standard. Many suggested that potable recycled water supplies be excluded from the amount of water subject to the conservation standard and that a credit system be established to also recognize investments made in developing non-potable recycled water supplies (which are not included in Total Water Production). Both of these sources of supply add resiliency and are key to a more sustainable water future. These suggestions were not integrated into the draft regulations because while the State, our federal government partners and local governments have provided much needed capital to make these projects work; they are still sources of supply that need to be managed judiciously, especially in times of drought.

The staff appreciates the extensive input submitted from individuals, communities and organizations around the State. In particular, comments that targeted specific concerns and provided specific solutions were very well received. There has been a wealth of input on actions that are more appropriately dealt with over the longer term, not necessarily in this rulemaking. These suggestions will be considered as the Board moves forward in establishing permanent regulations for water usage, conservation, and reporting under Provision 9 of the Executive Order as well as additional temporary emergency regulations that may be needed if it does not rain significantly next winter.

PROPOSED TEXT OF EMERGENCY REGULATION

Article 22.5. Drought Emergency Water Conservation.

Sec. 863. Findings of Drought Emergency.

(a) The State Water Resources Control Board finds as follows:

(1) On January 17, 2014, the Governor issued a proclamation of a state of emergency under the California Emergency Services Act based on drought conditions;

(2) On April 25, 2014, the Governor issued a proclamation of a continued state of emergency under the California Emergency Services Act based on continued drought conditions;

(3) On April 1, 2015, the Governor issued an Executive Order that, in part, directs the State Board to impose restrictions on water suppliers to achieve a statewide 25 percent reduction in potable urban usage through February 28, 2016; require commercial, industrial, and institutional users to implement water efficiency measures; prohibit irrigation with potable water of ornamental turf in public street medians; and prohibit irrigation with potable water outside newly constructed homes and buildings that is not delivered by drip or microspray systems;

~~(4)~~ The drought conditions that formed the basis of the Governor's emergency proclamations continue to exist;

~~(5)~~ The present year is critically dry and has been immediately preceded by two or more consecutive below normal, dry, or critically dry years; and

~~(6)~~ The drought conditions will likely continue for the foreseeable future and additional action by both the State Water Resources Control Board and local water suppliers will likely be necessary to prevent waste and unreasonable use of water and to further promote conservation.

Authority: Section 1058.5, Water Code.

References: Sections 102, 104 and 105, Water Code.

Sec. 864. End-User Requirements in Promotion of Water Conservation.

(a) To prevent the waste and unreasonable use of water and to promote water conservation, each of the following actions is prohibited, except where necessary to address an immediate health and safety need or to comply with a term or condition in a permit issued by a state or federal agency:

(1) The application of potable water to outdoor landscapes in a manner that causes runoff such that water flows onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots, or structures;

(2) The use of a hose that dispenses potable water to wash a motor vehicle, except where the hose is fitted with a shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use;

(3) The application of potable water to driveways and sidewalks; and

(4) The use of potable water in a fountain or other decorative water feature, except where the water is part of a recirculating system;

(5) The application of potable water to outdoor landscapes during and within 48 hours after measurable rainfall; ~~and~~

(6) The serving of drinking water other than upon request in eating or drinking establishments, including but not limited to restaurants, hotels, cafes, cafeterias, bars, or other public places where food or drink are served and/or purchased;

(7) The irrigation with potable water of ornamental turf on public street medians;
and

(8) The irrigation with potable water outside of newly constructed homes and buildings that is not delivered by drip or microspray systems.

(b) To promote water conservation, operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily. The hotel or motel shall prominently display notice of this option in each guestroom using clear and easily understood language.

(c) Immediately upon this subdivision taking effect, all commercial, industrial and institutional properties not served by a water supplier meeting the requirements of Water Code section 10617 or section 350 shall either:

(1) Limit outdoor irrigation of ornamental landscapes or turf with potable water to no more than two days per week; or

(2) Reduce potable water usage by 25 percent for the months of June 2015 through February 2016 as compared to the amount used for the same months in 2013.

(ed) The taking of any action prohibited in subdivision (a) or the failure to take any action required in subdivisions (b) or (c), in addition to any other applicable civil or criminal penalties, is an infraction, punishable by a fine of up to five hundred dollars (\$500) for each day in which the violation occurs.

Authority: Section 1058.5, Water Code.

References: Sections 102, 104, ~~and~~ 105, 350, and 10617, Water Code.

Sec. 865. Mandatory Actions by Water Suppliers.

(a) The term "urban water supplier," when used in this section, refers to a supplier that meets the definition set forth in Water Code section 10617, except it does not refer to suppliers when they are functioning solely in a wholesale capacity, but does apply to suppliers when they are functioning in a retail capacity.

~~(b)(1) To promote water conservation, each urban water supplier shall implement all requirements and actions of the stage of its water shortage contingency plan that imposes includes mandatory restrictions on the number of days that outdoor irrigation of ornamental landscapes or turf with potable water is allowed, or shall amend its water shortage contingency plan to include mandatory restrictions on the number of days that outdoor irrigation of ornamental landscapes or turf with potable water is allowed and implement these restrictions within forty five (45) days. Urban water suppliers with approved alternate plans as described in subdivision (b)(2) are exempted from this requirement.~~

~~(2) An urban water supplier may submit a request to the Executive Director for approval of an alternate plan that includes allocation based rate structures that satisfies the requirements of chapter 3.4 (commencing with section 370) of division 1 of the Water~~

~~Code, and the Executive Director may approve such an alternate plan upon determining that the rate structure, in conjunction with other measures, achieves a level of conservation that would be superior to that achieved by implementing limitations on outdoor irrigation of ornamental landscapes or turf with potable water by the persons it serves to no more than two days per week.~~

~~— (c) To promote water conservation, each urban water supplier that does not have a water shortage contingency plan that restricts the number of days that outdoor irrigation of ornamental landscapes and turf with potable water is allowed, or has been notified by the Department of Water Resources that its water shortage contingency plan does not meet the requirements of Water Code section 10632 shall, within forty five (45) days, limit outdoor irrigation of ornamental landscapes or turf with potable water by the persons it serves to no more than two days per week.~~

~~(db) In furtherance of the promotion of water conservation each urban water supplier shall:~~

~~(1) Provide prompt notice to a customer whenever the supplier obtains information that indicates that a leak may exist within the end-users exclusive control.~~

~~(2) Prepare and submit to the State Water Resources Control Board by the 15th of each month a monitoring report on forms provided by the Board. The monitoring report shall include the amount of potable water the urban water supplier produced, including water provided by a wholesaler, in the preceding calendar month and shall compare that amount to the amount produced in the same calendar month in 2013. The monitoring report shall specify the population served by the urban water supplier, the percentage of water produced that is used for the residential sector, descriptive statistics on water conservation compliance and enforcement efforts, ~~and~~ the number of days that outdoor irrigation is allowed, monthly commercial sector use, monthly industrial sector use, and monthly institutional sector use. The monitoring report shall also estimate the gallons of water per person per day used by the residential customers it serves.~~

~~(c)(1) To prevent the waste and unreasonable use of water and to meet the requirements of the Governor's April 1, 2015 Executive Order, each urban water supplier shall reduce its total potable water production by the percentage identified as its conservation standard in this subdivision. Each urban water supplier's conservation standard considers its service area's relative per capita water usage.~~

~~(2) Each urban water supplier whose source of supply does not include groundwater or water imported from outside the hydrologic region and that received average annual precipitation in 2014 may, notwithstanding its average July-September 2014 R-GPCD, submit for Executive Director approval a request to reduce its total water usage by 4 percent for each month as compared to the amount used in the same month in 2013. Any such request shall be accompanied by information showing that the supplier's sources of supply do not include groundwater or water imported from outside the hydrologic region and that the supplier's service area received average annual precipitation in 2014.~~

~~(3) Each urban water supplier whose average July-September 2014 R-GPCD was less than 65 shall reduce its total water usage by 8 percent for each month as compared to the amount used in the same month in 2013.~~

(4) Each urban water supplier whose average July-September 2014 R-GPCD was between 65 and 79.9 shall reduce its total water usage by 12 percent for each month as compared to the amount used in the same month in 2013.

(5) Each urban water supplier whose average July-September 2014 R-GPCD was between 80 and 94.9 shall reduce its total water usage by 16 percent for each month as compared to the amount used in the same month in 2013.

(6) Each urban water supplier whose average July-September 2014 R-GPCD was between 95 and 109.9 shall reduce its total water usage by 20 percent for each month as compared to the amount used in the same month in 2013.

(7) Each urban water supplier whose average July-September 2014 R-GPCD was between 110 and 129.9 shall reduce its total water usage by 24 percent for each month as compared to the amount used in the same month in 2013.

(8) Each urban water supplier whose average July-September 2014 R-GPCD was between 130 and 169.9 shall reduce its total water usage by 28 percent for each month as compared to the amount used in the same month in 2013.

(9) Each urban water supplier whose average July-September 2014 R-GPCD was between 170 and 214.9 shall reduce its total water usage by 32 percent for each month as compared to the amount used in the same month in 2013.

(10) Each urban water supplier whose average July-September 2014 R-GPCD was greater than 215 shall reduce its total water usage by 36 percent for each month as compared to the amount used in the same month in 2013.

(d)(1) Beginning June 1, 2015, each urban water supplier shall comply with the conservation standard specified subdivision (c).

(2) Compliance with the requirements of this subdivision shall be measured monthly and assessed on a cumulative basis.

(e) Each urban water supplier that serves 20 percent or more of its total production for commercial agricultural use meeting the definition of Government Code section 51201, subdivision (a) may subtract the amount of water supplied for commercial agricultural use from its water production total, provided that the supplier complies with the Agricultural Water Management Plan requirement of paragraph 12 of the April 1, 2015 Executive Order. Each urban water supplier that serves 20 percent or more of its total production for commercial agricultural use meeting the definition of Government Code section 51201, subdivision (a) shall certify that the agricultural uses it serves meet the definition of Government Code section 51201, subdivision (a), and shall report its total water production pursuant to subdivision (b)(2), identifying the total amount of water supplied for commercial agricultural use.

(ef)(1) To prevent waste and unreasonable use of water and to promote water conservation, each distributor of a public water supply, as defined in Water Code section 350, that is not an urban water supplier shall, ~~within forty-five (45) days,~~ take one or more of the following actions:

(+A) Limit outdoor irrigation of ornamental landscapes or turf with potable water by the persons it serves to no more than two days per week; or

(2B) Implement another mandatory conservation measure or measures intended to achieve a ~~20~~25 percent reduction in water consumption by the persons it serves relative to the amount consumed in 2013.

(2) Each distributor of a public water supply, as defined in Water Code section 350, that is not an urban water supplier shall submit a report by December 15, 2015, on a form provided by the Board, that includes:

(A) Total potable water production, by month, from June through November, 2015, and total potable water production, by month, for June through November 2013; or

(B) Confirmation that the distributor limited outdoor irrigation of ornamental landscapes or turf with potable water by the persons it serves to no more than two days per week.

Authority: Section 1058.5, Water Code.

References: Sections 102, 104, 105, 350, 1846, 10617 and 10632, Water Code.

Sec. 866. Additional Conservation Tools.

(a)(1) To prevent the waste and unreasonable use of water and to promote conservation, when a water supplier does not meet its conservation standard required by section 865 the Executive Director, or his designee, may issue conservation orders requiring additional actions by the supplier to come into compliance with its conservation standard.

(2) All conservation orders issued under this article shall be subject to reconsideration under article 2 (commencing with section 1122) of chapter 4 of part 1 of division 2 of the California Water Code.

(b) The Executive Director, or his designee, may issue an informational order requiring water suppliers, or commercial, industrial or institutional properties not served by a water supplier meeting the requirements of Water Code section 10617 or section 350, to submit additional information beyond that required to be reported pursuant to the other provisions of this article. The failure to provide the information requested within 30 days or any additional time extension granted is a violation subject to civil liability of up to \$500 per day for each day the violation continues pursuant to Water Code section 1846.

Authority: Section 1058.5, Water Code.

References: Sections 100, 102, 104, 105, 174, 186, 187, 275, 350, 1051, 1122, 1123, 1825, 1846, 10617 and 10632, Water Code.

Operational Updates



Yucaipa Valley Water District



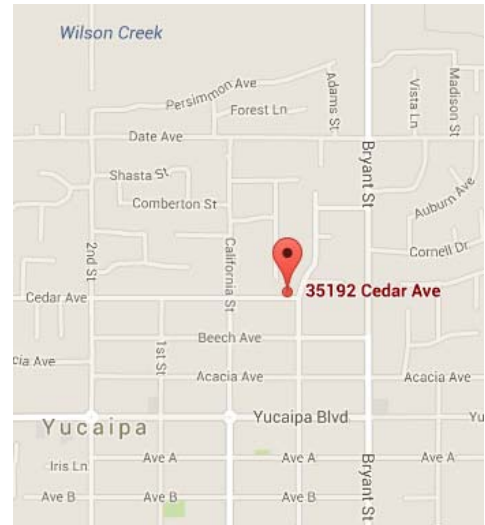
Date: April 28, 2015

Subject: Update on the Potential Use of the District Building at 35192 Cedar Avenue - Yucaipa (Assessor Parcel Number 0303-232-17)

At the board workshop held on May 27, 2014, the District staff discussed the need to demolish the existing building at 35192 Cedar Avenue. With concurrence from the Board of Directors, the District staff proceeded to move the documents stored and this facility, remove the windows, and physically disconnect all utilities (water, sewer, electrical, phone and gas services). With the building prepared for demolition, the District staff solicited proposals for the demolition work.

The District staff received the following three proposals to demolish the structure:

- J.B. Paving and Engineering - \$20,550;
- Larry Jacinto Construction - \$21,352; and
- Jeremy Harris Construction - \$23,000.



At the board workshop on February 24, 2015, Mark Westwood provided information during the public comment portion of the meeting stating his interest in establishing a local radio station. Based on his initial view of the exterior of the structure, he believes the existing Cedar Avenue building would be ideal for a local radio station. Following the meeting, the District staff provided Mr. Westwood with an opportunity to inspect the interior of the building.

While the District staff previously received direction to demolish the building, the Board of Directors may want to consider delaying the demolition to allow Mr. Westwood sufficient time to fully evaluate the costs associated with utilizing the structure for a local radio station.

If the Board of Directors would like to consider leasing the building, Mr. Westwood may need to secure a conditional use permit from the City of Yucaipa to allow a commercial use in the residential area. The terms of a conditional use permit may require improvements to the building that typically would include specific requirements related to the following items:

- Installation of doors and windows;
- Repair leaking roof;
- Landscaping to commercial standards;
- Parking lot improvements to commercial standards;
- Compliance with the Americans with Disabilities Act may be required for commercial use;
- Installation of antennae equipment and a new base/foundation;
- Heating / air conditioner unit installation;
- Water heater installation;
- Plumbing may need replaced;
- Flooring / carpet; and
- Electrical panel and wiring evaluated and upgraded to building code standards.

At the board meeting on March 18, 2015, the Board of Directors continued the discussion of this item to this board workshop.

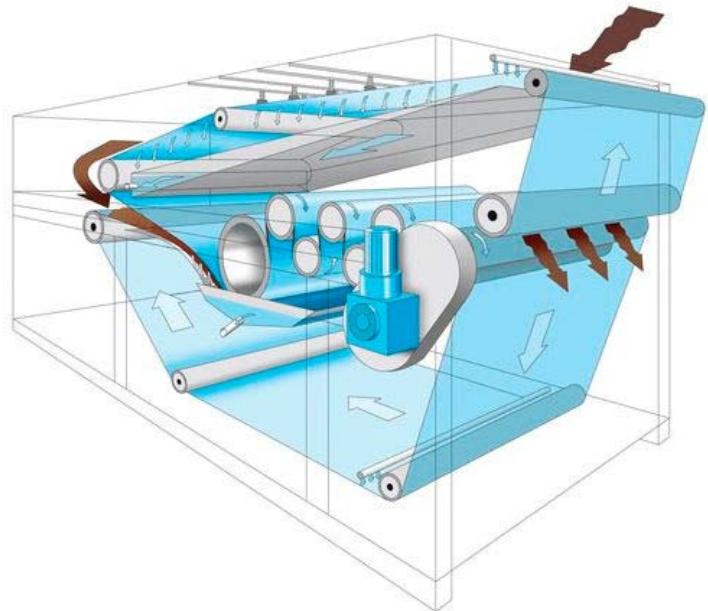
The purpose of this agenda item is to provide an update on the status of this facility.



Date: April 28, 2015

Subject: Review of Alternative Sludge Dewatering Equipment at the Wochholz Regional Water Recycling Facility

The Wochholz Regional Water Recycling Facility uses belt filters to remove liquids from the biosolids collected throughout the sewer treatment process. The belt filter technology has been in use at the sewer treatment plant for over twenty years. The belt filters have proven to be a simple and reliable technology that has been easy to maintain with a long life. As this equipment has surpassed its useful life due to metal fatigue and stress cracks in the equipment, it is necessary to evaluate other available technology.



The District staff will be pursuing alternative dewatering equipment to further reduce maintenance, energy and hauling costs. Pilot testing of potential equipment will provide an opportunity to validate the equipment performance and provide the operations staff members with first-hand knowledge about the overall operation and maintenance of the equipment.

The District staff has requested RMC Water and Environment to assist the District with the pilot testing and to provide an estimate of the return on investment (ROI) of newer technology based on the results of the pilot testing.



April 3, 2015

Yucaipa Valley Water District
Attn: Mr. Kevin King
12770 Second Street
Yucaipa, CA 92399-0730

Subject: Proposal to assist with Dewatering Equipment Pilot Testing

Mr. King:

The performance of the existing belt presses (installed over 20 years ago) for digester solids dewatering at the Yucaipa Valley Water District (District) Henry N. Wochholz Regional Water Recycling Facility (WRWRF) has significantly deteriorated. The District is considering replacing the belt presses with a more efficient dewatering technology to reduce maintenance, energy and hauling costs. Pilot testing of potential technologies is advisable: one (1) to verify the performance, and two (2) provide the YVWD operations staff with the opportunity to understand the O&M requirements. Most vendors will provide a pilot unit for testing at no cost to the District.

RMC Water and Environment proposes to assist the District with the pilot testing and to provide an estimate of the Return on Investment (ROI) of newer technology based on the results of the pilot testing. Our proposed scope of work and fee to support the District with testing and evaluation of dewatering technologies is contained in the following.

SCOPE OF WORK

Task 1: Test Plan and Vendor Coordination

1.1 Prepare Test Plan

RMC will prepare a test plan for each technology to be tested. This will include a description of the equipment, test objectives and information to be collected. The test plan will provide a day-by-day strategy for the test (flow, chemical addition, data to be recorded, sampling frequency, etc.). The test plan may be modified based on early test results. It is assumed that the District will operate the pilot unit, collect samples, and provide sample analysis to RMC following the pilot study.

1.2 Identify design requirements and prepare layout

RMC will identify preliminary design requirements for each pilot facility to be tested. This will include a layout of the test unit and associated requirements (e.g., electrical connection, water piping, sludge pumping and piping, filtrate disposal). District shall provide information on available utilities and their location.

1.3 Coordinate with vendors

RMC will coordinate with various vendors to be tested. Based on preliminary discussions with vendors it is assumed there will be up to four (4) different vendors supplying pilot units. We anticipate that the pilot tests will be held sequentially, with only one pilot unit on site at a time. RMC will also coordinate with the vendors to prepare the Test Plan, identify design requirements, and prepare the layout plan.

15510-C Rockfield Blvd., Suite 200
Irvine, CA 92618 • 949.420.5300 • rmcwater.com



April 3, 2015

Deliverables:

- Draft and final Test Plan
- Layout Plan / Piping & Instrumentation Diagram

Task 2: Pilot Testing Assistance

2.1 Assist with pilot test start-up

RMC will provide assistance to the District during the start-up for each pilot unit. Start-up will mainly be the responsibility of the vendor. All utility connections to the pilot units (e.g., site preparation, utilities hookups, assembly, and disassembly) will be the responsibility of the District.

2.2 Support pilot test operations and monitoring

RMC will provide support to the District during the operation of the pilot unit. Plant operations and laboratory staff will manage the day-to-day operation of the pilot unit, and provide in-house laboratory analyses (e.g., jar testing for polymer dose determination, dryness testing of thickened solids).

2.3 Manage and analyze pilot test data

RMC will manage the operational and monitoring data collected by the plant staff. RMC will analyze the data at the conclusion of each vendor's pilot. It is assumed there will be up to four (4) pilot units tested.

Task 3: Technical Evaluation

3.1 Prepare draft Technical Report

RMC will prepare a technical report, presenting results of the pilot study and estimated the costs and saving of full-scale replacement of the existing belt presses. The report will include an estimated ROI to compare the newer technology piloted against each other and against the existing belt presses. The ROI will include estimated capital cost, operational cost (e.g., energy consumption, chemical/polymer use), and sludge dryness and disposal costs. RMC assumes that the District will provide data on the performance of the existing belt presses.

3.2 Prepare final Technical Report

Based on comments received from the District, RMC will incorporate changes into a final technical report.

3.3 Board Workshop

RMC will attend a Board Workshop to present the results of the technical analysis and recommendations.

Deliverables:

- Draft Screw Press Pilot Study Report
- Final Screw Press Pilot Study Report

Task 4: Project Management and Quality Control

4.1 Project Management

RMC will provide project management services, including budget and schedule control, tracking, and payment for the duration of the project.

April 3, 2015

4.2 QA/QC

RMC will provide quality assurance and quality control on work products prior to submittal to District.

SCHEDULE

RMC anticipates that each pilot unit will be tested for about a week. Depending on the availability of test units, it is anticipated that pilot testing can be completed with 10 to 12 weeks from Notice to Proceed. The Technical evaluation report will be prepared and submitted to the District approximately two weeks after completion of the final test. Total time for this effort is estimated to be around 16 weeks.

FEE ESTIMATE

Our proposed fee estimate to complete the tasks previously described is provided in the attached table.

We appreciate the opportunity to propose on this important project for Yucaipa Valley Water District.

Sincerely,



Scott Goldman, P.E., BCEE

Attached: RMC Fee Estimate



Yucaipa Valley Water District

Dewatering Equipment Pilot Testing Assistance

Fee Estimate

Tasks	Labor				Admin.	Total Hours	Total Labor Costs (1)	ODCs	Total ODCs (3)	Total Fee
	Scott Galbrunn PIC	Sunny Huang PM	Naihanh Glase PE	Mark Takemoto QA/QC						
Task 1: Test Plan, Preliminary Design, and Vendor Coordination										
1.1 Prepare test plan		1	8			9	\$1,747		\$0	\$1,747
1.2 Identify design requirements and prepare layout		1	8			9	\$1,747		\$0	\$1,747
1.3 Coordinate with vendors		2	28		12	24	\$4,032		\$0	\$4,032
Subtotal Task 1:	0	2	28	0	12	42	\$7,526	\$0	\$0	\$7,526
Task 2: Pilot Testing Assistance										
2.1 Assist with pilot test start-up	1	2	12			15	\$2,909	\$199	\$219	\$3,218
2.2 Support pilot test operations and monitoring	1	2	12			14	\$2,734	\$600	\$660	\$3,394
2.3 Manage and analyze pilot test data	2	6	48		8	35	\$6,447		\$0	\$6,447
Subtotal Task 2:	2	6	48	0	8	64	\$12,180	\$799	\$879	\$13,059
Task 3: Technical Evaluation										
3.1 Prepare Draft Technical Report	1	4	20		12	39	\$8,925		\$0	\$8,925
3.2 Prepare final Technical Report	1	2	4		8	17	\$2,847		\$0	\$2,847
3.3 Board Workshop	4		8			12	\$2,580	\$199	\$219	\$2,799
Subtotal Task 3:	6	6	32	0	20	68	\$12,352	\$199	\$219	\$12,571
Task 4: Project Management and Quality Control										
4.1 Project Management	4	16	8			48	\$8,212		\$0	\$8,212
4.2 QA/QC	4	16	8	16		16	\$3,632		\$0	\$3,632
Subtotal Task 4:	4	16	8	16	0	64	\$11,844	\$0	\$0	\$11,844
TOTAL	32	30	116	16	40	231	\$43,937	\$899	\$1,098	\$46,034

1. The individual hourly rates include salary, overhead and profit.
2. Subconsultants will be billed at actual cost plus 10%.
3. Other direct costs (ODCs) such as reproduction, delivery, mileage (rates will be those allowed by current IRS guidelines), and travel expenses, will be billed at actual cost plus 10%.
4. RMC reserves the right to adjust its hourly rate structure and ODC markup at the beginning of the calendar year for all ongoing contracts.

Biosolids Dewatering Alternatives for Orange County

Michael Scullion, K. Richard Tsang, Larry Tunnell, William Hurley, and Mark Burgess

Dewatering is a critical step in biosolids processing. Producing a drier biosolids cake can result in a significant cost savings to many of the utilities in central Florida that rely on contract hauling and land application of their biosolids. Belt filter presses have long been the dewatering technology of choice; however, the next generation of biosolids dewatering technologies offers promising results.

Water Reclamation Facilities in Orange County

Orange County Utilities (OCU) operates three water reclamation facilities (WRF): the Northwest WRF, the South WRF, and the Eastern WRF. Each currently uses belt filter presses for dewatering of secondary waste activated sludge (WAS). None of the WRFs have primary clarifiers. The 7.5-mgd Northwest WRF utilizes a modified Ludzack Ettinger (MLE) process train with secondary WAS stored in a series of aerated sludge holding tanks prior to dewatering. The Eastern WRF consists of a 19-mgd, five-stage Bardenpho process train, and a parallel 5-mgd, three-pass step-feed process train. Secondary WAS is typically sent directly to the belt filter presses for dewatering. Two old dissolved air flotation (DAF) tanks located at the Eastern WRF are no longer in operation. Although they can be used for sludge holding, there is insufficient capacity for extended storage in the DAF tanks. At the 43-mgd South WRF, the three process trains consist of a 20.5-mgd step-feed process train, 15-mgd MLE process train, and a 7.5-mgd oxidation ditch. The WAS at the South WRF is thickened on gravity belt thickeners prior to being treated in anaerobic digesters. Anaerobically digested sludge is dewatered by belt filter presses and conveyed into trucks for land application or disposal.

Dewatering of biosolids is a critical step in biosolids processing, impacting downstream treatment processes and transportation costs. Over the previous three years, dewatered solids contents have ranged from 13 percent at the South WRF to 16 percent at the Eastern WRF. Newer dewatering technology can be expected to significantly improve the performance of the existing belt filter presses. Production of a drier

biosolids cake would reduce the volume of biosolids to be treated and transported, resulting in a significant savings. As the performance of dewatering technologies is largely site-specific, an on-site pilot testing program was conducted to provide a comparison of alternative dewatering technologies. In addition to a determination of the solid content of the biosolids cake produced by each alternative dewatering technology, the pilot testing also evaluated polymer dosage, throughput, power consumption, and solids capture.

Continued on page 20

Michael Scullion, P.E., is project manager, and Mark Burgess, P.E., BCEE, is vice president, with CDM Smith in Maitland. K. Richard Tsang, Ph.D., P.E., BCEE, is senior vice president with CDM Smith in Raleigh, N.C. Larry Tunnell, P.E., P.G., is chief engineer—utilities engineering division, and William Hurley, P.E., is manager—water reclamation division, at Orange County Utilities in Orlando.



Centrifuge pilot unit



Linear electro-dewatering pilot unit

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Methodology

Alternative dewatering technologies were evaluated to select technologies that offered increased capacity and greater solids content than the existing belt filter presses. Technologies selected for the evaluation included centrifuge, screw press, rotary fan press, and linear electro-dewatering.

Pilot Testing Schedule

Pilot testing was conducted between Jan. 25 and March 19, 2010. Table 1 provides an overview of the pilot testing schedule.

The pilot testing schedule was developed to allow side-by-side comparison of the alternative dewatering technologies as much as possible, based on equipment availability. Since centrifuges and screw presses are established methods for biosolids dewatering, the tech-

nologies were selected for side-by-side comparison with the existing belt filter press units. The rotary fan press was pilot-tested after the centrifuge and screw press testing had been completed; however, the belt filter presses were in operation allowing a side-by-side comparison of the performance of the two technologies. Biosolids cake produced by the belt filter presses at each of the three WRFs was processed on the electro-dewatering unit. Due to scheduling conflicts, pilot testing of dewatered biosolids cake produced by the centrifuge, screw press, and rotary fan press was not possible.

Sampling and Analysis

Prior to commencement of pilot testing, a sampling and analysis protocol was developed to standardize collection and analysis of samples during the pilot study. Samples of feed sludge, filtrate, and biosolids cake were collected by OCU at regular intervals during the pilot testing. Sampling intervals were selected

to allow for changes in operating conditions of the pilot units with adequate time for the units to reach equilibrium and produce a consistent biosolids cake. As part of the pilot testing program, the existing belt filter presses were operated and sampled at the same time as the alternative dewatering technologies.

Samples were split, with the equipment manufacturers conducting their analysis on-site, while OCU samples were shipped to its central laboratory for analysis. Feed sludge was tested for total and volatile solids, and pH. The solids content of the dewatered sludge cake and the filtrate was also measured.

Centrifuge Testing Methodology

The centrifuge technology utilizes high rotational speed to create a centrifugal force, pressing solids against the wall of the centrifuge bowl. Solids are removed from the centrifuge by a scroll rotating at a different speed than the bowl, while liquid level is controlled by adjustable weir plates that are adjusted to maintain a pond depth suitable for sedimentation of solids inside the centrifuge.

Samples of feed sludge collected from the WRFs were sent to the centrifuge manufacturer for preliminary sludge characterization and polymer testing the week prior to beginning the pilot testing program. Throughout the pilot study, the centrifuge manufacturer followed a set procedure for optimization of their equipment: establishment of the pond level, polymer testing, and finally, development of a throughput curve.

Screw Press Testing Methodology

The screw press technology consists of a series of U-shaped screen segments surrounding an inclined screw. Feed sludge enters the base of the unit, with the screen openings decreasing in size as the sludge travels up the screw. The slow rotation of the screw creates backpressure that forces water out of the sludge. A cone at the discharge end of the screw can be adjusted to provide additional backpressure to aid dewatering.

The screw press manufacturer did not evaluate the feed sludge prior to the beginning of the pilot testing. Upon arriving at the site, feed sludge was jar-tested with eight to ten polymers that the operator had on hand to evaluate the settling characteristics. Based on the results of the jar tests, one to two polymers were selected for further evaluation during the pilot testing period. The screw press manufacturer's testing protocol consisted of adjusting sludge feed rate, polymer type, dose and solution strength, screw speed, and discharge pressure based on the experience of the operator to obtain a drier cake.

Table 1. Orange County Biosolids Dewatering Pilot Program Schedule

Equipment Pilot Tested	OCU Facility	Dates Conducted
Centrifuge and Screw Press	Northwest WRF	Jan. 25-28, 2010
Centrifuge and Screw Press	South WRF	Feb. 1-4, 2010
Centrifuge and Screw Press	Eastern WRF	Feb. 8-11, 2010
Linear Electro-Dewatering	All WRFs	Feb. 15-25, 2010
Rotary Fan Press	South WRF	March 12-16, 2010
Rotary Fan Press	Eastern WRF	March 18-19, 2010



Linear electro-dewatering sludge cake

Linear Electro-Dewatering Testing Methodology

The linear electro-dewatering technology has recently emerged onto the market, with a limited number of municipal installations. Building upon the limits of conventional mechanical dewatering, the linear electro-dewatering process uses an electric field to extract additional water from biosolids cake. An add-on process following mechanical dewatering, linear electro-dewatering is capable of producing a final solids content of 30 to 50 percent.

The linear electro-dewatering pilot unit consists of three separate components: the electro-dewatering unit, a separate electrical and control skid, and a high-pressure booster pump. Biosolids cake is manually loaded into the inlet hopper of the machine, where it is rolled out into a thin layer on the belt for dewatering. As the belt moves forward, electrodes are lowered to make contact with the sludge layer, while applying minimal pressure. Current is applied to the sludge layer, inducing an electrical field that draws water down through the belt through electro-osmosis. After a preset period of time, the electrodes rise, the belt moves, and a scraper blade is used to remove sludge from the belt. The backwash pumps deliver a high-pressure spray to the underside of the belt for cleaning during the discharge process, prior to the next batch entering the machine. At 10 to 20 percent inlet cake solids, the linear electro-dewatering unit used in the pilot tests has a throughput of 200 to 300 pounds per hour.

The linear electro-dewatering process is intended to operate at a constant voltage, with the thickness of the sludge layer adjusted to optimize conductivity and throughput of the unit. In order to further improve conductivity, the manufacturer utilizes a propriety dewatering aid referred to as electro-dewatering agent (EDA). Dosage rates for EDA were not reported by the manufacturer; however, its use was not required for biosolids cake from the South WRF, and limited quantities (less than five gallons) were used during the pilot testing of biosolids cake from the Northwest and Eastern WRFs. The second process variable with the electro-dewatering unit is treatment time, which directly impacts throughput as the linear electro-dewatering unit operates as a batch process.

Bench-scale testing was conducted prior to the pilot testing on biosolids cake from the existing belt filter presses of the WRFs, as well as cake produced by the centrifuge and screw press at the South WRF. Baseline sludge layer thicknesses and dewatering times developed

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during the bench-scale testing were used as a starting point for the pilot testing.

Rotary Fan Press Testing Methodology

The rotary fan press technology utilizes two parallel wedgewire filter screens rotating at a slow speed to push feed sludge through the unit. A restrictor arm on the discharge of the press provides backpressure, which forces water out through the rotating screen elements.

The testing of the rotary fan press occurred after the testing of the other alternative dewatering technologies had been completed. Thus, side-by-side comparison of the rotary fan press was possible only with the existing belt filter presses.

The rotary fan press manufacturer con-

ducted preliminary sludge analysis on-site prior to testing. Anaerobically digested feed sludge at the South WRF was dosed with sulfuric acid or ferric sulfate in addition to polymer in some of the pilot test runs due to the presence of struvite. At the Eastern WRF, polymer alone was used for preconditioning of the feed sludge prior to dewatering. The rotary fan press pilot trailer contained two dewatering units to allow testing with both a 1-in. and 1.5-in. channel width. Rotary fan press performance was evaluated by varying throughput, feed pressure, polymer dosage, and polymer type.

Results and Discussion

The sampling and analysis protocol developed prior to the testing program ensured

that appropriate data were collected to allow for performance comparison. Parameters including solids content of the dewatered biosolids cake, polymer dosing rates, solids capture, energy consumption, and throughput provide a basis for comparison of dewatering performance.

Feed Sludge Characteristics

Feed sludge samples were collected regularly during the pilot testing period and analyzed for solids content, volatile solids, and pH. Characteristics of the feed sludge at each WRF are presented in Table 2.

Cake Solids Content

One key dewatering parameter is cake dryness attainable by each technology. The existing belt filter presses at each WRF were operated under typical conditions and sampled regularly throughout the pilot testing period. The Eastern WRF produced the highest average solids content of the three facilities at 15.1 percent. No single sample from any of the belt filter presses reached 16 percent solids. The rotary fan press produced cake solids marginally better than the belt filter presses. When optimized, the screw press produced solids content above 17 percent at each of the facilities. Biosolids cake from the centrifuge exceeded 20 percent at each WRF. Solids content of the biosolids cake produced using each dewatering technology is presented in Table 3.

It should be noted that the solids content values presented in Table 3 for the centrifuge and screw press are the maximum values achieved during the course of the pilot study. These values reflect the optimization of the process over the week-long test period. The values for the belt filter presses presented are average values; however, the solids content of the cake produced by the belt filter presses was very consistent (\pm 1 percent of the average) over the course of the pilot testing period. Based on the data collected during the pilot study, use of a centrifuge or screw press as an alternative dewatering technology can be expected to significantly outperform the existing belt filter presses. A summary of 2008 biosolids production rates at each OCU facility, and the reduction in volume that could be expected to be achieved with an alternative dewatering technology, are presented in Table 4.

Based on data collected during pilot testing, upgrading the existing belt filter presses to centrifuges or screw presses would result in a 26 to 32 percent reduction in the amount of biosolids cake produced by OCU. At 2008 biosolids production rates, this amounts to a reduction of 76 to 93 wet tons per day. Biosolids production would be reduced by up

Table 2. Alternative Dewatering Technology Feed Sludge Characteristics

OCU Facility	Solids Content	Volatile Solids	pH
Northwest WRF	1.0 to 1.5 percent	82 to 84 percent	7.0
South WRF	3.0 percent	70 to 74 percent	7.5
Eastern WRF	0.9 to 1.0 percent	88 to 90 percent	6.7 to 6.9

Table 3. Biosolids Cake Solids Content

OCU Facility	Centrifuge	Screw Press	Belt Filter Press	Rotary Fan Press
Northwest WRF	23.0 percent	21.4 percent	13.7 percent	N/A
South WRF	20.2 percent	17.1 percent	13.0 percent	13.7 percent
Eastern WRF	20.5 percent	20.3 percent	15.1 percent	17.2 percent

Samples of feed sludge, filtrate, and sludge cake



to 164 wet tons per day based on 2025 projections by incorporating a more efficient dewatering technology. Significant reductions in the operations and maintenance costs associated with contract hauling and land application of biosolids due to the reduced volume have the potential to offset capital costs associated with replacement of the existing dewatering equipment.

The linear electro-dewatering unit is a unique add-on dewatering technology with the potential to enhance the existing belt filter presses or to operate in unison with new mechanical dewatering equipment. Due to availability of equipment, the electro-dewatering pilot testing was only able to be conducted on biosolids cake produced by OCU's existing belt filter presses.

The performance of the electro-dewatering unit was promising, with over a 100 percent increase in solids content of biosolids from all three OCU facilities. Solids content of biosolids cake treated by the electro-dewatering unit far exceeded anything that could be produced using traditional mechanical dewatering technologies alone, as shown in Table 5.

Initial biosolids cake concentrations from the belt filter presses, which represent the feed concentration to the electro-dewatering unit, are also shown in Table 5. The initial solids content of the biosolids cake from the Northwest and Eastern WRFs are higher than the values reported in Table 3, partially due to the fact that the cake was collected overnight and trucked to the South WRF the following morning for testing. Fresh biosolids cake was delivered each day during the pilot testing to minimize additional air drying of the material prior to testing. Temperatures during the pilot testing period were unseasonably low for central Florida, helping to minimize evaporation and changes in solids content of the cake during the day.

The linear electro-dewatering unit was able to further increase the solids content of the cake produced by the belt filter presses to at least 30 percent. Longer treatment times can produce higher concentrations; however, the technology operates as a batch process where treatment time is directly related to throughput. Table 5 provides solids content for the minimum and maximum treatment times used during the pilot tests. The electro-dewatering process has a practical upper limit to the amount of water that can be removed, after which the additional time and power required to further increase solids content are not cost-effective. However, for the treatment times investigated during the pilot test, there is a linear relationship between treatment time and solids content.



Screw press pilot unit

Table 4. 2008 OCU Biosolids Production and Wet Tonnage after Dewatering

OCU Facility	Facility (Dry Tons per Day)	Belt Filter Press (Wet Tons per Day)	Centrifuge (Wet Tons per Day)	Screw Press (Wet Tons per Day)
Northwest WRF	4.7	34.3	20.4	22.0
South WRF	16.4	126.2	81.2	95.9
Eastern WRF	19.7	130.5	96.1	97.0
Total	40.8	290.9	197.7	214.9

Table 5. Electro-Dewatered Biosolids Cake Solid Content

OCU Facility	Belt Filter Press	Electro-Dewatering Unit (Minimum Time)	Electro-Dewatering Unit (Maximum Time)
Northwest WRF	14.8 percent	34.0 percent (7 min)	39.0 percent (7.5 min)
South WRF	13.0 percent	31.0 percent (8.5 min)	36.5 percent (9.5 min)
Eastern WRF	16.4 percent	34.0 percent (4.5 min)	43.0 percent (6.5 min)

A second process variable with the electro-dewatering unit is thickness of the sludge layer. A thinner layer improves dewatering performance at the cost of throughput. With cake from the Eastern WRF, increasing the layer thickness from 12.5 mm to 15.0 mm produced a 7 percent decrease in the solids content (from 43 percent to 36 percent) with the same six-minute treatment time. Layer thickness can be adjusted to produce the desired throughput; however, there are limitations as an excessively thick layer will have limited conductivity, prohibiting dewatering. Balancing throughput and solids content is required to maximize the effectiveness of the system. The desirable final solids content of biosolids cake

is also dependent upon the end use. Biosolids that are to be heat-dried for use as fuel should be as dry as possible prior to hauling to reduce cost. However, if the cake is to be composted, solids content that is too high is not desirable.

Polymer Dosing

In general, the polymers used for the biosolids dewatering pilot study had high to very high cationic charge, with medium molecular weight emulsion polymers at roughly 40 percent active polymer content. Polymer dosages were fine-tuned during pilot testing to develop a range that produced the driest biosolids cake. Typically, increasing the poly-

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mer dosing rate increases solids content; however, above a certain limit, additional polymer can actually hinder dewatering. The expense of polymer can also outweigh the benefits of a marginal increase in solids content achieved with a large increase in dose. Optimal polymer dose ranges are presented in Table 6.

Polymer dosage rates for the rotary fan press were reported as 12 to 16 lbs active polymer per dry ton for both the South WRF and Eastern WRF. The centrifuge and screw press consumed significantly larger amounts of polymer to dewater the digested sludge from the South WRF than sludge from the Eastern or Northwest WRFs. The rotary fan press consumes 30 to 50 percent less polymer than the centrifuge or screw press; however, the reduction in cake solids content offsets this benefit.

Polymer consumption, when operating the belt filter presses, is roughly half of what would be anticipated from a centrifuge or screw press at each facility. Replacing the existing belt presses with a centrifuge or screw press would double OCU's polymer con-

sumption rates, while improving dewatered cake solids content by 5 to 10 percent.

Solids Capture

Solids capture generally exceeded 90 percent during pilot testing. Average solids capture values at each facility are presented in Table 7.

Solids capture for the centrifuge was typically in excess of 95 percent. Lower centrifuge capture rates were observed during pilot testing at the Eastern WRF, particularly when throughput exceeded the rated capacity of the machine. Lower capture rates were observed for the screw press when operating at higher scroll speeds, higher throughput, and increased feed and discharge pressure. The rotary fan press produced solids capture rates above 97 percent over the course of pilot testing.

The linear electro-dewatering manufacturer notes that the lower capture rates observed during pilot testing are typical, as the doctor blade on the unit is not as efficient as a full-scale model and the blade was not set at

its optimal position. It should be noted that initial pilot testing of the electro-dewatering unit was completed with a standard conveyor belt. The linear electro-dewatering manufacturer had a belt with smaller openings shipped to the South WRF in an attempt to increase the capture rate. This belt was received on the final day of testing, allowing two test runs to be completed on biosolids cake from the South WRF. Solids capture of each sample exceeded 99 percent.

Very high solids capture rates have become the industry standard in dewatering. The equipment pilot tested at OCU facilities is no exception. At design solids loading rates, the solids capture of the units can be expected to be in excess of 95 percent.

Throughput

Throughput of dewatering equipment is a function of either hydraulic loading or solids loading. Biosolids dewatering equipment selected should provide adequate throughput to meet solids production within the desired operating schedule. Dewatering at OCU is typically conducted during one to two shifts per day to match plant staffing. Projected biosolids production for OCU's facilities is presented in Table 8.

The South WRF thickens secondary WAS prior to feeding its anaerobic digesters, decreasing the volume of feed sludge due to solids destruction in the digesters. Feed sludge at the South WRF is thicker, with around 3 percent solids content, while at the Northwest and Eastern WRFs, 1 to 1.5 percent solids is typical. Dewatering equipment at the South WRF would be expected to operate at a lower hydraulic loading rate to maintain the same solids loading rate into the machines.

The dewatering units used for pilot testing were all small-scale, commercially available units. A 36-in. diameter rotary fan press was used during pilot testing. The largest commercially available unit from the rotary fan press manufacturer is a double 48-in. diameter unit. This unit would be anticipated to process 90 gpm of 1 percent solids feed sludge based on observations from the pilot study. Higher throughputs could be obtained with a centrifuge or screw press. The largest screw press units offer capacity equivalent to that of a two-meter belt press, roughly 200 gpm at 1 percent solids feed sludge. While an improvement over the capacity offered by the rotary fan press, the limited throughput of the screw press may limit its application at large WRFs. Centrifuges offer the greatest throughput of any alternative dewatering technology, with units available to process 500 gpm or greater, at 1 percent solids feed sludge. Dewatering throughputs for

Table 6. Optimal Polymer Dosing Rates

OCU Facility	Centrifuge (lbs/ton Active Polymer)	Screw Press (lbs/ton Active Polymer)
Northwest WRF	20-24	18-20
South WRF	33-37	30-35
Eastern WRF	19-23	18-24

Table 7. Average Solids Capture at OCU WRFs

OCU Facility	Centrifuge	Screw Press	Electro-Dewatering
Northwest WRF	97.0 percent	94.5 percent	92 percent
South WRF	96.2 percent	94.9 percent	95 percent
Eastern WRF	91.5 percent	96.5 percent	93 percent

Table 8. Projected Biosolids Production

	Northwest WRF	South WRF	Eastern WRF
Feed Sludge Solids Content	1.25 percent	3.00 percent	1.00 percent
2009 Max Month Biosolids Production	18,800 ppd	48,400 ppd	48,300 ppd
2025 Max Month Biosolids Production	26,600 ppd	76,300 ppd	68,200 ppd
2009 Feed Sludge Flow Rate	180,500 gpd	193,500 gpd	579,000 gpd
2025 Feed Sludge Flow Rate	255,000 gpd (530 gpm*)	305,000 gpd (635 gpm*)	818,000 gpd (1,700 gpm*)

* Flow rates represent required flow rate at current feed sludge solids concentrations to complete dewatering in one eight-hour shift per day.

the linear dewatering unit were estimated based on pilot testing data. The largest linear electro-dewatering unit currently available has an estimated capacity of 1.4 to 2.8 wet tons of solids per hour. Higher throughput offers the benefit of fewer units and shorter run times, reducing capital and operations costs.

Energy Consumption

Operations costs associated with energy consumption can have a tremendous impact on biosolids dewatering. Energy consumption data were monitored and recorded by the centrifuge and linear electro-dewatering manufacturers during the pilot testing. The screw press manufacturer reported a maximum electric draw of the screw press, which was used to calculate energy consumption. Energy consumption of the dewatering equipment observed during pilot testing is presented in Table 9. These values only include the energy draw of the dewatering equipment, not energy use associated with pumping or conveyance.

The primary advantage of the screw press is energy consumption that is seven to ten times less than that of a centrifuge with comparable cake solids content. Mechanical dewatering is the most efficient dewatering method;

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Dewatered sludge cake from South Water Reclamation Facility

Table 9. Energy Consumption of Dewatering Alternatives

OCU Facility	Centrifuge (kWh/ton)	Screw Press (kWh/ton)	Electro-Dewatering (kWh/ton)
Northwest WRF	98	14	225
South WRF	53	6	265
Eastern WRF	92	14	163

Continued from page 25

however, achieving higher solids concentrations requires an alternative technology such as electro-dewatering or heat drying. Energy consumption observed with the linear electro-dewatering pilot unit is less than would be expected with heat drying to reach the same solids content. Linear electro-dewatering has the potential to pair well with heat drying to reduce operations costs.

Conclusions

Pilot testing confirmed that alternative dewatering technologies will outperform OCU's existing belt filter presses. The belt filter presses can also be labor intensive, and are open units leading to spills of partially dewatered biosolids cake from the units. The alternative dewatering technologies tested provide higher solids content, less maintenance, a smaller footprint, and a contained dewatering solution. While selection of an alternative dewatering technology is somewhat dependent upon the final destination of the dewatered biosolids, conclusions can be drawn based on the results of the pilot study.

A rotary fan press offers some improvement in dewatered cake solids content over the existing belt filter presses, with less polymer consumption than that of the centrifuge and screw press. Although the rotary fan presses can be provided with multiple units to a skid, throughput is a limiting factor for facilities on the scale of OCU's WRFs.

The centrifuge and screw press technologies produced the highest dewatered cake solids content in pilot testing. Polymer consumption for the two units was comparable, although significantly greater than that of the belt filter press. Centrifuges offer slightly higher cake solids than the screw press, and the highest throughput available, with the trade-off of higher energy consumption and noisy operation. In the case of the OCU, the combination of high throughput and dewatered cake solids have made centrifuges the biosolids dewatering technology of choice.

The innovative new linear electro-dewatering technology increases the solids content of biosolids cake produced via mechanical dewatering. At the present time, limited throughput and the increased materials handling associated with batch operation are challenges to the implementation of this equipment. However, as the technology develops, linear electro-dewatering has the potential to pair well with heat drying of biosolids to reduce overall energy costs. ◊

United States
Environmental Protection
Agency

Office of Water
Washington, D.C.

EPA 832-F-00-057
September 2000



Biosolids Technology Fact Sheet Belt Filter Press

DESCRIPTION

Belt filter presses are used to remove water from liquid wastewater residuals and produce a non-liquid material referred to as “cake”. Dewatered residuals, or cake, vary in consistency from that of custard to moist soil. Dewatering serves the following purposes:

- Reducing the volume, thus reducing storage and transportation costs.
- Eliminating free liquids before landfill disposal.
- Reducing fuel requirements if residuals are to be incinerated or dried.
- Producing a material which will have sufficient void space and volatile solids for composting when blended with a bulking agent.
- Avoiding the potential of biosolids pooling and runoff associated with liquid land application.
- Optimizing subsequent processes such as thermal drying.

A belt filter dewateres by applying pressure to the biosolids to squeeze out the water. Biosolids sandwiched between two tensioned porous belts are passed over and under rollers of various diameters. Increased pressure is created as the belt passes over rollers which decrease in diameter. Many designs of belt filtration processes are available, but all incorporate the following basic features: polymer

conditioning zone, gravity drainage zones, low pressure squeezing zone, and high pressure squeezing zones. Advanced designs provide a large filtration area, additional rollers, and variable belt speeds that can increase cake solids by five percent.

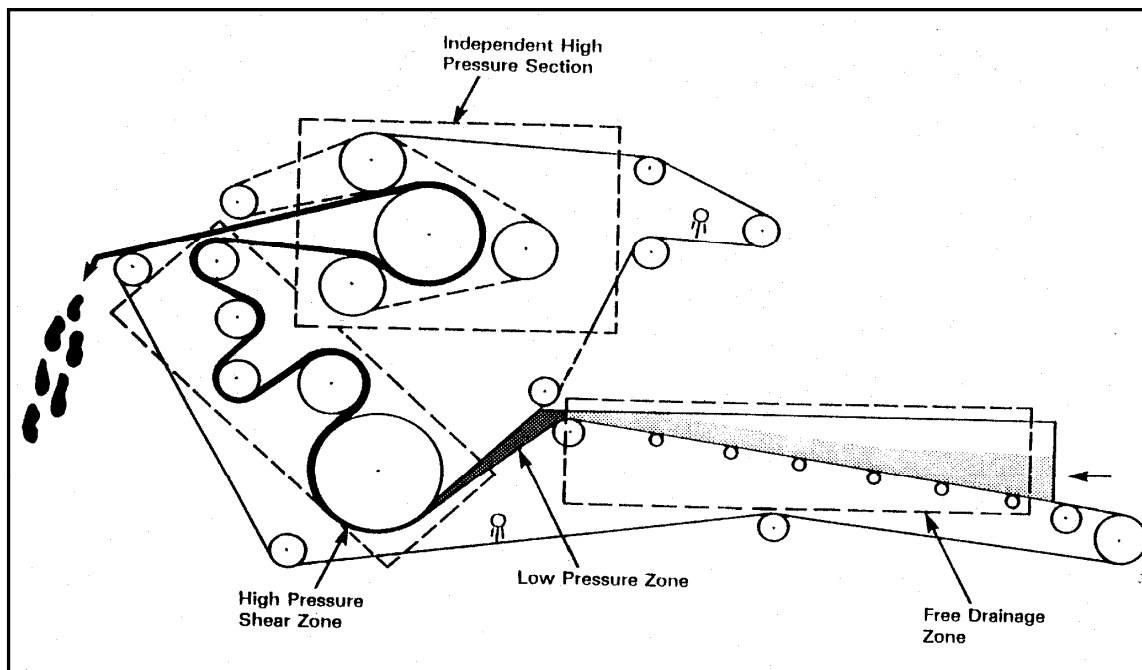
The general mechanical components of a belt filter press include dewatering belts, rollers and bearings, belt tracking and tensioning system, controls and drives, and a belt washing system. Figure 1 depicts a typical belt filter press.

APPLICABILITY

Belt filter presses can be used to dewater most biosolids generated at municipal wastewater treatment plants and are a common type of mechanical dewatering equipment. Using mechanical equipment to dewater solids may not be the most cost effective alternative for wastewater treatment plants operating at less than about 4 mgd. The selection of dewatering equipment should be based on the results of a site specific biosolids management plan which identifies both processing and end use alternatives and estimates costs. It may be less expensive to haul liquid to an application site or pay a processing facility to dewater and process or landfill the dewatered cake. Smaller facilities should also evaluate non-mechanical dewatering methods, such as drying beds or reed beds.

ADVANTAGES AND DISADVANTAGES

Advantages and disadvantages of belt filter presses for dewatering wastewater solids are summarized below:



Source: U.S. EPA, 1987.

FIGURE 1 SCHEMATIC OF A BELT FILTER PRESS

Advantages

- Staffing requirements are low, especially if the equipment is large enough to process the solids in one shift (USEPA, 1987).
- Maintenance is relatively simple and can usually be completed by a wastewater treatment plant maintenance crew. Replacing the belt is the major maintenance cost.
- Belt presses can be started and shut down quickly compared to centrifuges, which require up to an hour to build up speed (Henderson and Schultz, 1999).
- There is less noise associated with belt presses compared to centrifuges (Henderson and Schultz, 1999).

Disadvantages

- Odors may be a problem, but can be controlled with good ventilation systems and chemicals, such as potassium

permanganate, to neutralize odor-causing compounds (Rudolf, 1992). Some manufacturers offer fully enclosed equipment to minimize odors and reduce vapors in the operating room air (Bain et al., 1999).

- Belt presses require more operator attention if the feed solids vary in their solids concentration or organic matter. This should not be a problem if the belt presses are fed from well-mixed digesters (Henderson and Schultz, 1999).
- Wastewater solids with higher concentrations of oil and grease can result in blinding the belt filter and lower solids content cake.
- Wastewater solids must be screened and/or ground to minimize the risk of sharp objects damaging the belt.
- Belt washing at the end of each shift, or more frequently, can be time consuming and require large amounts of water

(Henderson and Schultz, 1999). An automatic belt washing system and the use of effluent can minimize these costs.

DESIGN CRITERIA

Belt presses are sized on the basis of weight or volume of solids to be dewatered rather than the wastewater flow to the plant. To determine how many presses are needed, the wastewater treatment plant must:

- Determine the amount of primary solids that will flow through the plant per day.
- Determine the amount of waste-activated or trickling filter solids produced per day.
- Determine the volume of thickened solids to be dewatered per day.
- Estimate the range of dry solids concentration in the feed.
- Estimate future increases in solids production.
- Anticipate changes in sewer discharges or operation that could change solids quality or organic matter content.

An effective biosolids management plan will include the above information. It is important to design for excess capacity so that the anticipated amount of incoming solids can be easily dewatered during operating hours. Allowing for excess capacity also ensures that the plant will not experience a build-up of solids if a unit is out of service. If only one unit is required, the plant should have an alternate program to remove solids in liquid form.

The polymer conditioning zone can be a small tank, approximately 265 to 379 liters (70 to 100 gallons) located 0.6 to 1.8 meters (2 to 6 feet) from the press, a rotating drum attached to the top of the press, or an in-line injector. The press manufacturer usually supplies this zone along with the belt filter press (USEPA, 1986).

The gravity drainage zone is a flat or slightly inclined belt unique to each model. Solids are dewatered by the gravity drainage of the free water. A 5 to 10 percent increase in solids concentration from the original biosolids should occur in this zone (USEPA, 1987). The free water drainage is a function of wastewater solids type, quality, conditioning, screen mesh, and design of the drainage zone.

The low-pressure zone is the area where the upper and lower belts come together with the wastewater solids in between. This is sometimes called the “wedge zone,” because the feed solids are sandwiched between the upper and lower belts. The low-pressure zone prepares the biosolids by forming a firm cake which can withstand the forces of the high pressure zone.

In the high-pressure zone, forces are exerted on the solids by the movement of the upper and lower belts as they move over and under a series of rollers of decreasing diameter. Some belt filter press models separate from the rest of the unit to increase pressure on the biosolids. This produces a drier cake, an important factor for plants that incinerate the final product or face high end use or disposal costs. A biosolids management plan should evaluate the advantages and disadvantages of a high performance belt filter press.

An additional design feature is a self-enclosed facility to reduce odors and protect worker health (Bain et al., 1999). Workers in the belt press areas are exposed to aerosols from wash spray nozzles and pathogens and hazardous gasses such as hydrogen sulfide. Enclosing the press reduces visibility to the operators and produces a corrosive environment for the rollers and bearings, but automating the system can alleviate these problems.

The automation of belt presses is the subject of a Water Environment Research Foundation project. Benefits of automation include optimization of non-linear variables which was rarely possible with manual or semi-automated operation, and the ability to produce dewatered cake at a constant rate. Automation generally increases capital costs by 10 percent. Manufacturers claim that this extra expense is worthwhile because it lowers labor costs,

reduces polymer use, and maximizes the solids content of the cake, reducing disposal and end use costs (Gillette et al., 2000).

The choice of dewatering technique and chemical polymer or salts impacts dewaterability as well as the potential for odor during further processing or recycling to land.

Ancillary equipment for efficient operation of a belt press includes:

- Polymer.
- Mixing, aging, feed, liquid feed day tank.
- Liquid residuals feed pump.
- Odor control and ventilation.
- Conveyor and/or pump to move dewatered cake.
- An enclosed area to load trucks or containers.

PERFORMANCE

Manufacturers should be consulted for design and performance data early in the planning stage. Data should be confirmed with other operating

installations and/or thrash pilot testing. Evaluation of equipment should consider capital and operating costs, including polymer, electricity, wash water, solids capture, and ventilation and odor control during dewatering and further processing or recycling. The operator can ensure system integration by requiring that the self-enclosed belt press, ventilation, and polymer system is supplied by a single provider. Since solids characteristics and quantity vary from plant to plant, it is important to evaluate different weaves, permeability, and solids retention abilities of dewatering belts to ensure optimum performance. Surveys of similar plants or testing of wastewater solids can be helpful in the decision-making process.

Table 1 displays the range of performance of a high pressure belt press on various types of wastewater solids.

Odor Control

Odor complaints at wastewater treatment plants and biosolids end use sites can interfere with implementation of the most cost effective biosolids management options. Odor control measures should be included when designing dewatering facilities. Odor control is addressed in more detail in another fact sheet, but briefly, the methods include:

TABLE 1 TYPICAL DATA FOR VARIOUS TYPES OF SLUDGES DEWATERED ON BELT FILTER PRESSES

Type of Wastewater Sludge	Total Feed Solids (percent)	Polymer (g/kg)	Total Cake Solids (percent)
Raw Primary	3 to 10	1 to 5	28 to 44
Raw WAS	0.5 to 4	1 to 10	20 to 35
Raw Primary + WAS	3 to 6	1 to 10	20 to 35
Anaerobically Digested Primary	3 to 10	1 to 5	25 to 36
Anaerobically Digested WAS	3 to 4	2 to 10	12 to 22
Anaerobically Digested Primary + WAS	3 to 9	2 to 8	18 to 44
Aerobically Digested Primary + WAS	1 to 3	2 to 8	12 to 20
Oxygen Activated WAS	1 to 3	4 to 10	15 to 23
Thermally Conditioned Primary + WAS	4 to 8	0	25 to 50

Source: U.S. EPA, 1987.

- Using a self enclosed belt press.
- Adding potassium permanganate or other oxidizing agent to minimize odors in the solids.
- Minimizing liquid storage prior to belt pressing to less than 24 hours. The longer the solids are stored, the lower the pH, the higher the liquid ammonia concentration, and the higher the organic sulfide emissions (Hentz et al., 2000).
- Conducting bench-scale and full-scale testing of liquid sludge to determine if combined storage of primary and waste activated sludges accelerates the deterioration of biosolids (Hentz et al., 2000).
- Specifying polymers that are stable at elevated temperatures and pH. This is especially important at facilities using lime stabilization or high temperature processing such as heat drying, thermophilic digestion, or composting.

Self-Enclosed Belt Presses

The main purpose of a self-enclosed system is to minimize the amount of foul air needing treatment in an odor control system. An induced draft fan provides a slight negative pressure (typically 100 cubic feet per meter per meter of belt width.) The system design should:

- Minimize gaps in the enclosure.
- Minimize enclosure volume.
- Locate mechanical and electrical components requiring maintenance outside the enclosed area for easy access and reduced maintenance.
- Include automation to optimize performance of the belt press.
- Use stainless steel materials.

- Provide multiple access hatches to allow operator viewing and clean up.
- Provide for easy removal of the belt for replacement (Bain et al., 1999).

Chemical Addition

Solids must be conditioned with polymer to ensure optimum performance. Polymer feed points should be designed at several locations to ensure flexibility and optimum performance. The solids/polymer mixture should be subject to gentle mixing as turbulent conditions can shear the floc, minimizing polymer effectiveness. Polymer dilution and aging systems should be large enough to optimize polymer usage.

Potassium permanganate or other oxidizing agents are often added to solids prior to dewatering. These have been shown to reduce odors caused by sulfides, reduce the amount of polymer needed, and increase cake solids content (Rudolf, 1992). Figure 2 shows dewatered solids from a belt filter press after processing.



Source: Dr. Peter Wright, Cornell University, 1996.

FIGURE 2 DEWATERED SOLIDS CAKE DROPPING FROM BELT FILTER PRESS AFTER PROCESSING

OPERATION AND MAINTENANCE

It is important to monitor operating parameters to achieve optimum performance and ensure that solids are properly conditioned and that good gravity drainage occurs. The manufacturer should

provide operation and maintenance training after installation as well as ongoing training to maintain skills.

Dewatering belts should be designed for easy replacement with minimum downtime. Belt washing should occur daily after the cake is removed.

Replacement of filter belts is a common maintenance requirement. Belt life averages about 2,700 running hours, with a range of 400 to 12,000 hours.

A belt press operator is responsible for polymer mixing, dosing and monitoring usage, and observing the feed and cake several times per day, making adjustments as necessary. Rollers and bearings require frequent lubrication.

It is important for the operator to keep records of all press performance parameters, including the volume of biosolids fed to the press, polymer dosage, and potassium permanganate or other chemical usage. A sample of the biosolids to the press, cake discharge, and filtrate should be taken at least once per shift and analyzed for total solids. At the end of each shift, the belt should be cleaned with high-pressure wash water. Labor is relative to plant size. A plant with a single belt press needs four to eight staff hours per day (including lab testing), whereas six to eight presses can be operated with eight to ten staff hours per day. Large plants use less operating effort per belt press. Highly automated systems reduce labor requirements, but require an instrumentation specialist to maintain the system.

COSTS

Capital costs for belt filter presses vary with the size of the equipment. Vendor estimates vary from \$47,500 (0.5 meter belt, approximate capacity of 500 dry pounds per hour) to \$115,000 (1.5 meter belt with approximate capacity of 1,625 dry pounds per hour). These estimates are based on a feed material which is 5 percent solids. These prices do not include the cost of installation, shipping, or ancillary equipment, such as flow control and centrate management.

Overall operation and maintenance costs range from \$80 per dry ton of solids (DTS) to \$200 per DTS. Typical polymer conditioning costs for belt filter press dewatering range from \$2.65 per million gallons to \$91.15 per million gallons, and average \$24.38 per million gallons. Permanganate adds about \$1 per million gallons to the cost of dewatering the biosolids. These costs vary widely, depending on the source of the residuals. The polymer costs for raw primary may cost \$12 per DTS, but may be as high as \$80 per DTS for residuals that are difficult to dewater.

REFERENCES

Other Related Fact Sheets

Odor Management in Biosolids Management
EPA 832-F-00-067
September 2000

Alkaline Stabilization of Biosolids
EPA 832-F-00-052
September 2000

Land Application of Biosolids
EPA 832-F-00-064
September 2000

In-Vessel Composting
EPA 832-F-00-061
September 2000

Other EPA Fact Sheets can be found at the following web address:
<http://www.epa.gov/owmitnet/mtbfact.htm>

1. Bain, R.E., Brady, P., and Torpey, P., 1999. "Experience With 70+ Self-Enclosed Belt Presses and Thickeners." In *Proceedings of the WEF/AWWA Joint Residuals and Biosolids Management Conference: Strategic Networking for the 21st Century*. Arlington, VA. Water Environment Federation.

2. Gillette, R.A., Joslyn, S.D., Palmer, T., 2000. "Optimization of Thickening and Dewatering Through Automation." In *Proceedings of the 14th Annual Residuals and Biosolids Management Conference*. Arlington, VA. Water Environment Federation.
3. Hamilton, K., and Millard, R., 1999. "Innovative Mechanical Dewatering and Thermal Drying Technologies." In *Proceedings of WEF/AWWA Joint Residuals and Biosolids Management Conference: Strategic Networking for the 21st Century*. Arlington, VA. Water Environment Federation.
4. Henderson, R.T. and Schultz, S.T. 1999. "Centrifuges Versus Belt Presses in San Bernardino, California." In *Proceedings of WEF/AWWA Joint Residuals and Biosolids Management Conference: Strategic Networking for the 21st Century*. Arlington, VA. Water Environment Federation.
5. Hentz, L. H. Jr., P.E., Cassel, A.F., and Conley, S. 2000. "The Effects of Liquid Sludge Storage on Biosolids Odor Emissions." In *Proceedings of 14th Annual Residuals and Biosolids Management Conference*. Arlington, VA. Water Environment Federation.
6. Kemp, J., 1997. "Just the Facts on Dewatering Systems." *Water Environment and Technology*, December 1997.
7. Rudolf, D.J. 1992, "Solution to Odor Problem Gives Unexpected Savings." *WATER/Engineering & Management*.
8. U.S. EPA, 1987. "Design Manual for Dewatering Municipal Wastewater Sludges." U.S. EPA, Washington, D.C.
9. Wright, Peter, 1996. Cornell University.

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Capital Improvement Projects



Yucaipa Valley Water District



Date: April 28, 2015

Subject: Status Report on the Construction of a 6.0 Million Gallon Drinking Water Reservoir R-12.4 - Calimesa

At the regular meeting on July 16, 2014, the Board authorized the solicitation of bids for the construction of a 6.0 Million Gallon R-12.4 Reservoir located on Singleton Road in Calimesa [Director Memorandum No. 14-060]. On November 19, 2014, the Board of Directors awarded the construction contract for the reservoir facility to Gateway Pacific Contractors [Director Memorandum No. 14-091].



The purpose of this agenda item is to provide an update on the progress of the reservoir construction project.







b







Date: April 28, 2015

Subject: Status Report on the Installation of an Air Conditioning System at Lift Station No. 1

At the regular meeting on March 18, 2015, the Board authorized the installation of an air conditioning system at Lift Station No. 1. The purpose of this agenda item is to provide an update on the progress of the project.



Date: April 28, 2015

Subject: Status Report on the Construction of Replacement Digester Covers and Associated Piping at the Wochholz Regional Water Recycling Facility

The Yucaipa Valley Water District operates and maintains four anaerobic digesters for sludge conditioning, each with a diameter of 45 feet and a side water depth of 22 feet, yielding a working capacity of approximately 262,000 gallons per digester. The digesters treat sludge drawn from both the primary clarifiers and from the dissolved air flotation thickeners. Digested sludge flows by gravity and can be stored temporarily in a sludge holding tank before being conveyed to the belt presses for dewatering. To keep the digesters functioning properly they should be cleaned every 8-10 years in order to remove the accumulated build-up of sand, grit, and other debris.

Projects	Construction Timeline	Summary of Work
Wastewater Treatment Plant	1976-design 1984-constr	<ul style="list-style-type: none"> Construction of Digester Nos. 1 and 2 and appurtenant equipment, (e.g. heaters) Digester No. 1 equipped with a fixed cover and Digester No. 2 equipped with a floating cover
Stage I Expansion Project	1992	<ul style="list-style-type: none"> Construction of Digester Nos. 3 and 4 Both Digester No. 3 and Digester No. 4 equipped with fixed covers
Digester No. 2 Cover Modifications	1994	<ul style="list-style-type: none"> Digester No. 2 cover converted from floating to fixed configuration
Digester Cleaning	2004	<ul style="list-style-type: none"> Digester Nos. 1-4 Cleaning
Digester Coating	2005	<ul style="list-style-type: none"> Digester Nos. 1-4 Coating of Cover
Digester and Sludge Holding Tank Modifications Project	2005	<ul style="list-style-type: none"> Digester Nos. 1-4 and Digester Holding Tank Pump Mix System installation

When the digesters were last cleaned in 2005, the District staff assessed the condition of the digesters and related equipment. Based on corrosion identified at this time, the District made a decision to replace at least two covers the next time the digesters were scheduled to be cleaned.

On November 6, 2013, the Board of Directors approved a contract with RMC to assist in the cleaning and the replacement of the steel covers and piping that was previously identified as having corrosion issues.

At the board workshop on February 24, 2015, Scott Goldman outlined the proposed construction alternatives that will allow the Board of Directors to either replace either two or four digester covers.



On March 4, 2015, the Board of Directors authorized District staff to solicit proposals for the digester repairs. The bid opening is currently scheduled for Tuesday, April 14, 2015 at 2:00 p.m. The District staff will review the proposals and provide a recommendation at the board meeting on May 6, 2015.

Bids for the WRWRF Digester Cleaning and Cover Replacement Project were opened and read aloud at 3:00 p.m. PST on Tuesday, April 14, 2015. Four bids were received, each of which was accompanied by the required bid security. The contractors bidding on the project included: Pascal and Ludwig Constructors (Pascal & Ludwig), Canyon Springs Ent. dba RSH Construction (RSH), Gateway Pacific Contractors, Inc. (Gateway Pacific), and Speiss Construction Co., Inc (Speiss). Table 1 provides a bid tabulation of the contractor's bids, listed in order of increasing amount. Contractors were requested to provide bids for three options:

- Option A: Replace covers for digesters 1 and 2, repair and coat digesters 3 and 4.
- Options B: Replace covers for digesters 1 and 2, assess condition of digesters 3 and 4 after digesters 1 and 2 are returned to service. Replace covers for digester 3 and 4 following condition assessment.
- Option C: Replace covers for all four digesters

Per the Instructions to Bidders, the District can award the construction contract to the lowest responsible bidder for either Bid Option A or Bid Option C. Pascal & Ludwig was the apparent low bidder for both Options A and C; RSH was the apparent second lowest bidder for both Options A and C.

Table 1: Contractor Bid Tabulation

Bidder	Bid Option A	Bid Option B	Bid Option C
Pascal & Ludwig	\$1,789,000	\$2,302,000	\$2,175,000
RSH	\$1,988,196	\$2,165,596	\$2,226,498
Gateway Pacific	\$2,115,021	\$2,609,546	\$2,421,991
Spiess	\$2,259,200	\$2,633,300 ^a	\$2,643,150
<i>Engineer's Estimate</i>	<i>\$2,104,000</i>	<i>\$3,043,000</i>	<i>\$2,787,000</i>

Footnotes:

- Due to a mathematical error, contractor's written bid of \$2,688,500 has been amended to accurately reflect the amounts listed in the bidding schedule submitted.

The bid submitted by Pascal & Ludwig was lowest for both Option A and Option C. The qualifications of Pascal & Ludwig have been reviewed by RMC Water and Environment and found to be satisfactory (see Bid Evaluation Report). Therefore, RMC recommends that the Contract be awarded to Pascal & Ludwig for either Bid Option A or Bid Option C. Given the lower than expected bid price for Option C, RMC is also recommending that the District select Option C. It is likely that the covers for Digesters 3 and 4 will require replacement when the condition assessment is performed—and if not now, certainly within the next 10 years when the digesters are next cleaned.



Yucaipa Valley Water District

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**HENRY N. WOCHHOLZ REGIONAL WATER RECYCLING FACILITY
(WRWRF)
DIGESTER CLEANING AND COVER REPLACEMENT PROJECT
P-88-289**

BID EVALUATION REPORT

April 22, 2015

Prepared by:



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**YUCAIPA VALLEY WATER DISTRICT
WRWRF DIGESTER CLEANING AND COVER REPLACEMENT PROJECT**

BID REPORT

1 GENERAL

Bids for the Yucaipa Valley Water District WRWRF Digester Cleaning and Cover Replacement Project were opened and read aloud at 3:00 p.m. PST on Tuesday, April 14, 2015.

2 BIDS RECEIVED

Four bids were received, each of which was accompanied by the required bid security. The contractors bidding on the project included: Pascal and Ludwig Constructors (Pascal & Ludwig), Canyon Springs Ent. dba RSH Construction (RSH), Gateway Pacific Contractors, Inc. (Gateway Pacific), and Speiss Construction Co., Inc (Speiss). **Table 1** provides a bid tabulation of the contractor's bids, listed in order of increasing amount. Contractors were requested to provide bids for three options:

- Option A: Replace covers for digesters 1 and 2, repair and coat digesters 3 and 4.
- Options B: Replace covers for digesters 1 and 2, assess condition of digesters 3 and 4 after digesters 1 and 2 are returned to service. Replace covers for digester 3 and 4 following condition assessment.
- Option C: Replace covers for all four digesters

Per the Instructions to Bidders, the District can award the construction contract to the lowest responsible bidder for either Bid Option A or Bid Option C. Pascal & Ludwig was the apparent low bidder for both Options A and C; RSH was the apparent second lowest bidder for both Options A and C.

Table 1: Contractor Bid Tabulation

Bidder	Bid Option A	Bid Option B	Bid Option C
Pascal & Ludwig	\$1,789,000	\$2,302,000	\$2,175,000
RSH	\$1,988,196	\$2,165,596	\$2,226,498
Gateway Pacific	\$2,115,021	\$2,609,546	\$2,421,991
Speiss	\$2,259,200	\$2,633,300 ^a	\$2,643,150
<i>Engineer's Estimate</i>	<i>\$2,104,000</i>	<i>\$3,043,000</i>	<i>\$2,787,000</i>

Footnotes:

- a. Due to a mathematical error, contractor's written bid of \$2,688,500 has been amended to accurately reflect the amounts listed in the bidding schedule submitted.

The bidding schedules for each bidder and option are presented side-by-side with the engineer's estimate in **Appendix A**.

3 IRREGULARITIES

The four bids were reviewed in detail, and the following irregularities were found:

- Speiss made a mathematical error in calculating the total bid amount under Option B; this has been amended in Table 1 above.
- RSH and Speiss presented higher bid amounts under Option C than Option B. It was anticipated that Option B would be higher than Option C for all bidders.
- The Bid Bond for Pascal & Ludwig was based on 10% of Bid Option A. Addendum No. 1 clarified that the Bid Bond should be based on Option C. If the project is awarded to them, this irregularity will need to be waived.
- RSH did not provide project references under the Information Required of Bidder.
- As the apparent second low bidder, RSH did not provide project references for its subbidders (subcontractors) in accordance with the Information Required of Bidder and the Instructions to Bidders as amended in Addendum No. 2.
- RSH did not provide a signed acknowledgment of receipt of Addendum No. 3.

4 BIDDER QUALIFICATION REVIEW

The qualifications of the four bidders were reviewed based on the following information:

- General information including the firm's name, contact information, years of experience, and prior project performance.
- Identification of previous similar and relevant projects. Bidder references were checked for Pascal & Ludwig and Gateway Pacific. (Note that no references were provided for RSH.)
- Contractor licenses were checked for each bidder and found to be current and active for Class A.

A summary of the bidder's qualification information is provided in the **Appendix B**.

6 SUMMARY

The bid submitted by Pascal & Ludwig was lowest for both Option A and Option C. The qualifications of Pascal & Ludwig have been reviewed and found to be satisfactory. Therefore, RMC Water and Environment recommends that the Contract be awarded to Pascal & Ludwig for either Bid Option A or Bid Option C.

Given the lower than expected bid price for Option C, RMC is also recommending that the District select Option C. It is likely that the covers for Digesters 3 and 4 will require replacement when the condition assessment is performed—and if not now, certainly within the next 10 years when the digesters are next cleaned.

APPENDIX A: BIDDING SCHEDULES

HENRY N. WOCHHOLZ REGIONAL WATER RECYCLING FACILITY (WRWRF)
 DIGESTER CLEANING AND COVER REPLACEMENT PROJECT
 P-88-289

APPENDIX A - BIDDING SCHEDULES

Item No.	Description	Unit	Engineer's Estimate	Pascal & Ludwig	RSH	Gateway Pacific	Speiss
OPTION A							
101	Contract bonds, insurance and permits (not to exceed 3% of bid amount)	LS	\$ 113,850	\$ 50,000	\$ 60,000	\$ 60,000	\$ 54,000
102	Mobilization of equipment, materials, and labor (not to exceed 3% of bid amount)	LS	\$ 113,850	\$ 50,000	\$ 60,000	\$ 60,000	\$ 67,000
103	Furnish and install temporary gas piping	LS	\$ 56,149	\$ 25,000	\$ 24,000	\$ 85,686	\$ 37,800
104	Demolition (Digesters 1 and 2 covers, gas piping)	LS	\$ 220,386	\$ 79,000	\$ 75,000	\$ 250,000	\$ 87,200
105	Clean Digesters 1 and 2	LS	\$ 255,024	\$ 173,000	\$ 165,000	\$ 200,000	\$ 280,600
106	Structural repairs to Digesters 1 and 2 tanks	LS	\$ 32,292	\$ 6,000	\$ 2,500	\$ 15,000	\$ 16,200
107	Furnish and install new covers (including coatings) for Digesters 1 and 2	LS	\$ 724,407	\$ 708,000	\$ 806,998	\$ 609,335	\$ 662,900
108	Furnish and install new gas piping and appurtenances	LS	\$ 132,794	\$ 270,000	\$ 290,000	\$ 150,000	\$ 433,200
109	Clean Digesters 3 and 4	LS	\$ 255,024	\$ 173,000	\$ 145,000	\$ 200,000	\$ 237,600
110	Structural repairs to Digesters 3 and 4 covers	LS Allowance		\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000
111	Structural repairs to Digesters 3 and 4 tanks	LS Allowance		\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000
112	Digesters 3 and 4 coatings	LS	\$ 200,000	\$ 240,000	\$ 382,698	\$ 400,000	\$ 332,200
113	All other items of work not included in the above bid items required for a complete and functional project in compliance with the Contract Documents	LS	\$ -	\$ -	\$ 14,000	\$ 50,000	\$ 15,500
Total Lump Sum Bid Option A			\$ 2,103,776	\$ 1,809,000	\$ 2,060,196	\$ 2,115,021	\$ 2,259,200
Last Minute Addition or Deduction				\$ (20,000)	\$ (72,000)		
Total Bid Option A			\$ 2,104,000	\$ 1,789,000	\$ 1,988,196	\$ 2,115,021	\$ 2,259,200
Rank		-		1	2	3	4

Percentage Checks					
Item No. 101 (NTE 3%)		2.8%	2.9%	2.8%	2.4%
Item No. 102 (NTE 3%)		2.8%	2.9%	2.8%	2.97%
Last Minute Addition or Deduction (NTE 7%)		-1.1%	-3.5%	0.0%	0.0%

HENRY N. WOCHHOLZ REGIONAL WATER RECYCLING FACILITY (WRWRF)
 DIGESTER CLEANING AND COVER REPLACEMENT PROJECT
 P-88-289

APPENDIX A - BIDDING SCHEDULES

Item No.	Description	Unit	Engineer's Estimate	Pascal & Ludwig	RSH	Gateway Pacific	Speiss
OPTION B							
101	Contract bonds, insurance and permits (not to exceed 3% of bid amount)	LS	\$ 193,200	\$ 50,000	\$ 68,000	\$ 60,000	\$ 54,000
102	Mobilization of equipment, materials, and labor (not to exceed 3% of bid amount)	LS	\$ 193,200	\$ 50,000	\$ 68,000	\$ 60,000	\$ 67,000
103	Furnish and install temporary gas piping	LS	\$ 56,149	\$ 25,000	\$ 24,000	\$ 85,686	\$ 37,800
104	Demolition (Digesters 1 and 2 covers, gas piping)	LS	\$ 220,386	\$ 79,000	\$ 95,000	\$ 250,000	\$ 87,200
105	Clean Digesters 1 and 2	LS	\$ 255,024	\$ 173,000	\$ 165,000	\$ 200,000	\$ 280,600
106	Structural repairs to Digesters 1 and 2 tanks	LS	\$ 32,292	\$ 6,000	\$ 2,500	\$ 15,000	\$ 16,200
107	Furnish and install new covers (including coatings) for Digesters 1 and 2	LS	\$ 724,407	\$ 708,000	\$ 820,998	\$ 609,335	\$ 662,900
108	Furnish and install new gas piping and appurtenances	LS	\$ 152,204	\$ 270,000	\$ 324,002	\$ 150,000	\$ 433,200
109	Clean Digesters 3 and 4	LS	\$ 255,024	\$ 173,000	\$ 145,000	\$ 200,000	\$ 237,600
110	Structural repairs to Digesters 3 and 4 covers	Not Used					
111	Structural repairs to Digesters 3 and 4 tanks	LS Allowance	\$ 20,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000
112	Digesters 3 and 4 coatings	Not Used					
113	All other items of work not included in the above bid items required for a complete and functional project in compliance with the Contract Documents	LS	\$ -	\$ -	\$ 26,000	\$ 50,000	\$ 15,500
114	Deduct Bid Items 110 and 112 from above	LS	\$ -	\$ -	\$ -	\$ -	\$ -
115	Demolition (Digesters 3 and 4 covers, gas piping)	LS	\$ 216,522	\$ 79,000	\$ 65,000	\$ 250,000	\$ 80,000
116	Furnish and install new covers (including coatings) for Digesters 3 and 4	LS	\$ 724,407	\$ 704,000	\$ 519,096	\$ 674,525	\$ 656,300
Total Lump Sum Bid Option B			\$ 3,042,815	\$ 2,322,000	\$ 2,327,596	\$ 2,609,546	\$ 2,633,300
Last Minute Addition or Deduction			\$ -	\$ (20,000)	\$ (162,000)	\$ -	\$ -
Total Bid Option B			\$ 3,043,000	\$ 2,302,000	\$ 2,165,596	\$ 2,609,546	\$ 2,633,300
Rank			Bidders Not Ranked on this Option				

Percentage Checks					
Item No. 101 (NTE 3%)		2.2%	2.9%	2.3%	2.1%
Item No. 102 (NTE 3%)		2.2%	2.9%	2.3%	2.5%
Last Minute Addition or Deduction (NTE 7%)		-0.9%	-6.96%	0.0%	0.0%

HENRY N. WOCHHOLZ REGIONAL WATER RECYCLING FACILITY (WRWRF)
 DIGESTER CLEANING AND COVER REPLACEMENT PROJECT
 P-88-289

APPENDIX A - BIDDING SCHEDULES

Item No.	Description	Unit	Engineer's Estimate	Pascal & Ludwig	RSH	Gateway Pacific	Speiss
OPTION C							
201	Contract bonds, insurance and permits (not to exceed 3% of bid amount)	LS	\$ 113,850	\$ 50,000	\$ 60,000	\$ 65,000	\$ 49,500
202	Mobilization of equipment, materials, and labor (not to exceed 3% of bid amount)	LS	\$ 113,850	\$ 50,000	\$ 60,000	\$ 65,000	\$ 61,400
203	Furnish and install temporary gas piping	LS	\$ 56,149	\$ 25,000	\$ 24,000	\$ 85,000	\$ 34,650
204	Demolition (Digesters 1 and 2 covers, gas piping)	LS	\$ 218,454	\$ 79,000	\$ 75,000	\$ 215,683	\$ 80,000
205	Clean Digesters 1 and 2	LS	\$ 254,537	\$ 173,000	\$ 165,000	\$ 200,000	\$ 257,200
206	Structural repairs to Digesters 1 and 2 tanks	LS	\$ 32,292	\$ 6,000	\$ 2,500	\$ 15,000	\$ 16,200
207	Furnish and install new covers (including coatings) for Digesters 1 and 2	LS	\$ 686,795	\$ 640,000	\$ 806,998	\$ 600,000	\$ 669,400
208	Clean Digesters 3 and 4	LS	\$ 254,537	\$ 173,000	\$ 145,000	\$ 200,000	\$ 237,600
209	Demolition (Digesters 3 and 4 covers, gas piping)	LS	\$ 218,454	\$ 79,000	\$ 75,000	\$ 200,000	\$ 87,300
210	Structural repairs to Digesters 3 and 4 tanks	LS Allowance		\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000
211	Furnish and install new covers (including coatings) for Digesters 3 and 4	LS	\$ 686,795	\$ 640,000	\$ 665,000	\$ 600,000	\$ 669,400
212	Furnish and install new gas piping and appurtenances	LS	\$ 150,317	\$ 270,000	\$ 290,000	\$ 150,000	\$ 455,000
213	All other items of work not included in the above bid items required for a complete and functional project in compliance with the Contract Documents	LS	\$ -	\$ -	\$ 15,000	\$ 16,308	\$ 15,500
Total Lump Sum Bid Option C			\$ 2,786,030	\$ 2,195,000	\$ 2,393,498	\$ 2,421,991	\$ 2,643,150
Last Minute Addition or Deduction				\$ (20,000)	\$ (167,000)		
Total Bid Option C			\$ 2,787,000	\$ 2,175,000	\$ 2,226,498	\$ 2,421,991	\$ 2,643,150
Rank		-	1	2	3	4	

Percentage Checks					
Item No. 201 (NTE 3%)		2.3%	2.5%	2.7%	1.9%
Item No. 202 (NTE 3%)		2.3%	2.5%	2.7%	2.3%
Last Minute Addition or Deduction (NTE 7%)		-0.9%	-6.98%	0.0%	0.0%

APPENDIX B: QUALIFICATION REVIEW

P-88-289_Bid Evaluation Report_2015-04-22.docx
RMC Water and Environment

04/22/2015
0350-57 | P-88-289

**YUCAIPA VALLEY WATER DISTRICT
WRWRF DIGESTER CLEANING AND COVER REPLACEMENT PROJECT**

QUALIFICATION REVIEW

The following information on the bidders has been obtained from the bid proposals and telephone interviews conducted April 17, 2015 through April 22, 2015.



CONTRACTORS STATE LICENSE BOARD



Contractor's License Detail for License # 373525

DISCLAIMER: A license status check provides information taken from the CSLB license database. Before relying on this information, you should be aware of the following limitations.

CSLB complaint disclosure is restricted by law (B&P 7124.6) If this entity is subject to public complaint disclosure, a link for complaint disclosure will appear below. Click on the link or button to obtain complaint and/or legal action information.
Per B&P 7071.17 , only construction related civil judgments reported to the CSLB are disclosed.
Arbitrations are not listed unless the contractor fails to comply with the terms of the arbitration.
Due to workload, there may be relevant information that has not yet been entered onto the Board's license database.

Data current as of 4/21/2015 4:10:41 PM

Business Information

PASCAL & LUDWIG CONSTRUCTORS INC
2049 E FRANCIS STREET
ONTARIO, CA 91761
Business Phone Number:(909) 947-4631

Entity Corporation
Issue Date 04/23/1979
Reissue Date 04/23/1999
Expire Date 04/30/2017

License Status

This license is current and active.
All information below should be reviewed.

Classifications

A - GENERAL ENGINEERING CONTRACTOR
B - GENERAL BUILDING CONTRACTOR

Certifications

HAZ - HAZARDOUS SUBSTANCES REMOVAL

Bonding Information

Contractor's Bond

This license filed a Contractor's Bond with SAFECO INSURANCE COMPANY OF AMERICA.
Bond Number: 5911752
Bond Amount: \$12,500
Effective Date: 01/01/2007
[Contractor's Bond History](#)

Bond of Qualifying Individual

The Responsible Managing Officer (RMO) LUDWIG ALAN GORDON certified that he/she owns 10 percent or more of the voting stock/equity of the corporation. A bond of qualifying individual is **not** required.
Effective Date: 04/23/1999

Workers' Compensation

This license has workers compensation insurance with the TRAVELERS PROPERTY CASUALTY COMPANY OF AMERICA
Policy Number:DTJUBOF92595814
Effective Date: 10/13/2014
Expire Date: 10/13/2015
Workers' Compensation History

Miscellaneous Information

04/23/1999 - LICENSE REISSUED TO ANOTHER ENTITY

Other

Personnel listed on this license (current or disassociated) are listed on other licenses.



CONTRACTORS STATE LICENSE BOARD



Contractor's License Detail for License # 806747

DISCLAIMER: A license status check provides information taken from the CSLB license database. Before relying on this information, you should be aware of the following limitations.

CSLB complaint disclosure is restricted by law (B&P 7124.6) If this entity is subject to public complaint disclosure, a link for complaint disclosure will appear below. Click on the link or button to obtain complaint and/or legal action information.
Per B&P 7071.17, only construction related civil judgments reported to the CSLB are disclosed.
Arbitrations are not listed unless the contractor fails to comply with the terms of the arbitration.
Due to workload, there may be relevant information that has not yet been entered onto the Board's license database.

Data current as of 4/21/2015 3:20:47 PM

Business Information

CANYON SPRINGS ENTERPRISES
DBA R S H CONSTRUCTION

3883 WENTWORTH DRIVE
HEMET, CA 92545
Business Phone Number:(951) 925-2288

Entity Corporation
Issue Date 04/17/2002
Expire Date **04/30/2016**

License Status

This license is current and active.
All information below should be reviewed.

Classifications

A - GENERAL ENGINEERING CONTRACTOR

Bonding Information

Contractor's Bond

This license has a Contractor's Cash Deposit on file with CSLB.
Bond Number: T1087L5
Bond Amount: \$12,500
Effective Date: 01/01/2007
Contractor's Bond History

Bond of Qualifying Individual

This license filed Bond of Qualifying Individual number **7637985** for ERICKSON CHUCK ALLAN in the amount of **\$12,500** with FIDELITY AND DEPOSIT COMPANY OF MARYLAND.
Effective Date: 11/05/2013

Workers' Compensation

This license has workers compensation insurance with the OLD REPUBLIC GENERAL INSURANCE CORPORATION
Policy Number:A1CW95411405
Effective Date: 11/01/2014
Expire Date: 11/01/2015
Workers' Compensation History

Other

Personnel listed on this license (current or disassociated) are listed on other licenses.



CONTRACTORS STATE LICENSE BOARD



Contractor's License Detail for License # 517988

DISCLAIMER: A license status check provides information taken from the CSLB license database. Before relying on this information, you should be aware of the following limitations.

CSLB complaint disclosure is restricted by law (B&P 7124.6) If this entity is subject to public complaint disclosure, a link for complaint disclosure will appear below. Click on the link or button to obtain complaint and/or legal action information.
Per B&P 7071.17 , only construction related civil judgments reported to the CSLB are disclosed.
Arbitrations are not listed unless the contractor fails to comply with the terms of the arbitration.
Due to workload, there may be relevant information that has not yet been entered onto the Board's license database.

Data current as of 4/21/2015 3:51:23 PM

Business Information

GATEWAY PACIFIC CONTRACTORS INC
8055 FREEPORT BLVD
SACRAMENTO, CA 95832
Business Phone Number:(916) 665-4100

Entity Corporation
Issue Date 09/22/1987
Expire Date 09/30/2015

License Status

This license is current and active.

All information below should be reviewed.

Classifications

A - GENERAL ENGINEERING CONTRACTOR
B - GENERAL BUILDING CONTRACTOR

Bonding Information

Contractor's Bond

This license filed a Contractor's Bond with TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA.
Bond Number: 103453633
Bond Amount: \$12,500
Effective Date: 01/01/2007
Contractor's Bond History

Bond of Qualifying Individual

The Responsible Managing Officer (RMO) LUNDIN EVAN ROBERT certified that he/she owns 10 percent or more of the voting stock/equity of the corporation. A bond of qualifying individual is **not** required.
Effective Date: 12/17/1998

Workers' Compensation

This license has workers compensation insurance with the TRAVELERS PROPERTY CASUALTY COMPANY OF AMERICA
Policy Number:DTJUB365K759
Effective Date: 01/01/2013
Expire Date: 01/01/2016
Workers' Compensation History



CONTRACTORS STATE LICENSE BOARD



Contractor's License Detail for License # 333989

DISCLAIMER: A license status check provides information taken from the CSLB license database. Before relying on this information, you should be aware of the following limitations.

CSLB complaint disclosure is restricted by law (B&P 7124.6) If this entity is subject to public complaint disclosure, a link for complaint disclosure will appear below. Click on the link or button to obtain complaint and/or legal action information.
Per B&P 7071.17 , only construction related civil judgments reported to the CSLB are disclosed.
Arbitrations are not listed unless the contractor fails to comply with the terms of the arbitration.
Due to workload, there may be relevant information that has not yet been entered onto the Board's license database.

Data current as of 4/21/2015 4:14:09 PM

Business Information

SPIESS CONSTRUCTION CO INC
P O BOX 2849
SANTA MARIA, CA 93457
Business Phone Number:(805) 937-5859

Entity Corporation
Issue Date 03/24/1977
Expire Date 05/31/2016

License Status

This license is current and active.

All information below should be reviewed.

Classifications

A - GENERAL ENGINEERING CONTRACTOR
B - GENERAL BUILDING CONTRACTOR
C33 - PAINTING AND DECORATING
C27 - LANDSCAPING

Bonding Information

Contractor's Bond

This license filed a Contractor's Bond with TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA.
Bond Number: 400JS0475
Bond Amount: \$12,500
Effective Date: 03/22/2008
Contractor's Bond History

Bond of Qualifying Individual

This license filed Bond of Qualifying Individual number **400JX5602** for MATCHETT BARRY LEE in the amount of **\$12,500** with TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA.
Effective Date: 01/01/2007
BQI's Bond History
The Responsible Managing Officer (RMO) COLEMAN SCOTT ALLYN certified that he/she owns 10 percent or more of the voting stock/equity of the corporation. A bond of qualifying individual is **not** required.
Effective Date: 09/21/2006

Workers' Compensation

This license has workers compensation insurance with the STARR INDEMNITY & LIABILITY COMPANY
Policy Number:1000001459
Effective Date: 10/01/2014
Expire Date: 10/01/2015
Workers' Compensation History

Other

Personnel listed on this license (current or disassociated) are listed on other licenses.

Telephone Discussion Notes



P-88-289 WRWRF DIGESTER CLEANING AND COVER REPLACEMENT

**Subject: Pascal & Ludwig
Reference Check**

RMC

Employee: Bert Ly

Date: April 22, 2015

Time: 9:00am to 9:07am

Project Number: 0305-57

Other Party

Contact: Brian Peck

Company/Agency: SOCWA

Phone: 949.234.5400
919.234.5400 (incorrect number)

Address: N/A

1. Purpose of Discussion

Perform reference check on Pascal & Ludwig.

2. Discussion Summary

Export Sludge Equalization Basin – April 2014

1. Brief description of the project and work performed by **Pascal & Ludwig**
Design build project. Export sludge from one treatment plant to another. Constructed eq. tank 60' dia. by 20' tall with concrete cover. Holds sludge for 3-4 days. Includes new pump station and electrical building.
2. Dollar value of the project. Confirm Contract Amount: **\$4,779,997**.
Correct.
3. Were they the General Contractor or were they a subcontractor? If subcontractor, who was the GC.
General Contractor – design build.
4. How was their performance on the project?
Very good.
5. Did they perform the work adequately/competently?
High quality and organized.
6. Was it completed on time and within budget?
Completed on time and on budget. Fast tracked project with Prop 50 funds.
7. Were there any claims or change orders filed on the project?
No claims or change order were small.
8. Any comments on the final product?
High quality. Pascal & Ludwig has completed nine construction project with SOCWA and is currently constructing another project.

Telephone Discussion Notes



P-88-289 WRWRF DIGESTER CLEANING AND COVER REPLACEMENT

**Subject: Pascal & Ludwig
Reference Check**

RMC

Employee: Bert Ly

Date: April 22, 2015

Time: 9:40am (Out of the Office)
11:20am – 11:30am

Project Number: 0305-57

Other Party

Contact: Safa Kamangar

Company/Agency: IEUA

Phone: 949.637.3999

Address: N/A

1. Purpose of Discussion

Perform reference check on Pascal & Ludwig.

2. Discussion Summary

San Joaquin Pump Station Improvements – May 2014

1. Brief description of the project and work performed by **Pascal & Ludwig**
Retrofit of existing pump station. Replaced pumps.
2. Dollar value of the project. Confirm Contract Amount: **\$806,986**
Yes. Based on memory.
3. Were they the General Contractor or were they a subcontractor? If subcontractor, who was the GC.
GC.
4. How was their performance on the project?
Perfect. No complaints. Would hire again.
5. Did they perform the work adequately/competently?
Yes. Good crew.
6. Was it completed on time and within budget?
Yes.
7. Were there any claims or change orders filed on the project?
Minor change orders.
8. Any comments on the final product?
Facility is still working well.

Telephone Discussion Notes



P-88-289 WRWRF DIGESTER CLEANING AND COVER REPLACEMENT

**Subject: Pascal & Ludwig
Reference Check**

RMC

Employee: Bert Ly

Date: April 22, 2015

Time: 9:35am (Out of the Office)
11:15am (Out of the Office)

Project Number: 0305-57

Other Party

Contact: Joe Polimino

Company/Agency: Yorba Linda Water District

Phone: 714.701.3000
714.701.3106 (Incorrect Number)

Address: N/A

1. Purpose of Discussion

Perform reference check on Pascal & Ludwig.

2. Discussion Summary

Equipping of Well No. 20 – October 2012

1. Brief description of the project and work performed by **Pascal & Ludwig**
2. Dollar value of the project. Confirm Contract Amount: **\$1,134,109**.
3. Were they the General Contractor or were they a subcontractor? If subcontractor, who was the GC.
4. How was their performance on the project?
5. Did they perform the work adequately/competently?
6. Was it completed on time and within budget?
7. Were there any claims or change orders filed on the project?
8. Any comments on the final product?

Telephone Discussion Notes



P-88-289 WRWRF DIGESTER CLEANING AND COVER REPLACEMENT

**Subject: Pascal & Ludwig
Reference Check**

RMC

Employee: Bert Ly

Date: April 22, 2015

Time: 9:25am (Out of the Office)

Project Number: 0305-57

Other Party

Contact: C. Shem Hawes

Company/Agency: Garden Grove Sanitary District

Phone: 626.357.0588

Address: N/A

1. Purpose of Discussion

Perform reference check on Pascal & Ludwig.

2. Discussion Summary

Belgrave Pump Station Replacement Project – April 2014

1. Brief description of the project and work performed by Pascal & Ludwig.
2. Dollar value of the project. Confirm Contract Amount: **\$2,010,300.**
3. Were they the General Contractor or were they a subcontractor? If subcontractor, who was the GC.
4. How was their performance on the project?
5. Did they perform the work adequately/competently?
6. Was it completed on time and within budget?
7. Were there any claims or change orders filed on the project?
8. Any comments on the final product?

Telephone Discussion Notes



P-88-289 WRWRF DIGESTER CLEANING AND COVER REPLACEMENT

**Subject: Canyon Springs Enterprises dba RSH Construction
Reference Check**

RMC

Employee: Bert Ly

Date: April 22, 2015

Time: 9:45am (Out of the Office)

Project Number: 0305-57

Other Party

Contact:

Company/Agency:

Phone:

Address: N/A

1. Purpose of Discussion

Perform reference check on Canyon Springs Enterprises.

2. Discussion Summary

No References provided

1. Brief description of the project and work performed by **Canyon Springs Enterprises**

2. Dollar value of the project. Confirm Contract Amount: \$ -

3. Were they the General Contractor or were they a subcontractor? If subcontractor, who was the GC.

4. How was their performance on the project?

5. Did they perform the work adequately/competently?

6. Was it completed on time and within budget?

7. Were there any claims or change orders filed on the project?

8. Any comments on the final product?



Telephone Discussion Notes

P-88-289 WRWRF DIGESTER CLEANING AND COVER REPLACEMENT

**Subject: Gateway Pacific Contractors, Inc.
Reference Check**

RMC

Employee: Bert Ly

Date: April 22, 2015

Time: 9:55am-10:03am

Project Number: 0305-57

Other Party

Contact: Mark Sulik (Spoke with PE Mike)

Company/Agency: City of Chino

Phone: 530.894.4301

Address: N/A

1. Purpose of Discussion

Perform reference check on Gateway Pacific Contractors, Inc.

2. Discussion Summary

Digester Cleaning and Cover Replacement – August 2014

1. Brief description of the project and work performed by **Gateway Pacific Contractors, Inc.**
Remove and build a new floating cover to replace existing cover.
2. Dollar value of the project. Confirm Contract Amount: **\$1,441,961**
Sounds approximately correct.
3. Were they the General Contractor or were they a subcontractor? If subcontractor, who was the GC.
GC.
4. How was their performance on the project?
Good job as general contractor. Sub (coating - Mason) was not prepared. Took longer than expected.
5. Did they perform the work adequately/competently?
Yes.
6. Was it completed on time and within budget?
Sub and weather delayed the project by 6 months. Do not recalled original budget.
7. Were there any claims or change orders filed on the project?
No claims. Change orders were approximately 20% of the budget.
8. Any comments on the final product?
Satisfied.

Telephone Discussion Notes



P-88-289 WRWRF DIGESTER CLEANING AND COVER REPLACEMENT

**Subject: Gateway Pacific Contractors, Inc.
Reference Check**

RMC

Employee: Bert Ly

Date: April 22, 2015

Time: 9:50am

Project Number: 0305-57

Other Party

Contact: Greg Deist

Company/Agency: City of San Clemente

Phone: 949.361.6154

Address: N/A

1. Purpose of Discussion

Perform reference check on Gateway Pacific Contractors, Inc.

2. Discussion Summary

Modify/Construct Reclamation Plant and Pump Station

1. Brief description of the project and work performed by **Gateway Pacific Contractors, Inc.**
Treatment plant expansion for recycled water capacity. From 2MGD to 5MGD.
2. Dollar value of the project. Confirm Contract Amount: **\$8,303,921**
Approximately \$9M.
3. Were they the General Contractor or were they a subcontractor? If subcontractor, who was the GC.
GC.
4. How was their performance on the project?
Excellent – Foreman: Tim Gangle.
5. Did they perform the work adequately/competently?
Yes.
6. Was it completed on time and within budget?
On time and on budget including change orders.
7. Were there any claims or change orders filed on the project?
City made many changes. 8.9% of construction budget as change orders. No claims.
8. Any comments on the final product?
Very pleased and responsive.

Telephone Discussion Notes



P-88-289 WRWRF DIGESTER CLEANING AND COVER REPLACEMENT

**Subject: Gateway Pacific Contractors, Inc.
Reference Check**

RMC

Employee: Bert Ly

Date: April 22, 2015

Time: 10:00am (out of the office)
11:35am (out of the office)

Project Number: 0305-57

Other Party

Contact: Cindy

Thanh Vo (no longer works here)

Company/Agency: Delta Diablo Sanitation
District

Phone: 925.756.1900 x 1976
925.746.1900 (incorrect number)

Address: N/A

1. Purpose of Discussion

Perform reference check on Gateway Pacific Contractors, Inc.

2. Discussion Summary

Rehabilitation of Existing Digester – April 2012

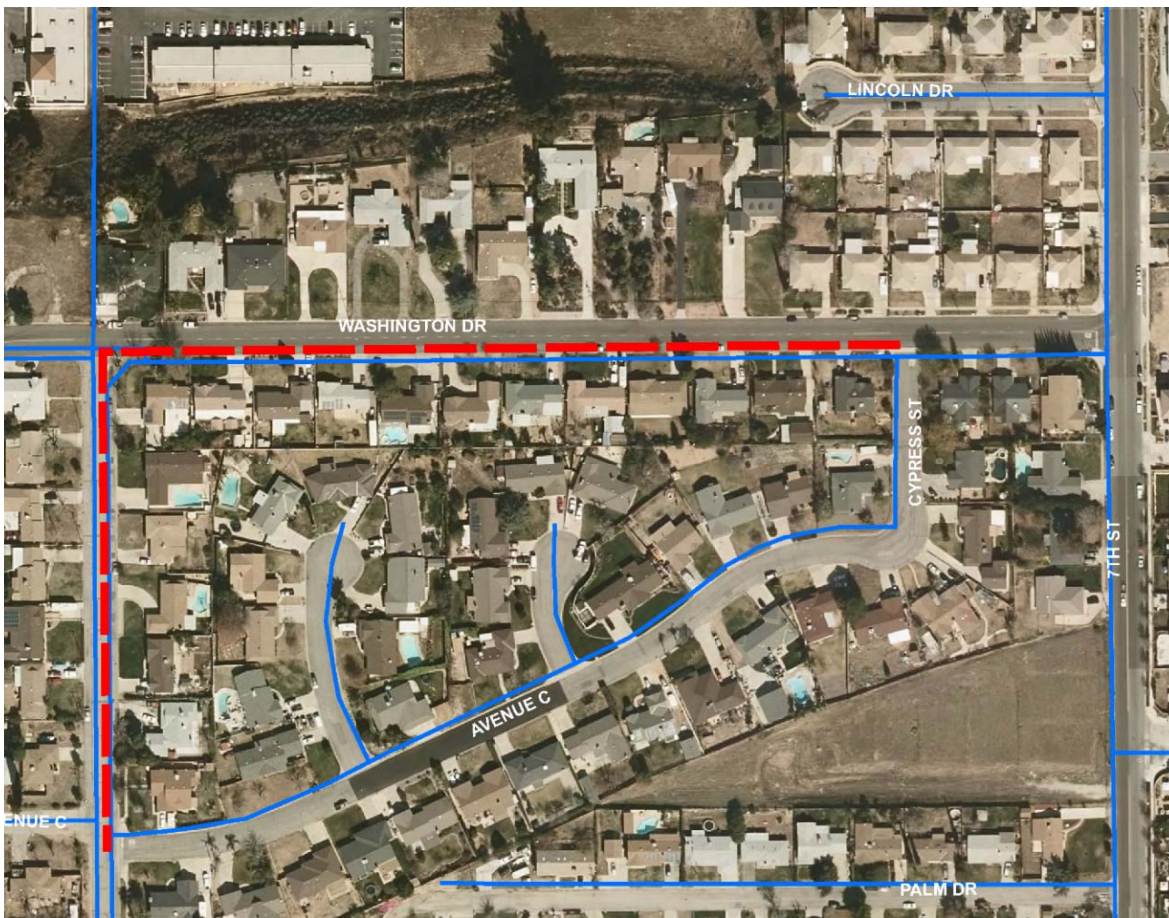
1. Brief description of the project and work performed by **Gateway Pacific Contractors, Inc.**
2. Dollar value of the project. Confirm Contract Amount: **\$1,055,111**
3. Were they the General Contractor or were they a subcontractor? If subcontractor, who was the GC.
4. How was their performance on the project?
5. Did they perform the work adequately/competently?
6. Was it completed on time and within budget?
7. Were there any claims or change orders filed on the project?
8. Any comments on the final product?



Date: April 28, 2015

Subject: Status Report on the Construction of the 8th Street and Washington Drive Replacement Pipelines

On January 21, 2015, the Board of Directors authorized the District staff to solicit bids for the construction of an 8-inch drinking water pipeline in 8th Street and Washington Drive. The proposed pipeline project will involve the construction of 1,565 linear feet of 8-inch ductile iron pipe in 8th Street from Avenue C to Washington Drive and in Washington Drive from 8th Street to Cypress Street. These pipes will replace an existing 6-inch steel leak-prone pipe.



On March 18, 2015, the Board of Directors awarded a construction contract to Borden Excavating for the project.

The purpose of this workshop agenda item is to provide an update on the status of this project.

Administrative Items



Yucaipa Valley Water District



Date: April 28, 2015

Subject: Identification and Declaration of Bad Debts for Calendar Year 2013

The District actively pursues delinquent accounts, and in most cases is able to collect delinquent fees through a combination of shutting off the services provided, sending accounts to a collection agency, placing a lien on the property involved, and/or pursuing the claims through legal actions such as small claims court. In some cases, the District is unable to collect the money owed the District.

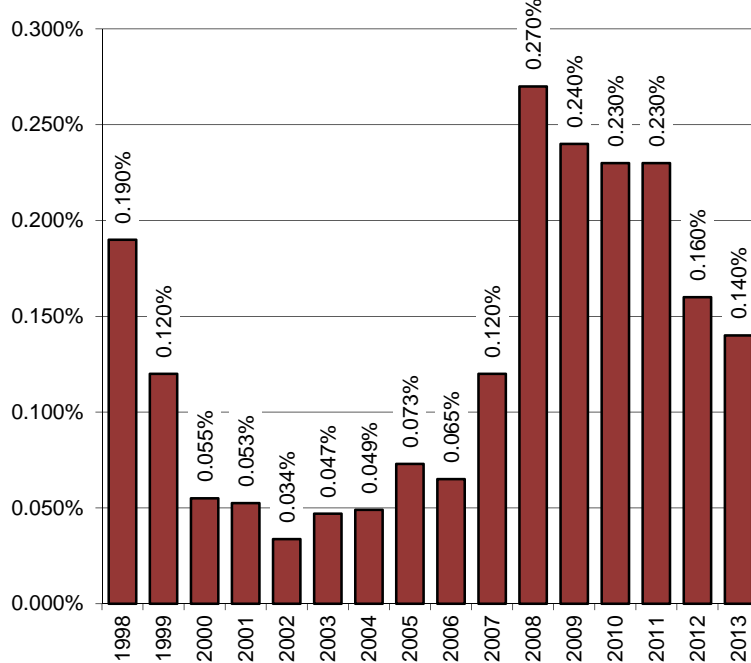
During the calendar year 2013, we did see a small drop in foreclosures. The amount of bad debt due to foreclosures is \$11,434.15, which includes \$4,955.72 sewer only customers and \$6,478.43 water/sewer customers. This leaves account balances of \$14,327.18 that was not collected in the normal collection process.

As a proper accounting procedure, this bad debt must be accounted for on our financial statements; otherwise the debt remains as a liability on the District's annual audit.

District staff has compiled the list of uncollectible accounts for calendar year 2013, which amounts to \$25,761.33. Of this total, 44% of the bad debts are due to home foreclosures, and this trend will hopefully continue to decline for calendar year 2014.

Overall, the total amount of bad debt represents a loss of 0.14% for calendar year 2013 based on total water and sewer revenues.

Bad Debt as a Percentage of Annual Water and Sewer Revenues

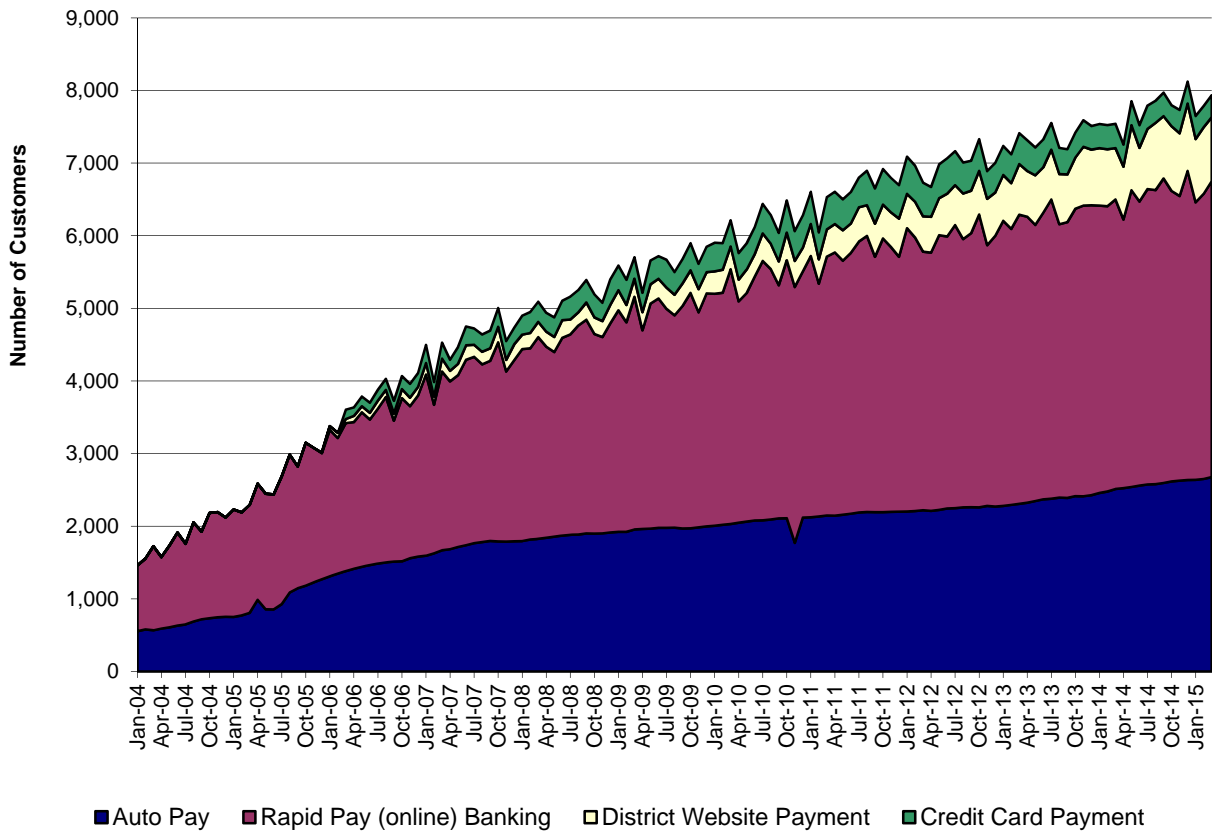




Date: April 28, 2015

Subject: Review of Alternative Payment Options for Customers of the Yucaipa Valley Water District

In July 2003, the District began to offer our customers the ability to pay their utility bills by directly debiting their bank account. When a new utility billing system came online in December 2005, the District was able to offer credit card payments via our website and over the counter. The majority of the District customers use some form of automated payment method.



The purpose of this agenda item is to discuss and explore other alternative payment options.



Date: April 28, 2015

Subject: Discussion Regarding Draft Surplus Recycled Water Exchange Agreement Between Yucaipa Valley Water District and Beaumont Cherry Valley Water District

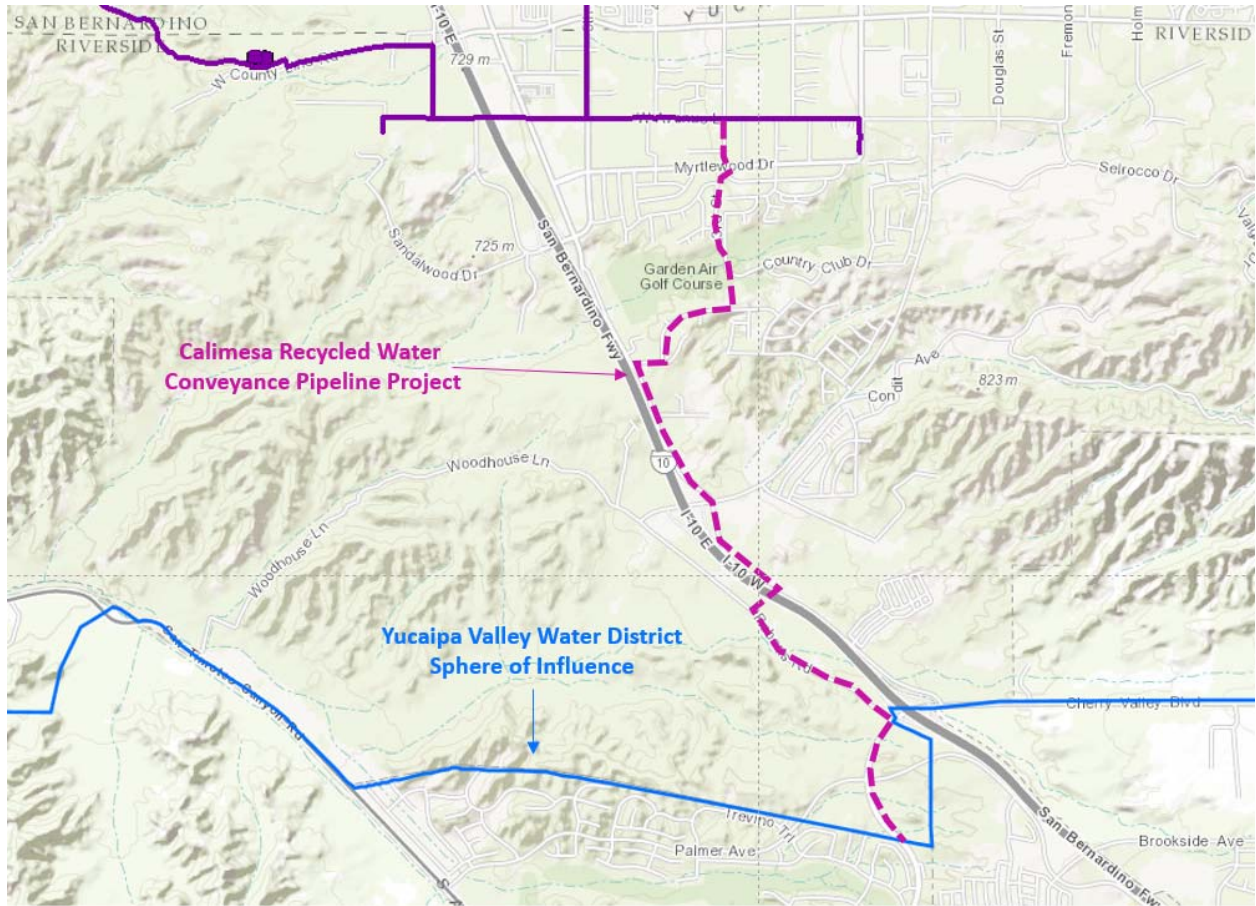
At the board workshop on March 24, 2015, the District staff presented several items related to the ongoing drought (Workshop Memorandum Nos. 15-044 and 15-045) and the importance of constructing recycled water improvements to enhance our alternative water supply sources (Workshop Memorandum Nos. 15-046 and 15-047).

While areas throughout the State are wrestling with the implementation of various drought solutions, the Yucaipa Valley Water District has a recycled water infrastructure system in place that will allow us to facilitate the construction of a new recycled water conveyance pipelines to further reduce the demands on regional water resources by about 2,000 acre feet per year. The new recycled water pipeline would interconnect the Yucaipa Valley Water District's recycled water system with the Beaumont Cherry Valley Water District's recycled water system.

With the construction of a recycled water interconnection pipeline, the two water agencies will be able to share recycled water resources. Initially, recycled water that is surplus to the needs of the Yucaipa Valley Water District customers will be made available to customers in the service area of the Beaumont Cherry Valley Water District. Within the next five years, the City of Beaumont will be expanding and adding desalination facilities to their wastewater treatment plant that will then be able to produce recycled water consistent with the water quality objectives enforced by the Regional Water Quality Control Board. Therefore, with an interconnected recycled water system, the recycled water resources that are surplus to the needs of the Yucaipa Valley Water District and generated from the Wochholz Regional Water Recycling Facility can be shared with the customers of the Beaumont Cherry Valley Water District. Likewise, the recycled water resources surplus to the needs of the Beaumont Cherry Valley Water District / City of Beaumont and generated from the City of Beaumont Wastewater Treatment Plant in the future can be shared with customers of the Yucaipa Valley Water District.

This type of exchange agreement is commonly implemented with drinking water supplies. As the drought continues to impact the State and more recycled water systems are constructed, the District staff envisions that there will be additional exchange agreements for sharing recycled water resources in the future.

On April 1, 2015, the Board of Directors authorized District staff to develop a recycled water exchange and purchase contract between the two agencies [Director Memorandum No. 15-029]. A draft copy of the conceptual agreement is attached for discussion purposes.



Draft 4/22/2015

**AGREEMENT FOR RECYCLED WATER EXCHANGE
BETWEEN THE YUCAIPA VALLEY WATER DISTRICT AND THE
BEAUMONT CHERRY VALLEY WATER DISTRICT**

The Yucaipa Valley Water District, a County Water District (hereinafter referred to as "YVWD") and Beaumont Cherry Valley Water District, an Irrigation District (hereinafter referred to as "BCVWD"), (hereinafter also referred to as "Party" or collectively as the "Parties"), do hereby agree to establish this Recycled Water Exchange Agreement ("Agreement"), to provide for the delivery and exchange of locally treated surplus recycled water between the Parties, subject to the following provisions.

I. DEFINITIONS

"Judgment" means the Court ruling and order rendered in San Timoteo Watershed Management Authority v. City of Banning, et. al., Case No. RIC 389197, by the Superior Court of the State of California, County of Riverside, which governs the parties in that matter including YVWD and BCVWD relating to groundwater rights in the Beaumont Basin.

"Receiving Entity" means the Party requesting and taking delivery of the Recycled Water.

"Recycled Water" means a water supply intended for non-potable use meeting the water quality standards of Title 22 of the California Code of Regulations.

"SGPWA" means the San Gorgonio Pass Water Agency, a State Water Contractor.

"Supplying Entity" means the Party providing and delivering Recycled Water at the request of the Receiving Entity.

"Beaumont Basin" means the Upper San Timoteo area groundwater basin within which YVWD and BCVWD have groundwater pumping rights subject to and governed by the Judgment.

"Year" means the calendar year beginning on January 1 to December 31.

II. POINT OF DELIVERY

Recycled Water shall be delivered at the following locations by the Supplying Entity and received by the Receiving Entity:

- A. Cherry Valley Boulevard Interconnection southwest of Interstate 10 ("Interconnection A").
- B. Cherry Valley Boulevard Interconnection northeast of Interstate 10 ("Interconnection B").

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- C. Any agreed upon future recycled water system interconnections by the Parties.

III. SERVICE CONDITIONS

- A. Only those quantities and flow rates of Recycled Water shall be made available to the Receiving Entity that do not adversely affect the Supplying Entity.
- B. The Recycled Water pressure shall be that of the Supplying Entity's system at the time of delivery.
- C. All Recycled Water deliveries shall be considered interruptible and at the control of the Supplying Entity. However, the Parties may establish non-binding targets for delivery over an extended time period.
- D. The details of Recycled Water delivery shall be by mutual agreement of the General Managers, or their designees, for BCVWD and YVWD.
- E. The Parties will mutually establish flow schedules twenty four hours in advance of the beginning of delivery.
- F. Neither YVWD nor BCVWD will be obligated to provide any Recycled Water under this Agreement if there is no surplus Recycled Water available.

IV. RECYCLED WATER INFRASTRUCTURE

YVWD has prepared design drawings and construction specifications for the Calimesa Recycled Water Conveyance Pipelines. These pipelines, as illustrated in Exhibit "A", will consist of the following components:

- Segment A - A 24" diameter ductile iron recycled water pipeline from the intersection of Avenue L and 3rd Street to a point at the Interstate 10 crossing and Calimesa Boulevard.
- Segment B - A 16" diameter ductile iron recycled water pipeline from the southerly end of "Segment A" to a connection point with existing inactive recycled water pipelines located in the San Gorgonio Land Development.
- Segment C - A 24" diameter ductile iron recycled water pipeline from the southerly end of "Segment A" to a terminus point approximately 3,000 feet east of the intersection of Calimesa Boulevard and Cherry Valley Boulevard. Unless approved otherwise in writing, a booster facility will be located near the easterly terminus of Segment C. The capital and operational costs will be the responsibility of BCVWD.
- Cherry Valley Booster Facility - The Parties have identified the need for an inline recycled water booster facility to be located in the vicinity of Cherry Valley

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Boulevard. This facility and related appurtenances may be component of an amended agreement between the Parties.

A construction schedule for Segment A, Segment B and Segment C is attached as Exhibit "B". The construction schedule is dependent upon the availability of funding from the Parties.

The Parties agree to pursue alternative funding for this project from the State Water Resources Control Board to facilitate the funding and construction of the identified facilities.

At each interconnection, the Supplying Entity will maintain primary SCADA control of each flow control facility or interconnection. Flow control will be set using mutually agreeable SCADA data from the Receiving Entity.

V. RECYCLED WATER EXCHANGES

Any Recycled Water supplied by YVWD to BCVWD, or by BCVWD to YVWD, through the Interconnection(s) subject to this Agreement shall be returned in like volume, or value, as measured by the meter on the Interconnection. Unless otherwise requested by the Receiving Entity, the delivery of recycled water shall be provided at a 120-month rolling average salinity level equal to the Maximum Benefit Objective of the Beaumont Management Zone which is currently established by the Santa Regional Water Quality Control Board as 330 mg/l of Total Dissolved Solids. Recycled water quality data between the Parties shall be summarized and exchanged on a quarterly basis.

A. Interim Value-Based Exchange - Capital Cost Reimbursement / Recycled Water Pre-Payment

YVWD and BCVWD have agreed to participate in the financing of the Calimesa Recycled Water Conveyance Pipeline whereby 50% of the construction contract (excluding inspection and construction management services) will be placed on deposit by BCVWD in advance of soliciting construction bids for the pipeline project by YVWD. The deposited construction funds by BCVWD will be applied as payment for recycled water provided by YVWD at a cost equal to \$300 per acre foot of recycled water delivered by YVWD to BCVWD at the Interconnection until all deposited funds are exhausted. The Parties shall maintain records of the Interim Value-Based Exchanges which shall be reconciled at the end of each month.

B. Value-Based Exchange

The value of any Recycled Water supplied through the Interconnection(s) subject to this Agreement after the use of funds provided as the Interim Value-Based Exchange above, will be at a rate established by the governing board of each

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Party. The Parties shall maintain records of the Value-Based Exchanges which shall be reconciled at the end of each month.

The Parties agree that there is a mutual benefit to utilize local water infrastructure for regional benefit. Therefore, the governing Board of Directors of each Party will develop independent rates, fees and charges for potential use as shared infrastructure (such as recharge basins, desalination facilities, drinking water sources, Beaumont Basin groundwater in storage, etc...) that can be applied as like-value and exchanged between the Parties pursuant to the Value-Based Exchange concept.

When the Supplying Entity does not have a surplus of Recycled Water, the value of said Recycled Water will be the typical recycled water commodity rate charged to customers of the Supplying Entity.

C. Volumetric-Based Exchange

Any Recycled Water supplied through the Interconnection(s) subject to this Agreement may be returned in like volume as measured by the meter on the Interconnection, when requested by the Party supplying the Recycled Water. The Parties shall maintain records of the exchanges which shall be reconciled by the end of each year in either Recycled Water volume or value as described in Section V.B.

VI. ADDITIONAL RECYCLED WATER USES

If the BCVWD Board of Directors desires to pursue the recharge of Recycled Water in the Beaumont Management Zone, the Parties will cooperate and proportionally share all costs associated with the preparation of technical reports, applications, testing, as well as operational costs related to testing, reporting, maintenance, recharge of diluent, etc...

Notwithstanding the paragraph above, the

VI. INDEMNITY

In consideration of the terms and provisions of this Agreement, BCVWD and YVWD do hereby agree to relieve, release, defend, hold harmless and forever discharge the other Party and each of its officers, agents, and employees and each of them of and from any and all claims, rights, debts, liabilities, demands, obligations, liens, promises, acts, agreements, costs and expenses (including, but not limited to, attorney's fees and costs), damages, actions and causes of action, of whatever kind or nature (including without limitation any statutory, civil or administrative claim), whether known or unknown,

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suspected or unsuspected, fixed or contingent, apparent or concealed, in any way based on, arising out of or related to or connected with the delivery of water to the other Party.

The obligations to indemnify, defend, and hold one another harmless shall remain in effect and shall be binding upon the Parties whether such injury or damage shall accrue or may be discovered before or after termination of this Agreement.

VII. INSURANCE

Both BCVWD and YVWD represent that they are each self-insured and maintain the following limits:

- General Liability \$2,000,000;
- Automobile Liability \$2,000,000;
- Worker's Compensation Liability \$2,000,000.

Each of the Parties further warrant that the limits of their self-insurance coverage meet or exceed the requirements and obligations as set forth, and to the extent permitted by State law.

VIII. TERM

This Agreement shall have a minimum term of five years from the date of execution by the parties and shall remain in effect until either party chooses to terminate said agreement, upon thirty (30) days written notice to the other Party. Any funds on deposit or balances owed to a Party shall be reconciled within 60 days pursuant to the terms of this Agreement.

IX. NOTICES

All correspondence between the Parties to this Agreement regarding provisions within said agreement shall be addressed as follows:

For BCVWD: General Manager
 Beaumont Cherry Valley Water District
 560 Magnolia Avenue
 Beaumont, California 92223

For YVWD: General Manager

Draft 4/22/2015

Yucaipa Valley Water District
12770 Second Street
Yucaipa, California 92399

X. ENTIRE AGREEMENT

This jointly prepared Agreement represents the entire integrated agreement between the Parties and supersedes all prior negotiations, representations or agreements, either written or oral. This Agreement may be amended only by a written instrument signed by both Parties.

XI. ASSIGNMENT

Nothing under this Agreement shall be construed to give any rights or benefits to any party other than the Parties hereto. Neither of the Parties shall assign any right or interest in this Agreement, nor delegate any duty owed, without the other's prior written consent. Any attempted assignment or delegation shall be void and totally ineffective for all purposes, and shall constitute a material breach and grounds for immediate termination or suspension of this Agreement. In the event the Parties consent to an assignment of delegation, the assignee, delegate, or its legal representative shall agree in writing to personally assume, perform, and be bound by this Agreement's covenants, conditions, obligations and provisions.

XII. SUCCESSORS AND ASSIGNS

Subject to the provisions regarding assignment, this Agreement shall be binding on the heirs, executors, administrators, successors, and assigns of the respective Parties.

XIII. GOVERNING LAW

This Agreement shall be governed by the laws of the State of California.

XIV. SEVERABILITY

Should any Party, term or provisions of this Agreement be declared invalid, void or unenforceable, all remaining parts, terms and provisions hereof shall remain in full force and effect.

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XV. FORCE MAJEURE

Neither Party shall be considered in default in the performance of its obligations hereunder or any of them, if such obligations were prevented or delayed by any cause, existing or future beyond the reasonable control of such Party which include but are not limited to acts of God, labor disputes, civil unrest, water supply deficiencies, mechanical failure, interruption in electrical energy, natural disaster, drought, and regulatory issues.

IN WITNESS WHEREOF, the Yucaipa Valley Water District and the Beaumont Cherry Valley Water District have duly executed this Agreement on this ____ day of _____, 2015.

BEAUMONT CHERRY VALLEY WATER DISTRICT

Ken Ross, President Board of Directors

ATTEST:

Eric Fraser, General Manager

YUCAIPA VALLEY WATER DISTRICT

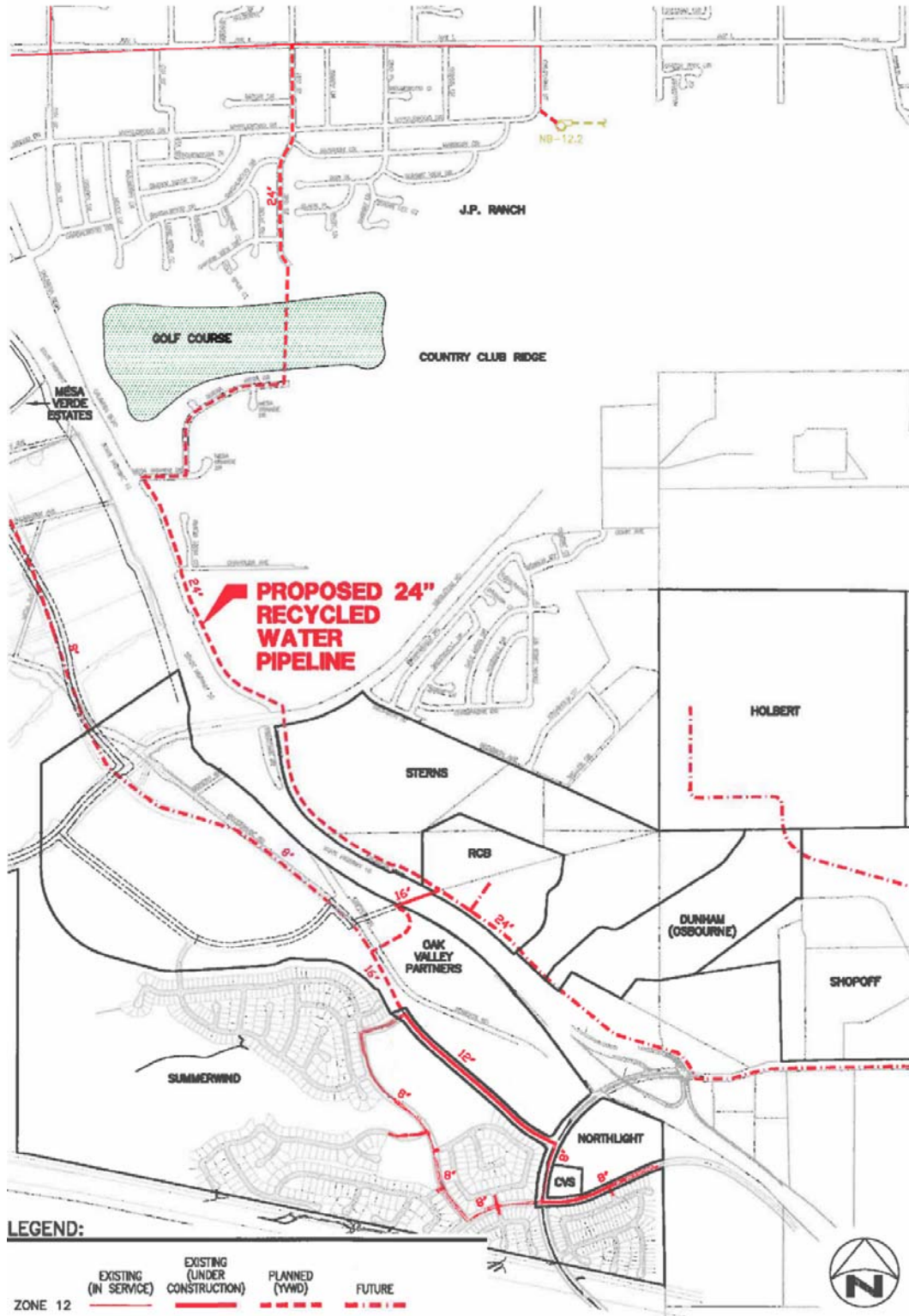
Lonni Granlund, President Board of Directors

ATTEST:

Joseph B. Zoba, General Manager

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Exhibit "A"



Draft 4/22/2015

Exhibit “B”

[Recycled Water System Proposed Schedule]

Director Comments



Yucaipa Valley Water District



FACTS ABOUT THE YUCAIPA VALLEY WATER DISTRICT

Service Area Size: 40 square miles (sphere of influence is 68 square miles)

Elevation Change: 3,140 foot elevation change (from 2,044 to 5,184 feet)

Number of Employees: 5 elected board members
57 full time employees

Operating Budget: Water Division - \$13,072,750
Sewer Division - \$11,689,000
Recycled Water Division - \$433,500
Total Annual Budget - \$25,195,250

Number of Services: 12,206 water connections serving 16,843 units
13,492 sewer connections serving 20,312 units
62 recycled water connections

Water System: 215 miles of drinking water pipelines
27 reservoirs - 34 million gallons of storage capacity
18 pressure zones
12,000 ac-ft annual water demand (3.9 billion gallons)
Two water filtration facilities:
- 1 mgd at Oak Glen Surface Water Filtration Facility
- 12 mgd at Yucaipa Valley Regional Water Filtration Facility

Sewer System: 8.0 million gallon treatment capacity - current flow at 4.0 mgd
205 miles of sewer mainlines
5 sewer lift stations
4,500 ac-ft annual recycled water prod. (1.46 billion gallons)

Recycled Water: 22 miles of recycled water pipelines
5 reservoirs - 12 million gallons of storage
1,200 ac-ft annual recycled demand (0.4 billion gallons)

Brine Disposal: 2.2 million gallon desalination facility at sewer treatment plant
1.108 million gallons of Inland Empire Brine Line capacity
0.295 million gallons of treatment capacity in Orange County



THE MEASUREMENT OF WATER PURITY

One part per hundred is generally represented by the percent (%).
This is equivalent to about fifteen minutes out of one day.

One part per thousand denotes one part per 1000 parts.
This is equivalent to about one and a half minutes out of one day.

One part per million (ppm) denotes one part per 1,000,000 parts.
This is equivalent to about 32 seconds out of a year.

One part per billion (ppb) denotes one part per 1,000,000,000 parts.
This is equivalent to about three seconds out of a century.

One part per trillion (ppt) denotes one part per 1,000,000,000,000 parts.
This is equivalent to about three seconds out of every hundred thousand years.

One part per quadrillion (ppq) denotes one part per 1,000,000,000,000,000 parts.
This is equivalent to about two and a half minutes out of the age of the Earth (4.5 billion years).





GLOSSARY OF COMMONLY USED TERMS

Every profession has specialized terms which generally evolve to facilitate communication between individuals. The routine use of these terms tends to exclude those who are unfamiliar with the particular specialized language of the group. Sometimes jargon can create communication cause difficulties where professionals in related fields use different terms for the same phenomena.

Below are commonly used water terms and abbreviations with commonly used definitions. If there is any discrepancy in definitions, the District's Regulations Governing Water Service is the final and binding definition.

Acre Foot of Water - The volume of water (325,850 gallons, or 43,560 cubic feet) that would cover an area of one acre to a depth of 1 foot.

Activated Sludge Process – A secondary biological sewer treatment process where bacteria reproduce at a high rate with the introduction of excess air or oxygen, and consume dissolved nutrients in the wastewater.

Annual Water Quality Report - The document is prepared annually and provides information on water quality, constituents in the water, compliance with drinking water standards and educational material on tap water. It is also referred to as a Consumer Confidence Report (CCR).

Aquifer - The natural underground area with layers of porous, water-bearing materials (sand, gravel) capable of yielding a supply of water; see Groundwater basin.

Backflow - The reversal of water's normal direction of flow. When water passes through a water meter into a home or business it should not reverse flow back into the water mainline.

Best Management Practices (BMPs) - Methods or techniques found to be the most effective and practical means in achieving an objective. Often used in the context of water conservation.

Biochemical Oxygen Demand (BOD) – The amount of oxygen used when organic matter undergoes decomposition by microorganisms. Testing for BOD is done to assess the amount of organic matter in water.

Biosolids – Biosolids are nutrient rich organic and highly treated solid materials produced by the sewer treatment process. This high-quality product can be used as a soil amendment on farm land or further processed as an earth-like product for commercial and home gardens to improve and maintain fertile soil and stimulate plant growth.

Catch Basin – A chamber usually built at the curb line of a street, which conveys surface water for discharge into a storm sewer.

Capital Improvement Program (CIP) – Projects for repair, rehabilitation, and replacement of assets. Also includes treatment improvements, additional capacity, and projects for the support facilities.

Collector Sewer – The first element of a wastewater collection system used to collect and carry wastewater from one or more building sewer laterals to a main sewer.

Coliform Bacteria – A group of bacteria found in the intestines of humans and other animals, but also occasionally found elsewhere and is generally used as an indicator of sewage pollution.

Combined Sewer Overflow – The portion of flow from a combined sewer system, which discharges into a water body from an outfall located upstream of a wastewater treatment plant, usually during wet weather conditions.

Combined Sewer System– Generally older sewer systems designed to convey both sewage and storm water into one pipe to a wastewater treatment plant.

Conjunctive Use - The coordinated management of surface water and groundwater supplies to maximize the yield of the overall water resource. Active conjunctive use uses artificial recharge, where surface water is intentionally percolated or injected into aquifers for later use. Passive conjunctive use is to simply rely on surface water in wet years and use groundwater in dry years.

Consumer Confidence Report (CCR) - see Annual Water Quality Report.

Cross-Connection - The actual or potential connection between a potable water supply and a non-potable source, where it is possible for a contaminant to enter the drinking water supply.

Disinfection By-Products (DBPs) - The category of compounds formed when disinfectants in water systems react with natural organic matter present in the source water supplies. Different disinfectants produce different types or amounts of disinfection byproducts. Disinfection byproducts for which regulations have been established have been identified in drinking water, including trihalomethanes, haloacetic acids, bromate, and chlorite

Drought - a period of below average rainfall causing water supply shortages.

Dry Weather Flow – Flow in a sanitary sewer during periods of dry weather in which the sanitary sewer is under minimum influence of inflow and infiltration.

Fire Flow - The ability to have a sufficient quantity of water available to the distribution system to be delivered through fire hydrants or private fire sprinkler systems.

Gallons per Capita per Day (GPCD) - A measurement of the average number of gallons of water use by the number of people served each day in a water system. The calculation is made by dividing the total gallons of water used each day by the total number of people using the water system.

Groundwater Basin - An underground body of water or aquifer defined by physical boundaries.

Groundwater Recharge - The process of placing water in an aquifer. Can be a naturally occurring process or artificially enhanced.

Hard Water - Water having a high concentration of minerals, typically calcium and magnesium ions.

Hydrologic Cycle - The process of evaporation of water into the air and its return to earth in the form of precipitation (rain or snow). This process also includes transpiration from plants, percolation into the ground, groundwater movement, and runoff into rivers, streams and the ocean; see Water cycle.

Infiltration – Water other than sewage that enters a sewer system and/or building laterals from the ground through defective pipes, pipe joints, connections, or manholes. Infiltration does not include inflow. See *Inflow*.

Inflow - Water other than sewage that enters a sewer system and building sewer from sources such as roof vents, yard drains, area drains, foundation drains, drains from springs and swampy areas, manhole covers, cross connections between storm drains and sanitary sewers, catch basins, cooling towers, storm waters, surface runoff, street wash waters, or drainage. Inflow does not include infiltration. See *Infiltration*.

Inflow / Infiltration (I/I) – The total quantity of water from both inflow and infiltration.

Mains, Distribution - A network of pipelines that delivers water (drinking water or recycled water) from transmission mains to residential and commercial properties, usually pipe diameters of 4" to 16".

Mains, Transmission - A system of pipelines that deliver water (drinking water or recycled water) from a source of supply the distribution mains, usually pipe diameters of greater than 16".

Meter - A device capable of measuring, in either gallons or cubic feet, a quantity of water delivered by the District to a service connection.

Overdraft - The pumping of water from a groundwater basin or aquifer in excess of the supply flowing into the basin. This pumping results in a depletion of the groundwater in the basin which has a net effect of lowering the levels of water in the aquifer.

Peak Flow – The maximum flow that occurs over a specific length of time (e.g., daily, hourly, instantaneously).

Pipeline - Connected piping that carries water, oil or other liquids. See Mains, Distribution and Mains, Transmission.

Point of Responsibility, Metered Service - The connection point at the outlet side of a water meter where a landowner's responsibility for all conditions, maintenance, repairs, use and replacement of water service facilities begins, and the District's responsibility ends.

Potable Water - Water that is used for human consumption and regulated by the California Department of Public Health.

Pressure Reducing Valve - A device used to reduce the pressure in a domestic water system when the water pressure exceeds desirable levels.

Pump Station - A drinking water or recycled water facility where pumps are used to push water up to a higher elevation or different location.

Reservoir - A water storage facility where water is stored to be used at a later time for peak demands or emergencies such as fire suppression. Drinking water and recycled water systems will typically use concrete or steel reservoirs. The State Water Project system considers lakes, such as Shasta Lake and Folsom Lake to be water storage reservoirs.

Runoff - Water that travels downward over the earth's surface due to the force of gravity. It includes water running in streams as well as over land.

Sanitary Sewer System - Sewer collection system designed to carry sewage, consisting of domestic, commercial, and industrial wastewater. This type of system is not designed nor intended to carry water from rainfall, snowmelt, or groundwater sources. See *Combined Sewer System*.

Sanitary Sewer Overflow – Overflow from a sanitary sewer system caused when total wastewater flow exceeds the capacity of the system. See *Combined Sewer Overflow*.

Santa Ana River Interceptor (SARI) Line – A regional brine line designed to convey 30 million gallons per day of non-reclaimable wastewater from the upper Santa Ana River basin to the sewer treatment plant operated by Orange County Sanitation District.

Secondary Treatment – Biological sewer treatment, particularly the activated-sludge process, where bacteria and other microorganisms consume dissolved nutrients in wastewater.

Supervisory Control and Data Acquisition (SCADA) - A computerized system which provides the ability to remotely monitor and control water system facilities such as reservoirs, pumps and other elements of water delivery.

Service Connection - The water piping system connecting a customer's system with a District water main beginning at the outlet side of the point of responsibility, including all plumbing and equipment located on a parcel required for the District's provision of water service to that parcel.

Sludge – Untreated solid material created by the treatment of sewage.

Smart Irrigation Controller - A device that automatically adjusts the time and frequency which water is applied to landscaping based on real-time weather such as rainfall, wind, temperature and humidity.

Special District - A political subdivision of a state established to provide a public services, such as water supply or sanitation, within a specific geographic area.

Surface Water - Water found in lakes, streams, rivers, oceans or reservoirs behind dams.

Total Suspended Solids (TSS) – The amount of solids floating and in suspension in water or sewage.

Transpiration - The process by which water vapor is released into the atmosphere by living plants.

Trickling Filter – A biological secondary treatment process in which bacteria and other microorganisms, growing as slime on the surface of rocks or plastic media, consume nutrients in primary treated sewage as it trickles over them.

Underground Service Alert (USA) - A free service that notifies utilities such as water, telephone, cable and sewer companies of pending excavations within the area (dial 8-1-1 at least 2 working days before you dig).

Urban Runoff - Water from city streets and domestic properties that typically carries pollutants into the storm drains, rivers, lakes, and oceans.

Valve - A device that regulates, directs or controls the flow of water by opening, closing or partially obstructing various passageways.

Wastewater – Any water that enters the sanitary sewer.

Water Banking - The practice of actively storing or exchanging in-lieu surface water supplies in available groundwater basin storage space for later extraction and use by the storing party or for sale or exchange to a third party. Water may be banked as an independent operation or as part of a conjunctive use program.

Water cycle - The continuous movement water from the earth's surface to the atmosphere and back again; see Hydrologic cycle.

Water Pressure - Pressure created by the weight and elevation of water and/or generated by pumps that deliver water to the tap.

Water Service Line - The pipeline that delivers potable water to a residence or business from the District's water system. Typically the water service line is a 1" to 1½" diameter pipe for residential properties.

Watershed - A region or land area that contributes to the drainage or catchment area above a specific point on a stream or river.

Water Table - The upper surface of the zone of saturation of groundwater in an unconfined aquifer.

Water Transfer - A transaction, in which a holder of a water right or entitlement voluntarily sells/exchanges to a willing buyer the right to use all or a portion of the water under that water right or entitlement.

Water Well - A hole drilled into the ground to tap an underground water aquifer.

Wetlands - Lands which are fully saturated or under water at least part of the year, like seasonal vernal pools or swamps.

Wet Weather Flow – Dry weather flow combined with stormwater introduced into a combined sewer system, and dry weather flow combined with infiltration/inflow into a separate sewer system.





COMMONLY USED ABBREVIATIONS

AQMD	Air Quality Management District
BOD	Biochemical Oxygen Demand
CARB	California Air Resources Board
CCTV	Closed Circuit Television
CWA	Clean Water Act
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
FOG	Fats, Oils, and Grease
GPD	Gallons per day
MGD	Million gallons per day
O & M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration
POTW	Publicly Owned Treatment Works
PPM	Parts per million
RWQCB	Regional Water Quality Control Board
SARI	Santa Ana River Inceptor
SAWPA	Santa Ana Watershed Project Authority
SBVMWD	San Bernardino Valley Municipal Water District
SCADA	Supervisory Control and Data Acquisition system
SSMP	Sanitary Sewer Management Plan
SSO	Sanitary Sewer Overflow
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
WDR	Waste Discharge Requirements
YVWD	Yucaipa Valley Water District