Notice and Agenda of a Board Workshop

Tuesday, February 27, 2018 at 4:00 p.m.

MEETING LOCATION:	District Administration Building 12770 Second Street, Yucaipa
MEMBERS OF THE BOARD:	Director Chris Mann, 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. Applications and Uses of Photogrammetry Technology [Workshop Memorandum No. 18-067 - Page 30 of 268]

B. Overview of a Brine Management Wetland Project - Goodyear, Arizona [Workshop Memorandum No. 18-068 - Page 31 of 268]

V. Operational Updates

A. The Benefits of Implementing Water and Wastewater DNA Sequencing Strategy [Workshop Memorandum No. 18-069 - Page 40 of 268]

B. Status Report of Water Mainline Breaks in the Wildwood Canyon Area [Workshop Memorandum No. 18-070 - Page 55 of 268]

VI. Capital Improvement Projects

A. Status Report on the Installation of a Parallel Sewer Segment of Mainline on 6th Place as part of the Proposed Wildwood Creek Bridge Improvements [Workshop Memorandum No. 18-071 - Page 58 of 268]

B. Status Report on the Emergency Repairs for Drinking Water Reservoir 17.1.1 [Workshop Memorandum No. 18-072 - Page 59 of 268]

Any person who requires accommodation to participate in this meeting should contact the District office at (909) 797-5117, at least 48 hours prior to the meeting to request a disability-related modification or accommodation.

Materials that are provided to the Board of Directors after the meeting packet is compiled and distributed will be made available for public review during normal business hours at the District office located at 12770 Second Street, Yucaipa. Meeting materials are also available on the District's website at www.yvwd.dst.ca.us

VII. Policy Issues

A. Discussion Regarding a Draft Resolution for the Implementation of 50" Water Meter Boxes for Drinking Water and Recycled Water Infrastructure [Workshop Memorandum No. 18-073 - Page 61 of 268]

B. Discussion Regarding the Development of a Policy Related to Accessory Dwelling Units and Other Multiple Unit Developments [Workshop Memorandum No. 18-74 - Page 66 of 268]

C. Overview of the Western Coalition of Arid States (WESTCAS) Legislative Workshop [Workshop Memorandum No. 18-075 - Page 109 of 268]

VIII. Development Projects

A. Discussion Regarding a Development Agreement for Sewer Service to Property Located on Avenue H, Yucaipa as Tract No. 18167 - MBTK Homes [Workshop Memorandum No. 18-076 - Page 116 of 268]

IX. Administrative Issues

A. Overview of the Draft 2017 Consolidated Annual Report and Engineering Report of the Beaumont Basin Watermaster [Workshop Memorandum No. 18-077 - Page 133 of 268]

X. Director Comments

XI. Closed Session

A. Conference with Real Property Negotiator(s)
Property: Assessor's Parcel Numbers: 0301-211-020 and 0301-201-030
Agency Negotiator: Joseph Zoba, General Manager
Negotiating Parties: Mesa Verde Ventures LLC c/o Betek Corporation Under Negotiation: Terms of Payment and Price

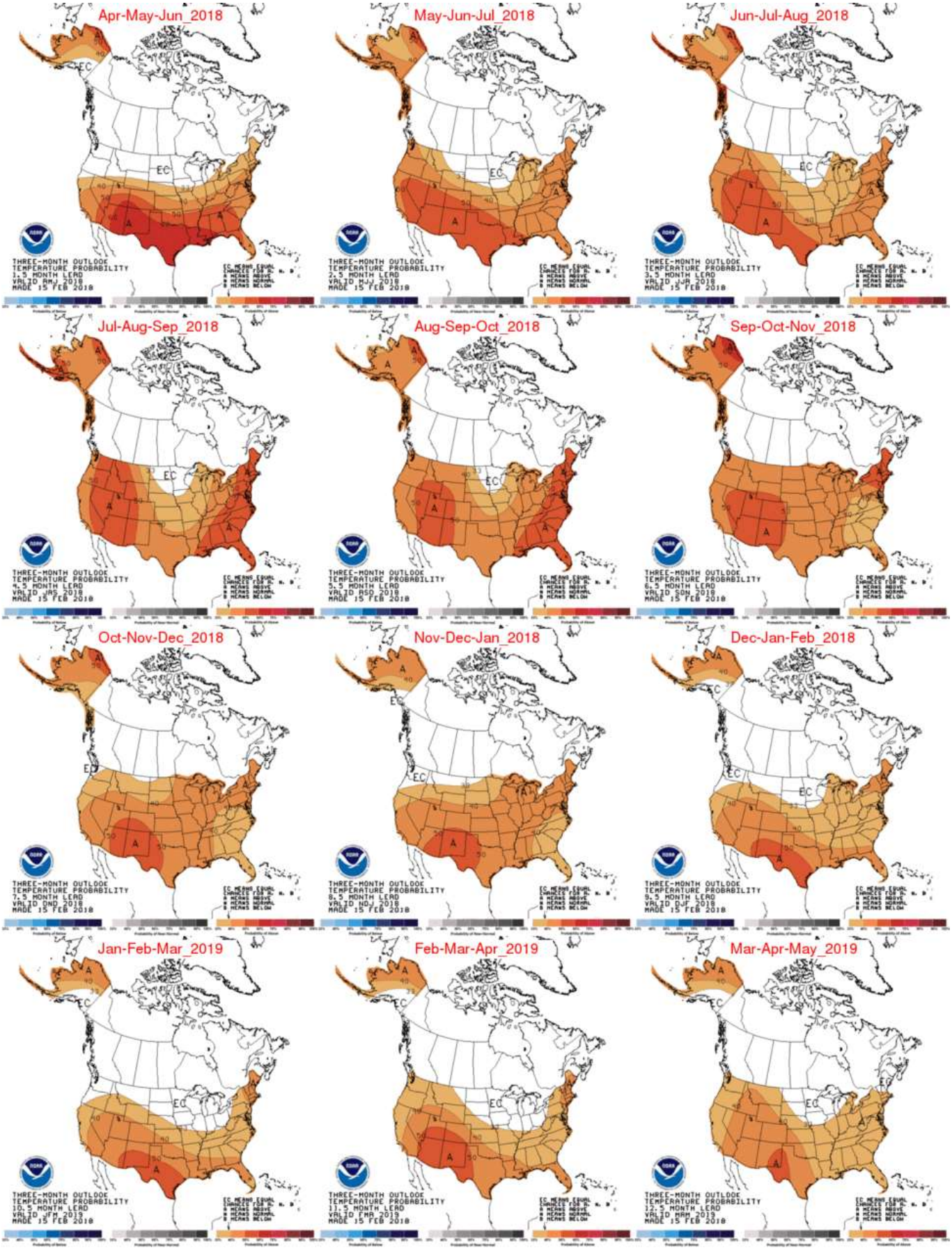
XII. Adjournment

Staff Report

Yucaipa Valley Water District

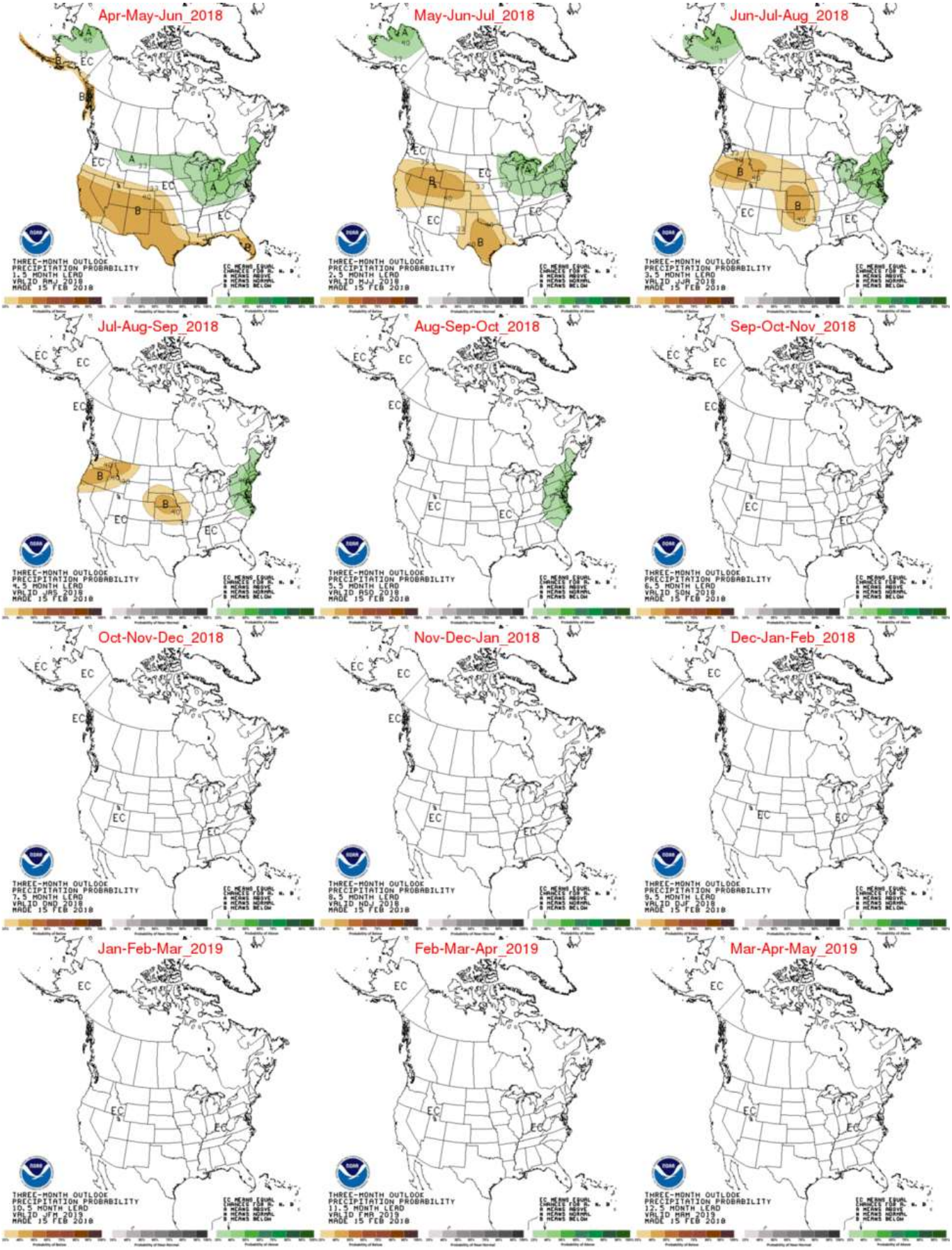
Multi-Seasonal Temperature Outlook

Source: http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/t.gif



Multi-Seasonal Precipitation Outlook

Source: http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/p.gif



Some fear California drought cuts could erase water rights

By JONATHAN J. COOPER
February 21, 2018 - https://apnews.com/5217fb0810c0477e8839dba5784c6a57

SACRAMENTO, Calif. (AP) — A proposal to make California's drought-era water restrictions permanent could allow the state to chip away at long-held water rights in an unprecedented power grab, representatives from water districts and other users told regulators Tuesday.

Members of the state Water Resources Control Board delayed a decision about whether to bring back what had been temporary water bans from California's drought, spanning 2013 to 2017. The plan is part of an effort to make water conservation a way of life, with climate change expected to lead to longer, more severe droughts.

It comes after U.S. officials declared that nearly half the state, all of it in the south, is back in drought just months after emerging from it.

Officials from several irrigation and water agencies said the restrictions are reasonable, but not the plan to impose them under the state Constitution's prohibition on the "waste or unreasonable use" of water. That would create a slippery slope of allowing the board to repeatedly chip away at California's historic protection of water rights for landowners, they said.

"Erratic individuals can occupy great positions of power in government, and you had better believe they will occupy your chair someday," said Jackson Minasian, an attorney for Stanford Vina Ranch Irrigation Co. "Their view of what is 'waste and unreasonable use' will be radically different than yours."

Some water users also said permanent mandates would be too rigid in a sprawling state with needs that vary by region.

The restrictions, punishable by a $500 fine, include prohibitions on watering lawns so much that the water flows into the street, using a hose to wash down sidewalks or using a hose without an automatic shut-off nozzle to wash cars. A final decision is now expected by April 17.

Hotels would have to ask guests if they really need their towels and sheets washed each day. Running an ornamental fountain without a recirculating system would be barred, as would watering outside within 48 hours of a good rain. Another measure would give cities and counties until 2025 to stop watering ordinary street medians.

Restaurants would be allowed to serve water only on request if the governor declares a drought emergency.

Water officials expect neighbors to be responsible for detecting and reporting most of the wasteful water use, and they have no plans to add more enforcement officers if the permanent restrictions are adopted.

Generally, first-time offenders would get warnings, while repeat offenders risk fines.

Environmental groups urged officials to crack down more aggressively on wasteful water use rather than rely on policies that encourage neighbors to develop good practices.

Water board chairwoman Felicia Marcus said the restrictions are hardly a long-term solution to California's drought problems but "the least we should do."

"We're not in an emergency right now, but shame on us if we just bury our heads in the sand ... allow people to go out and waste water by washing down the driveway with a hose when a broom would do," she said.

The plan also includes legislation that would create customized water-use limits for urban water districts, which would risk state enforcement if they fell short. Lawmakers also are considering whether to allow districts to enforce drought regulations, a power now reserved for the state.

Gov. Jerry Brown lifted California's emergency drought status a year ago, after a wet winter. Strict 25 percent conservation orders for cities and towns and other restrictions then were phased out.

Some climate scientists say the drought never fully ended in parts of Southern California. The Los Angeles area has received just a fourth of normal rainfall so far this rainy season.

In the Northern Sierra Nevada, the winter so far has been the third-driest on record for the year's wettest three months — December, January and February — produced very little rainfall, said John Leahigh of the California Department of Water Resources.

The water content of the Sierra snowpack, which feeds water supplies, is about 20 percent of normal for this time of year, he said.

Most of California's reservoirs are at or slightly above their historical average for this time of year, but experts expect that to fall when water is released in the spring and summer and not enough melting snow can replenish it.

"This is a very ugly picture in terms of the water supply management," Leahigh said.

Source: *https://apnews.com/5217fb0810c0477e8839dba5784c6a57/Some-fear-California-drought-cuts-could-erase-water-rights*

reason
FREE MINDS AND FREE MARKETS

HIT & RUN Blog

California Wants to Fine You $500 for Washing Your Car With a Garden Hose

Proposed water restrictions will do little to solve the state's water woes.

Christian Britschgi | Feb. 22, 2018 8:00 am


Vladyslav Bashutskyy/Dreamstime.com

Californians will have to start living with dusty cars and dry lawns if the state's Water Resource Control Board has its way.

The Board is proposing a number of strict prohibitions on water use to deal with a recently declared drought in southern California, including bans on washing your vehicle with a garden hose, watering your garden 48 hours after it rains, and even hosing down your driveway.

Businesses and cities will be affected too. No longer would your local government be allowed to water parkway median strips, nor would hotels be permitted to wash towels and sheets without first giving guests the chance to reuse them. Restaurants would be barred from offering unsolicited glasses of water during a state-declared drought.

If the Board's proposal goes into effect, engaging in any of this sort of water usage will earn the violator a hefty $500 fine.

The rules were first imposed on a temporary basis at the direction of California Governor Jerry Brown during the state's 2014 drought, and were phased out as the effects of the drought lessened in 2017. But with U.S. Department of Agriculture's Drought Monitor declaring 44 percent of the state to be in moderate to severe drought last week, The Water Resource Control Board is proposing to make them permanent.

Water Board Chairwoman Felicia Marcus told the *Santa Rosa Press Democrat*, "We're not in an emergency right now, but shame on us if we just bury our heads in the sand...allow people to go out and waste water by washing down the driveway with a hose when a broom would do."

Despite the Board's stated worries about waste, the proposed regulations would do little to curb water usage.

Of the 3.5 million acre-feet of water saved by all conservation methods during California's 2014-2017 drought, the Water Board estimates that only 1 percent of the savings—some 12,489 acre-feet—was a result of the end-user restrictions that might soon become permanent.

That's because the kinds of behaviors targeted by the proposed regulations make up a tiny fraction of California's water usage.

According to numbers compiled between 1998-2010 by the state's Water Resource Department, only 10 percent of California's water is consumed by urban uses across the state. Some 50 percent is used for environmental purposes, such as keeping streams and riverbeds wet. Another 40 percent is sucked up by the state's agribusinesses.

California's water woes, says Reed Watson, an environmental economics professor at Clemson University, will not be solved by piling on more restrictions on end-users.

"The fact is, if you look anywhere in the United States, water use restrictions do not address the systematic issue, which is price," Watson tells *Reason*.

California's system of water rights privileges agricultural interests, while restricting the ability of everyone in the system to trade the water rights they do have to the people willing to pay for it.

The result is a non-functioning pricing system that sells water to farmers for pennies per every thousand gallons, while urban users often shell out $2 to $3 for the same quantity.

Some of that price difference, says Walters, is the result of the higher costs involved in getting water to lawns in Los Angeles compared to alfalfa farms in California's central valley. A lot of it however has to do with the red tape on trading water rights between different uses.

A recent report by the R Street Institute and the Property and Environment Research Center found that the average price to transfer water from an agricultural user to a municipal user is $7,000 per acre-foot higher than transferring the same quantity between two agricultural users.

The dysfunctional, government-imposed price system leads California farmers to continue growing water-intensive crops in the midst of severe droughts. So far, the state has responded to this problem by restricting water usage, rather than by allowing for more market-driven pricing.

But says Watson, that such an approach is doomed to failure.

"Any proposed restriction that doesn't effect price is going to be ineffective at addressing the issue. A better way to do it is to charge people the fill cost of their water and let them trade," he tells *Reason*. "Only when you do that will you have lack of waste."

The Water Resource Control Board is accepting public comment on its restrictions for another two weeks. No date has been set for finalizing the rules.

Photo Credit: Vladyslav Bashutskyy/Dreamstime.com
Christian Britschgi is an assistant editor at Reason

Source: https://reason.com/blog/2018/02/22/california-wants-to-fine-you-500-for-was

R Street

Free markets. Real solutions.

PERC

PROPERTY AND ENVIRONMENT RESEARCH CENTER

R STREET POLICY STUDY NO. 131
February 2018

WATER MARKETS AS A RESPONSE TO CLIMATE CHANGE

Josiah Neeley

CONTENTS

INTRODUCTION

It does not take a crystal ball to know that water scarcity will be one of the major challenges faced by the western United States in the 21st century. Indeed, it already is. The past decade has seen severe droughts in Texas, California and elsewhere that have cost states billions of dollars. Further, even when not officially in drought, many western areas have experienced bitter fights over water. In the coming decades, these problems are almost certain to increase, as climate change will place serious, additional strain on the ability of western states to meet their water needs. If left unaddressed, such strains will cause increased drought and may change the economic viability of agricultural production in some areas.

Yet despite such serious issues, water usage in much of the United States remains highly inefficient, and restrictions on the ability to transfer water mean that significant quantities of the precious commodity are not available for their most valuable use. Indeed, legal doctrines in some states effectively punish water conservation and encourage wasteful use. Increased efficiency could free up millions of acre-feet[1] of water and would help alleviate the growing stresses on water availability.

To this end, the present study assesses several proposed changes to state regulation of surface water that could help make its use more efficient and could help states adapt better to climate change. It is focused primarily on twelve western states, and identifies six policy reforms that states could enact to address the problem of water scarcity:

1. Eliminate restrictions on changing the use of water;
2. Recognize water storage as a beneficial use sufficient to maintain a water right;

1. An acre-foot is a standard unit of measure used in discussion of water resources. It is defined as the amount of water needed to fill an acre of surface area to a depth of one foot, or approximately 325,853 gallons.

3. End "use-it-or-lose-it" doctrines that undermine incentives for rights holders to increase water efficiency;
4. Eliminate amorphous, non-environmental, third-party considerations from the approval process;
5. Create or expand an expedited approval process for short-term leases;
6. Use water banks to facilitate water transfers.

All of these proposed changes increase flexibility and use of water markets, which will be an important strategy to meet the challenges of climate change in the West.

INCREASING THE STRAIN ON WATER AVAILABILITY

Between 2010 and 2014, Texas endured one of the most severe droughts in its history. Based on the Palmer Drought Severity Index, the 2010 drought was the second longest lasting and included the driest 12-month period on record.[2] In 2011 alone, the resulting agricultural losses were nearly $8 billion.[3] In 2015, Texas was subjected to the flip side of drought and experienced severe flooding.[4] However, Texas' experience is hardly unique. From 2011 to 2017, California experienced one of its worst droughts ever, which also ended in severe flooding.[5]

In the coming decades, events like these are expected to grow more frequent due to factors like population shifts and climate change. While the precise effects of climate change remain unknown, it could exacerbate current water scarcity problems in many ways. Hotter temperatures, for example, will increase water evaporation from soil, which makes certain areas more susceptible to drought. These rising temperatures can also alter weather patterns, which would lead to less rainfall in parts of the West or longer dry periods punctuated by heavy flooding.[6] Such changed rainfall patterns could themselves lead to periods of prolonged drought and later, heavy rain and flooding. As temperatures increase, certain areas will no longer be suitable for growing particular crops, while other areas may become more productive.[7] To give one example, the Intergovernmental Panel on Climate Change (IPCC) projects "large declines in land suitability for California viticulture by 2050 (with increases further north)."[8] Finally, climate change will exacerbate issues involving some endangered species. With respect to this, the IPCC further notes that "a number of ecosystems in North America are vulnerable to climate change. For example, species in alpine ecosystems are at high risk due to limited geographic space into which to expand."[9]

The American West has long faced the challenges associated with procuring sufficient water supply to meet demand. But for this very reason, any worsening of these problems because of climate change requires serious action and thus, water in the West must be conserved and used ever more efficiently.

WATER TRADING AS A MEANS OF CLIMATE ADAPTATION

To cope with these challenges, water markets are a key strategy, as they can increase the efficient use of water in several ways. First, markets promote frugality. When water is scarce, users are inspired to make do with less, and thus they are more likely to reduce waste and find substitutes for water. Prices serve as signals to users about the scarcity of a resource. If water prices are kept artificially low—as they often are for a variety of reasons—people will act as if it is plentiful and will be less likely to conserve. By contrast, higher prices create incentives for individuals and businesses to find more efficient ways to meet their water needs. Research suggests that a 10 percent increase in water prices reduces demand for water in agriculture by nearly 5 percent in the short term, while residential demand decreases 3-4 percent in the short term and 6 percent in the long term.[10]

Even where prices remain low, the ability to sell "saved" water can provide a substantial incentive to use water more efficiently. When every gallon of water not used represents a potential profit opportunity, the incentive to find new ways to conserve increases dramatically. And, water storage can also be used as a hedge to protect against extended dry periods.

In addition, markets facilitate transfer of water toward its highest and best use. The most beneficial uses of water will inevitably change over time. For example, a factory or mine that once used considerable amounts may go out of business or the water needs of a city may grow as its population

2. "Water for Texas: 2017 State Water Plan," Texas Water Development Board, 2017, p. 32. http://www.twdb.texas.gov/waterplanning/swp/2017/doc/SWP17-Water-for-Texas.pdf?d=15162595033?3.

3. "Drought cost Texas close to $9 billion in agricultural losses in 2011, study finds," *Austin American Statesman*, March 21, 2012. http://www.statesman.com/news/state-regional/drought-cost-texas-close-billion-agricultural-losses-2011-study-finds/pGb-99977nTFfsxV8XKlWoK.

4. John Nielsen-Gammon, "Texas state climatologist on climate change, floods and droughts," *Houston Chronicle*, June 2, 2015. http://www.houstonchronicle.com/local/gray-matters/article/Texas-state-climatologist-on-climate-change-6302140.php.

5. Shelby Grad, "Most of California is out of the drought," *Los Angeles Times*, Feb. 23, 2017. http://www.latimes.com/local/lanow/la-me-drought-gone-20170223-story.html.

6. "Fifth Assessment Report," Intergovernmental Panel on Climate Change, 2014, pp. 735, 745. https://www.ipcc.ch/report/ar5.

7. Ibid., p. 1462.

8. Ibid.

9. Ibid., p. 1458.

10. Terry L. Anderson et al., *Tapping Water Markets* (RFF Press, 2012), pp. 13-14.

does. Alternatively, a farmer may switch from growing one type of crop to another, less water-intensive one. As these shifts occur, water originally dedicated to one purpose can be rededicated to new ones. Accordingly, states like Texas formally recognize that meeting future water needs will require the "voluntary redistribution" of water rights.[11]

There are two ways for these transitions to occur. The first is through political decision-making; the other is through markets. As to the former, politicians decide which uses of water are most important and require it to be shifted accordingly. Political decision-making, however, has generally proven to be a bad way of allocating resources. It would be a mistake to think that questions about the most important use of water can be decided in the abstract, for example, by deciding that agriculture is more important than municipal use or vice versa. Some use of water for agriculture is essential. Other agricultural water use (say, to grow a water intensive crop on marginal land) may make little economic sense. Further, to properly decide between potential uses of water requires knowledge of local conditions that is often beyond the grasp of the regulator.[12] In addition, political allocation of water is vulnerable to rent seeking and cronyism, wherein water is allocated not to those who value it most but rather to those with the most political pull.[13]

By contrast, water markets "provide a way of adapting to a dynamic world of changing human demands for water and the changing supplies of it."[14] This is because if the owner of a resource values it less than some other party, then she should be willing to sell it to that party for a mutually agreeable price. Market transactions require a willing buyer and a willing seller, both of whom conclude that they will be better off as a result of the transfer. As such, they are more likely to reallocate water efficiently than are bureaucratic judgments about its best use.

Market adaptation is particularly useful with respect to climate change because it does not require advanced knowledge of what the effects of climate will be. If the effects of rising temperature turn out to be greater than anticipated, the incentives for market adaptation will increase correspondingly.

RESTRICTIONS ON WATER TRADING

While the particulars of water law differ, all states in the western region use some form of the "prior appropriation" system for water rights, at least for surface water. Under this system, the right to divert and use water is based on historical use. A typical water right gives the owner the right to divert a given amount of water each year from a particular place for a specified use. States maintain a list of recognized "beneficial uses" of water, and each water right must be designated for one of those uses. In cases like drought where there is not enough water for all rights holders, older or "senior" rights are given priority over newer, "junior" ones.

The current system of water regulation in the West differs in several ways. In an efficient market system, owners decide for themselves how best to use their property subject to specific legal prohibitions, and transfers depend only on a willing buyer and seller agreeing to the details of the transaction. However, under the prior appropriation system, transfers also typically require the pre-approval of regulators, and often many third parties can also object. Even absent a change in ownership, a right holder will often need pre-approval to change the how his water is used and can only use water in a way formally designated by the state as beneficial. Regulators will typically be required to assess whether a transfer will negatively affect the ability of other rights holders to access their own water, as well as the environmental impact of the transfer. In addition, many states require consideration of broader economic factors such as the effect a transfer might have on the local community. Obtaining approval for a transfer can take years and cost many thousands of dollars, sometimes representing a significant portion of the total cost of the transfer.

The need for pre-approval and other restrictions on transfers create what economists refer to as "transaction costs." The higher the transaction costs, the more potentially valuable transfers will not occur because the cost of the approval process exceeds the benefit of the transfer. Transaction costs are especially problematic when it comes to climate adaptation. Because climate change occurs gradually over the course of decades, adaptation will often require a series of small changes and improvements made over time. High transaction costs, however, are particularly likely to impede these smaller changes because the value of each individual transaction is likely to be low, even as they are cumulatively important.

The prior appropriation system can also unintentionally undermine incentives to be frugal with water use, as many states currently incorporate a "use-it-or-lose-it" doctrine into their water rights. Under this system, a water right owner who does not use their entire allocation will forfeit the unused amount. Similarly, this policy can mean that individuals who find ways to use water more efficiently cannot

11. Kathleen Hartnett White et al., "The Case for a Texas Water Market," Texas Public Policy Foundation April 2017, p. 3. https://www.texaspolicy.com/library/doclib/2017-04-RR-WaterMarkets-ACEE-KHartnettWhite.pdf.

12. See, e.g., F.A. Hayek, "The Use of Knowledge in Society," *American Economic Review* 4 (1945), pp. 519-30. http://www.econlib.org/library/Essays/hykKnw1.html.

13. See, e.g., Sean Callagy, "The Water Moratorium: Takings, Markets, and Public Choice Implications of Water Districts," *Ecology Law Quarterly* 35:2 (2008), pp. 223-62. https://scholarship.law.berkeley.edu/cgi/viewcontent.cgi?article=1865&context=elq.

14. Terry L. Anderson, "Dynamic Markets for Dynamic Environments: The Case for Water Marketing," *Daedalus* 144:3 (Summer 2015), p. 87. https://www.mitpressjournals.org/doi/abs/10.1162/DAED_a_00344?journalCode=daed.

benefit financially and indeed may be penalized for doing so. For example, a farmer who has a water right to 100 acre-feet a year for irrigation use and reduces his water consumption to 90 acre-feet a year through more efficient management may be "rewarded" for his conservation efforts by having his water right reduced permanently from 100 to 90 acre-feet a year. According to states that employ this model, the theory behind it is that the extra ten acre-feet were "waste" that the owner should have never had a right to in the first place.

INEFFICIENCY IN THE CURRENT WATER SYSTEM

The restrictions on the transfer and use of water described above have led to major inefficiencies in water usage. These can be seen in the different prices paid for water put to different uses. For example, urban water users typically pay between $1 to $3 per thousand gallons of water. By contrast, many farmers pay only a few pennies per thousand gallons.[15] To take an extreme example, in 2001, farmers in California's Imperial Irrigation District paid $13.50 per acre-foot of water, while a development near the Grand Canyon National Park was willing to pay $20,000 per acre-foot from the same source.[16] These disparities insulate certain sectors from the price signals of scarcity, which impedes economical conservation. The price disparities also suggest that there are potentially large gains from trade through water markets that are not currently being realized.

The disparity can also be seen in the prices gained for transfers. In 2005, the average price for water transfers from agriculture to municipal use was $7000 per acre-foot a year more than the price for a transfer from one agricultural user to another.[17] In an efficient system, these differences would be eliminated by shifting water away from the lower value uses in favor of higher value ones. After all, why would a farmer sell to another farmer if he can make thousands of dollars more per acre-foot selling the same water to a non-farmer? Yet the time and cost of getting an approval for changing the use of water means that water is often trapped in less valuable uses. In other words, the transaction costs associated with transfers are too high.

When it comes to increasing the efficiency of the water use system, the bad news is also the good news. Current water usage is woefully inefficient, due significantly to restrictions on how water is regulated. The flip side of this is that by correcting and removing these barriers, states could greatly increase the efficient use of water.

The power of markets in water can be seen in the case of transfers for instream use. Historically, state-recognized beneficial uses of water were limited to uses that involved diversion from its natural source. This meant that those who were willing to pay to keep water instream (either for commercial or environmental conservation purposes) could not do so. Over time, most states came to recognize instream uses as beneficial, and therefore as a valid legal use for a water right.

However, this alone did not solve the problem, as water in most western areas had already been fully allocated (meaning that no new water rights could be issued). Thus, for water to be dedicated for instream purposes, existing water rights must be transferred. To deal with this, some states have set up special expedited processes whereby water rights can be transferred specifically for instream purposes.

Overall, this system has been a success. California's Scott River Valley, for example, long faced challenges related to the preservation of an endangered salmon species. Heavy diversion of water for irrigation imperiled the viability of the salmon population due to their need to return to the river in which they were born to spawn. To address this, the Scott River Water Trust, a non-profit conservation organization, negotiated voluntary agreements whereby local farmers were paid to temporarily refrain from the diversion of water during specified low-flow periods. These agreements resulted in a more than five-fold increase in Coho salmon returning to the area between 2008 and 2011.[18]

OPTIONS FOR REFORM

Despite operating under the same basic prior appropriation system, western states differ significantly in how open they are to water transfers, frugality and savings. A survey of western states yields six potential legal reforms that could greatly increase the long-term efficiency of the water system—each of which are already in operation in some states. While these reforms are not comprehensive, each would go a long way to help western states meet their growing water scarcity challenges.

15. Peter W. Culp et al., "Shopping for Water: How the market can mitigate water shortages in the American west," *The Hamilton Project Discussion Paper* No. 2014-05, October 2014, p. 10. http://www.hamiltonproject.org/assets/files/how_the_market_can_mitigate_water_shortage_in_west.pdf.

16. Jedidiah Brewer et al., "2006 Presidential Address: Water Markets in the West: Prices, Trading and Contract Forms," *Economic Inquiry* 46.2 (April 2008), p. 91. https://pdfs.semanticscholar.org/dc20/7de4824727081 2df5c74e4f7068ddd3399ce.pdf.

17. Ibid, p. 101 (fig. 1).

18. Reed Watson, "Scott River Water Trust: Improving Stream Flows the Easy Way," Property and Environmental Research Center, Jan. 3, 2014. https://www.perc.org/articles/scott-river-water-trust-improving-stream-flows-easy-way.

TABLE 1: STATE POLICIES ON WATER MARKETS AND TRANSFERS

	AZ	CA	CO	ID	MT	NE	NM	NV	OR	SD	TX	WA
Restrictions on change of use?	No	No	No	Yes	No	No	No	No	No	Yes	No	Yes
Storage recognized as beneficial use?	Yes	No	No	No	Yes	No	No	Yes	No	No	No	No
Can keep/sell conserved water?	No	Yes	No	Yes	Yes	No	Yes	No	Yes	No	Yes	Yes
Amorphous third-party considerations for approval?	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No
Expedited Review for Short-Term Leases?	No	Yes (but limited to one year and remains extensive)	Yes (but remains extensive)	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes
Active water banking?	Yes	Yes	No	Yes	No	Yes	No	No	Yes	No	Yes	Yes

Eliminate restrictions on change of use

Water rights are limited to a specific use, which must be among a list of state-designated "beneficial uses." While the categories of uses that are deemed beneficial tend to be broad (e.g. agriculture, mining or municipal), they are not comprehensive and do not include all potential valuable uses of water. Even where a water right holder simply wants to change between one beneficial use and another, they may still face a daunting regulatory approval process. For example, in one case, the city of Marshall, Texas saw its application to add an additional beneficial use to its water right languish for six years before ultimately being withdrawn.[19]

As if this were not bad enough, some states go further and impose outright prohibitions on certain types of water-use changes. For example, in Washington, water rights established under the "Family Farm Act" cannot be transferred for uses other than agriculture unless as part of a lease.[20] Similarly, in South Dakota, a water transfer from an irrigation water right may only be approved for domestic uses within a water distribution system (such as a municipality), and property from which the transfer is made can no longer be irrigated from any water source.[21]

Specific bans on transferring water from one beneficial use to another should be eliminated, but even the necessity of requiring approvals needs to be reconsidered. The need for pre-approval of a change of use is based on the fact that different uses of water can have different hydrological effects. For example, a large portion of water used in irrigation may ultimately return to the water source through run off. If this water were to be used for another purpose, such as municipal uses, it could leave less water for other rights holders even if the total amount of water being diverted remains unchanged.

To the extent that a change of use impedes other water right holders, it is a legitimate regulatory issue. That said, changes within a beneficial use category (such as adopting more efficient irrigation methods) can also affect water availability to junior right holders without requiring regulatory pre-approval, and certain use changes are unlikely to harm other rights holders. Some states have streamlined or automated approval processes for certain use changes. Nebraska regulators, for example, may approve a transfer without notice or a hearing if the water is to be used exclusively for irrigation.[22] States should look to expand the use of expedited or automatic approvals for cases where use changes are unlikely to harm the rights of others.

Indeed, there is little reason that water rights should be limited to a specific set of beneficial uses, at all. Historically, the beneficial use framework was a simple way to define water rights while preventing a small group from laying claim to all available water. Today, however, water in most western states is fully appropriated if not overly so. Accordingly, concerns about speculation and hoarding are no longer as relevant as they may have been in the past. As one prominent water resource economist has argued, "the whole idea of specifying any list is misdirected. Is the government sufficiently knowledgeable to recognize all conceivable and valuable uses of water?"[23]

The justification for approval of changes to the use of a water right is that different uses have different levels of return flow. Thus, a change to a use with less return flow could leave less

19. Hartnett White et al., p. 9. https://www.texaspolicy.com/library/doclib/2017-04-RR-WaterMarkets-ACEE-KHartnettWhite.pdf

20. Wash. Stat. § 90.66.065 (2), (5)

21. S.D. codified laws § 46-5-34.1

22. Neb. Rev. Stat. § 46-291; 457 Neb. Admin. Code, Ch. 9 § 00

23. Ronald C. Griffin, Water Resource Economics (MIT Press: 2016), p. 163.

water available for other right holders. One way to avoid this problem would be to define water rights not in terms of the amount of water diverted but in terms of the amount of water consumed. As described in a recent Brookings report:

> [r]edefining the water right in terms of the amount of water *consumed* by the crops would eliminate the need for a "no-harm-to-juniors" inquiry because junior appropriators never had access to consumed water.[24]

Water rights based on consumption would therefore be more well-defined and more easily transferred with lower transaction costs. While no U.S. state currently operates under this system, it has proven successful in the Mexicali Valley of northwestern Mexico.

Recognize storage as a beneficial use

One anticipated effect of climate change will be altered weather patterns, which will change the timing of rain and snowfall. Some parts of the western United States that are not expected to receive less precipitation overall may still experience more drought because rainfall may occur more sporadically. Longer periods of little rainfall will then be punctuated by periods of heavier-than-usual precipitation. In Texas, for example, extreme rainfall events are estimated to have increased between 20 and 40 percent over the past century, with the record for monthly rainfall occurring in May 2015 at the end of one of the state's most severe droughts.[25]

A key way to adapt to this change would be through increased use of water storage. Surplus water could be captured and stored during periods of heavier rain and could then be used to relieve shortages during drier years. Storage can take a variety of forms at a variety of scales, including reservoirs and aquifers, centralized water banks and smaller groundwater recharge options. Storage can even be used to access water that otherwise would have gone to waste. The Cadiz Valley Water Conservation, Recovery, and Storage Project, for example, would capture water in the Mojave Desert before it is contaminated by salt or lost to evaporation.[26] In some cases, an individual property owner, such as a farmer, may store water themselves to be used in later years. To be most effective, however, storage projects would need to be available at various scales and not tied to a specific owner or project.

Unfortunately, many states do not formally recognize storage as a beneficial use or do not allow water to be taken for storage purposes at scale unless the ultimate use is specified in advance. For example, in 2005, California courts invalidated a permit issued by the State Water Resources Control Board to allow diversion of water for storage and resale in future years. The Board had initially granted the permit on the grounds that storing the water for later beneficial use was prudent since California lacked sufficient water during most years. However, the court later ruled that this was insufficient, and that the permit must specify the actual ultimate use of the water.[27]

Saving extra water today to meet shortages in the future is common sense. Accordingly, states should add storage as a recognized beneficial use without requiring pre-specification of ultimate use, and should allow owners of stored water to sell to other users when the time comes. Transfers into storage would still have to go through the approval process required for water transfers generally.

Let right holders keep and sell salvaged water

If a manufacturer finds a way to make its products with fewer raw materials, it saves money. This incentive to become more efficient in the use of resources is a major source of economic progress. The drive to conserve is therefore built into the market system.

When it comes to water, however, these incentives are undermined by the "use-it-or-lose-it" doctrine, which holds that a right holder who does not use his total water allocation may permanently lose the right to the excess. An example of this in action can be seen in *Southeastern Water Conservancy District v. Shelton Farms*,[28] wherein several Colorado landowners made efforts to conserve water by removing phreatophytes[29] from their property and sought to receive credit for the water saved. The court, however, held that giving the owners an "unconditional water right therefore would be a windfall which cannot be allowed, for thirsty men cannot step into the shoes of a 'water thief' (the phreatophytes)."[30]

However, the court in *Shelton Farms* had it backwards. It was the junior rights holders who received a windfall from the court's decision, gaining more water without doing anything to achieve it. By denying property owners the benefit

24. Culp et al., p. 15. http://www.hamiltonproject.org/assets/files/how_the_market_can_mitigate_water_shortage_in_west.pdf.

25. Kate Wythe "Extremely Expected: Extreme is the new (and old) normal in Texas Weather," Texas Water Resources Institute, Fall 2016. http://twri.tamu.edu/publications/txh2o/fall-2016/extremely-expected.

26. Reed Watson, "Water From the Desert: Entrepreneurs Tap into Unlikely Water Sources," Property and Environmental Research Center, Jan. 4, 2014. https://www.perc.org/articles/water-desert-entrepreneurs-tap-unlikely-water-sources.

27. *Central Delta Water Agency v. SWRCB*, 124 Cal. App. 4th (2004), p. 245.

28. 187 Colo. 181 (Colo. 1975)

29. Phreatophytes are a type of naturally occurring plant that sucks up large amounts of water from the soil.

30. *Shelton Farms*, 187 Colo., p. 188.

of their own conservation efforts, the court merely removed the incentive for future conservation.

By contrast, New Mexico law provides that "improved irrigation methods or changes in agriculture practices resulting in conservation of water shall not diminish beneficial use or otherwise affect an owner's water rights."[31] Other states should follow this model to provide incentives for conservation and increased efficiency.

Eliminate amorphous third-party considerations

Transferring water requires several government permits and approvals. However, the need for pre-approval before water can be appropriated and used places significant limits on the ability of individuals to innovate.

To some extent, requiring pre-approval for water withdrawals may be justified. For example, many states require regulators to ensure that water diversions will not have harmful environmental consequences that would not otherwise be accounted for in the market system.

Many states, however, impose additional, amorphous requirements for approval. In Idaho, for example, regulators cannot approve a change in water rights unless it is in the "local public interest," which is defined as "the interests that the people in the area directly affected by a proposed water use have in the effects of such use on the public water resource."[32] In addition, transfers must "not adversely affect the local economy of the watershed or local area within which the source of water for the proposed use originates."[33]

These requirements can become even more expansive when the proposed water transfer would involve moving water between basins or in another geographically extensive manner. A stark example comes from Texas, which imposes extensive requirements for inter-basin transfers, including multiple hearings with notice and public comment, and a loss of seniority for the transferred right. To approve the transfer, state regulators in Texas must consider factors ranging from "the need for the water in the basin of origin," the "availability of feasible and practicable alternative supplies," the "projected economic impact" and the "proposed mitigation or compensation, if any, to the basin of origin by the applicant."[34]

At first blush, many of these requirements may seem like common sense. After all, few would argue that a transfer should be approved if it would harm the local community. In practice, however, proving a lack of harm can be a costly and time-consuming process, and it introduces a large degree of subjectivity into the approval process that can be used to grant or deny projects for political reasons. Imagine if similar "impact on the community" assessments were required before a restaurant could move locations or an individual could buy a car. Making approvals costly induces stagnation, which is itself economically harmful to the surrounding community.

To the extent that third-party considerations are involved in the approval process, they should be narrowly focused on environmental harms, rather than amorphous economic impacts that are difficult—if not impossible—to quantify objectively, and that will be positive for voluntary transactions in any case.

Expand expedited review for short-term leasing

Apart from reducing the regulatory approval requirements in general, states can also create a special, more expedited approval process for cases where the potential harms are not as great. Several states allow expedited approval for short-term water leases (as opposed to permanent sales), at least for certain purposes. In Nevada, for example, one-year transfers can be approved without notice or a hearing if regulators determine that the change is in the public interest and will not interfere with other water rights.[35] Similarly, in Montana, a water right holder may lease all or part of their water rights for a period of up to 90 days for road construction and dust abatement without prior approval.[36] States have been particularly likely to use an expedited process for approving short-term leases for environmental flows, on the grounds that such transfers are unlikely to be harmful.

Although many states have some form of expedited process, in practice, the effectiveness can vary wildly. The contrast between Oregon and California, for example, is stark. While Oregon has approved nearly 2000 short-term leases, California has approved a mere 34. This is because California has an expedited approval process for short-term leases, but it is only available for leases of a year or less and even the expedited process is lengthy and burdensome. In some cases, the length of the approval process can last almost as long as the lease itself. By contrast, in Oregon, a short-term lease can be for up to five years and is typically approved in 30 days.[37]

An expedited process that is still cumbersome and costly undermines its own reason for existence. Other states should

31. N.M. Stat. Ann. § 72-5-18

32. Idaho Code Ann. §§ 42-222; 42-202b

33. Ibid. § 42-222.

34. Texas Water Code Sec. 11.085(k)

35. Nev. Rev. Stat. § 533.345

36. Montana Code Ann. § 85-2-410

37. Szeptycki et al., p. 19. https://www.pacificresearch.org/wp-content/uploads/2017/06/4_WITW-WaterRightsLawReview-2015-FINAL.pdf.

look to states like Oregon and Washington to see how an effective streamlined process can safeguard the environment without deterring needed water transfers. Allowing transfers will be critical to the West's future ability to adapt to climate change.

Encourage transfers through water banking

One barrier to water right transfers is informational. A transaction clearinghouse or "water bank" can help overcome these problems by helping to match willing buyers and sellers, set pricing and perform other administrative or technical services. A water bank can be particularly useful in cases where a buyer seeks water from multiple sellers.[38]

At least in name, most states already maintain a form of water bank, however, the structure and function of each one differs greatly by state. In some cases, the bank simply serves as a storage facility and is not used to conduct transfers. Some banks, by contrast, do not store water at all, but only serve as a "paper exchange" for transfers of rights. This structure might be thought of as analogous to a commodities exchange, where ownership interests, rather than the commodities themselves, are what change hands.

To date, water bank activity has been limited, partially because of restrictions on participation. For example, California's water bank is limited to existing water rights holders. States should look to increase activity in water banks and structure them as an efficient vehicle for transfers, rather than just a holding facility.

CONCLUSION

No policy reform is a panacea. In many parts of the western United States water is vastly over-appropriated, and rising temperatures and growing populations will only put further strain on an already overtaxed system in the coming decades. But the dire nature of the water availability crisis only underscores the need for reforms that can increase conservation and free up water for more beneficial use. If more widely adopted, many potential reforms already implemented in some states could help ease the transition to the warmer world of the future.

ABOUT THE AUTHOR

Josiah Neeley is senior fellow, energy policy director and Southwest region director for the R Street Institute. He leads the institute's energy program, which works to advance a well-defined and limited role for government in shaping decisions about infrastructure, wholesale and retail electricity, research and development, fuel choice and diversity, and climate adaptation and mitigation. He also leads the institute's work on legislation and issues affecting Arkansas, Louisiana, New Mexico, Oklahoma and Texas.

The present study was written during a visiting fellowship at the Property and Environment Research Center (PERC), a non-profit institute in Bozeman, Montana that is dedicated to improving environmental quality through property rights and markets.

38. "Analysis of Water Banks in the Western States," pp. 3-7. http://www.water-law.sympoisium.com/sites/default/files/Water%20Banks%20in%20the%20West.pdf.

DOES CALIFORNIA'S ENVIRONMENT DESERVE ITS OWN WATER RIGHT?IN DEPTH:

FISHERIES AND WILDLIFE FACE GROWING CHALLENGES, BUT SO DO WATER SYSTEMS COMPETING FOR LIMITED SUPPLY. IS THERE ROOM FOR AN ENVIRONMENTAL WATER RIGHT?

Does California need to revamp the way in which water is dedicated to the environment to better protect fish and the ecosystem at large? In the hypersensitive world of California water, where differences over who gets what can result in epic legislative and legal battles, the idea sparks a combination of fear, uncertainty and promise.

Saying that the way California manages water for the environment "isn't working for anyone," the Public Policy Institute of California (PPIC) shook things up late last year by proposing a redesigned regulatory system featuring what they described as water ecosystem plans and water budgets with allocations set aside for the environment.

Brian Gray, senior fellow at the PPIC and one of the report's authors, believes the time has come to manage water in a more holistic and equitable manner.

"The current system of protecting the environment is essentially based on placing limitations on other individuals' exercise of their water rights," he said. "We think that over time it has undervalued the ecosystem. That got us thinking about this idea of identifying the ecosystem as holding an interest that is akin to other water rights, the same stature as other water rights."

The PPIC believes its proposal can be accomplished without taking water away from others simply by making better use of water that's already earmarked for the environment.

That doesn't allay concerns from farmers and cities that more water for the environment means less water for them.

"It is not the water rights system that's the problem, it's the scarcity..." ~Chris Scheuring, California Farm Bureau Federation

In an already oversubscribed system, adding an environmental water right or budget "is sort of like making a game of playing musical chairs even tougher," said Chris Scheuring, managing counsel for the California Farm Bureau Federation. "There are not enough chairs to go around as it is.

"We've already got a water rights system that allocates scarcity," Scheuring said. "It is not the water rights system that's the problem, it's the scarcity, and so will an environmental water budget and environmental water right address the underlying scarcity and improve the overall supply? I don't know and would want to know that it would."

Scheuring's point was highlighted Feb. 20 when the Bureau of Reclamation announced an initial water supply allocation of 20 percent to its agricultural water service contractors south of the Delta.

Tim Quinn, executive director of the Association of California Water Agencies (ACWA), whose members serve both urban and agricultural users, said he appreciates PPIC's proposal of using market tools to increase efficiency.

"I think it's a concept worth looking at," he said. "I'm stopping short of saying it could work."

Roger Patterson, assistant general manager of the Metropolitan Water District of Southern California, echoed Quinn's comments, saying, "In my view it has some merit. Whether it will go somewhere or not is a different question."

Patterson, who has held leadership posts with the Nebraska Department of Natural Resources and the Bureau of Reclamation, said his experience with other states' use of environmental water rights shows the method "can provide flexibility and may even be less controversial" than other water management tools.

California's most recent drought highlighted the fragile balance between allocating water for people and for the environment. There is growing recognition that more water has to be kept in reservoirs and in rivers to preserve flow and cooler temperature needs for fish, especially during critical life stages.

The existing water quality apparatus functions in a manner that aims to limit pollutants in rivers while ensuring enough instream flows exist to protect water quality and fish and wildlife. Water rights holders are limited, especially during drought, in the amount of water they can take (including water contractors that rely on exports) and critically dry years affect people across the state.

"The 2012-16 drought caused unprecedented stress to California's ecosystems and pushed many native species to the brink of extinction," according to PPIC's report, *Managing California's Freshwater Ecosystems: Lessons from the 2012-16 Drought*. "It also tested the laws, policies, and institutions charged with protecting the environment."

Gray with the PPIC said a broad cross section of stakeholders was consulted prior to the report's preparation and that many people agree the existing framework does not work well.

"People are very frustrated with the current state of affairs," he said. "They don't think it's working either to provide adequate protection and habitat for fish or a reliable water supply. Both sides feel they bear a disproportionate share of the risk of hydrologic and regulatory uncertainty."

"People are very frustrated with the current state of affairs. They don't think it's working either to provide adequate protection and habitat for fish or a reliable water supply." ~Brian Gray, senior fellow, PPIC

Water systems throughout the state exist on a thin margin, meaning users are subject to inevitable conflict, especially during drought, Gray said. Then there are the federal and state Endangered Species Acts - powerful laws that function in a way that waits until species are in serious trouble before their protections kick in. PPIC believes the goals of its proposal can be accomplished through the existing amount of water dedicated for environmental purposes.

"We think the amount of water that should appropriately be assigned or dedicated to ecological services should be well-defined," Gray said. "It should be defined as a budget and it should function as a water right."

Protections for the environment have been growing since the landmark Clean Water Act was enacted in 1972. Twenty years later, the Central Valley Project Improvement Act dedicated 800,000 acre-feet of water annually to the restoration of anadromous fish in the Sacramento and San Joaquin rivers, their tributaries and the Delta. Last year, an attempt was made in Colorado to establish legal "personhood" for the Colorado River before the motion was withdrawn by the proponents. If pursued, the case would have been the first federal lawsuit seeking to establish legal rights for nature in the United States.

"What the plaintiffs in that case were trying to do is … use the principles of personhood … to have the courts establish certain rights that then will affect water diversions and water use," Gray said. "I'm not saying that is necessarily bad," but he said there are more straightforward ways to bolster environmental protection.

Mono Lake was the focus of decisions by California courts and the State Water Resources Control Board that gave the Public Trust Doctrine new weight in deciding water rights cases.

One of the pillars of legal protections for the environment is the Public Trust Doctrine, under which the state retains supervisory control over the diversion and use of water to protect public trust uses in navigable waters, including recreation, environmental values and fish and wildlife habitat. The Public Trust Doctrine also protects fish in non-navigable water. In its decision-making, the State Water Resources Control Board must consider protection of the public trust while also balancing all uses of water, a difficult task considering the many competing demands.

In the 1980s, decisions by the California Supreme Court and a state appellate court ultimately directed the State Water Board to amend the city of Los Angeles' water rights to protect Mono Lake and its tributary creeks. In 1994, the State Water Board issued its "Mono Lake Decision," which determined that the Public Trust Doctrine was relevant in the reconsideration of the allocation of the waters of the Mono Basin.

Gray and others believe the present system is not protective enough, given the dire straits for species such as Chinook and coho salmon, and that a new course of action is needed.

"We think the public trust values and ecosystem needs have really been structurally shorted because they are implemented as restrictions or set asides of water and they have a hard time competing with other water right holders," he said.

Gray acknowledged calling it an environmental water right "raises unnecessary hackles" and that it would be preferable for the idea to be codified in statute by the Legislature.

"Whatever it is called, it needs to function as a water right," he said. "The manager of the environmental water budget, the ecosystem trustee, must have all the rights and prerogatives that any other water right holder has."

"The way things are done now, I think you can make an easy case that the status quo is not great..." ~Curtis Knight, executive director of California Trout

Fisheries advocates have long believed the layer of protection provided by a dedicated block of water would benefit struggling fish species. Curtis Knight, executive director of California Trout, said having enough water in rivers is crucial to maintain temperature controls and limit the salinity that

comes with each tide through the Sacramento-San Joaquin Delta.

“The issue of salinity doesn’t get talked about enough,” he said. “In dry years, it creeps up and damages crops and then starts to limit the amount of water that can be pumped from the Delta. It also wipes out important rearing habitat so more water can have a lot of benefits.”

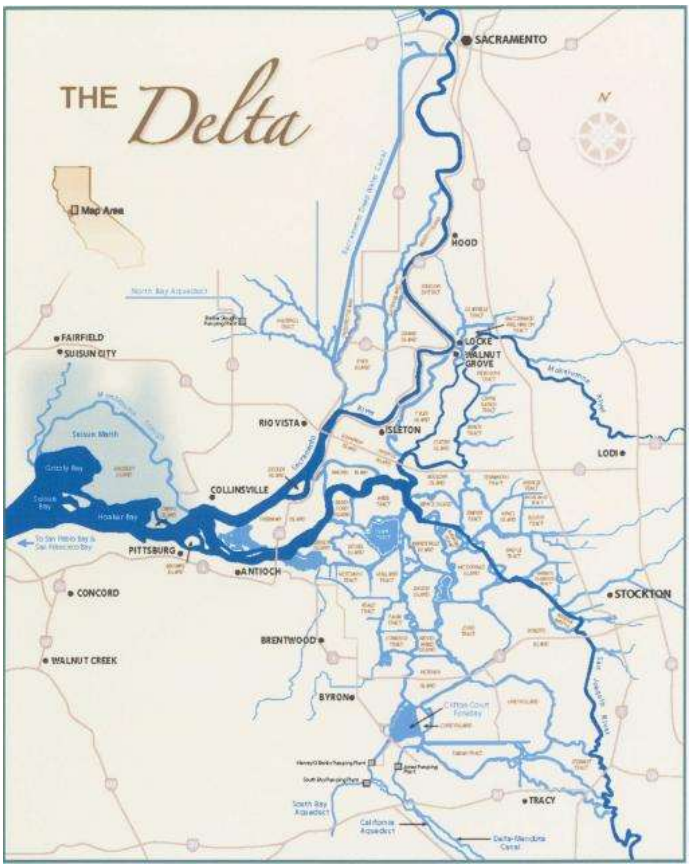
Getting a dedicated block of water in place “intuitively makes sense, but then you throw that intuitive idea on the whole water rights system and it just gets so daunting,” Knight said, adding “it seems like it’s the right thing to do, but it’s a tough thing to do.”

Any mention of changing water rights draws concern from water users, particularly farmers, who have been hit hard by drought and must contend with proposed flow regulations designed to protect fish and preserve freshwater levels in the Delta.

“I wouldn’t disagree with anybody that things aren’t working so well right now for the environment, but when you start talking about a whole new demand that’s overlaid … I can’t see how this isn’t a water rights reorganization or something that trumps the existing water rights regime,” said Scheuring, with the California Farm Bureau Federation. “When you talk about operating from the fundamental principle of starting all over and creating an environmental water right of some sort or a water budget for the environment then … my question is, ‘Where does that water come from?’”

The State Water Board’s Plan

Reserving enough water instream for the “reasonable” protection of fish and wildlife is the cornerstone of the first phase of the State Water Board’s proposed updated water quality plan for the Bay-Delta. The plan has garnered much criticism for its requirement that a budget or block of water equivalent to 30 percent to 50 percent of the unimpaired flow of the Stanislaus, Tuolumne and Merced rivers, all of which flow into the San Joaquin River and eventually the Delta, be managed for instream beneficial uses.



Initially, 40 percent of the impaired flow would be required, but this amount may be adjusted, taking into account current information, to protect fish and wildlife, according to the State Water Board. The increased flows also would help meet salinity standards in the southern Delta. Water agencies serving people and farms affected by the proposed rules have blasted it as an overreach while some environmental advocacy groups believe the proposal is insufficiently protective of fish and wildlife.

"We are as much about changing the dynamic to reward action as we are the numbers." ~State Water Board Chair Felicia Marcus

Felicia Marcus, chair of the State Water Board, said the PPIC's proposal is in line with what the board is trying to do, which is "to figure how to get the most benefit out of every drop to deal with all of the objectives – fish and wildlife, agricultural, and other human uses through incentivizing creativity and collective action while we adequately protect fish and wildlife. But we're looking at more than just how we manage the water part of that and including non-flow actions that fish and wildlife need too."

"What they've proposed is a very fruitful area for a collective discussion about how we manage for ecosystem and human needs in a more holistic and predictable way – bringing everybody together as opposed to the wordplay that has dominated this dialogue and the conflict," she said of the PPIC proposal. "I also think the fact they have broken out the distinction between water that truly is for the environment and water that is for salinity control … is a really important conversation because well-intended people mistook all of it being for fish and wildlife when it really isn't."

The Delta drains water from roughly 40 percent of California. Enough freshwater must flow into the Delta throughout dry months to repel salt water that pushes inland on ocean-driven tides from San Francisco Bay. If there is not enough water in upstream reservoirs to release and repel the salt water, it can contaminate the channels from which water supplies are drawn, not just for the State Water Project and Central Valley Project, but also for Delta farmers and water districts in nearby Contra Costa, Alameda and San Joaquin counties.

Gray said the PPIC's proposal would be a better approach than the State Water Board's water quality plan for the Delta.

"We would assign responsibility for managing that environmental water to a trustee and give that trustee the ability to deploy the water, be accountable for deploying the water, the ability to store water, the ability to trade, purchase and sell water and to store some of the ecosystem water underground and have conjunctive use that may be beneficial for groundwater recharge," he said.

The PPIC cites the Lower Yuba River Accord and the Putah Creek settlements, both of which rely on releases of water stored in upstream reservoirs to provide flows for fisheries, as two templates for how the process could work. PPIC's report notes that the 2008 Lower Yuba River Accord sets flow targets across a range of hydrologic conditions "that better protects the environment and provides more certainty for water users," while the Putah Creek example features negotiated agreements from 2000 that "increased certainty and reduced conflict over potential allocations of water."

Balancing the Tension Between Supply and Demand

Legal experts acknowledge that changing the existing system, no matter the mechanism, is an uphill climb. If the idea is to create a distinct environmental water right, “it would be extremely challenging to implement,” said Eric Garner, managing partner of Best Best & Krieger LLP in Los Angeles.

“The issue comes down to balancing the tension between the inherent uncertainty and science in these complex ecosystems with the need for entities that deliver water to have certainty in terms of building projects and having certainty of supply for their users,” he said.

Determining exactly how much water should remain in all the rivers and tributaries that flow to the Sacramento-San Joaquin Delta is a constant challenge. Scientific experts note that the answer doesn’t lie with a specific number and that there are many factors to consider regarding the relative health of a Delta ecosystem that has been dramatically altered for more than a century.

PPIC Senior Fellow Jeff Mount said the Endangered Species Act is “a bad management tool because it is what I call ’set it and forget it,’ meaning you set these standards and make the assumption that if they are met all the time, things are going to go great. All the time the system is changing so it doesn’t work well in that regard. We are not managing things as ecosystems; we are managing for specific life stages of specific species, which really puts us in a box.”

"We are not managing things as ecosystems; we are managing for specific life stages of specific species, which really puts us in a box." ~ Jeff Mount, Public Policy Institute of California

In 2010, experts with the State Water Board were asked to recommend a flow criterion for the Delta solely to protect fish. In their report, they noted that “it took over a century to change the Delta’s ecosystem to a less desirable state,” and that “it will take many decades” to put it back together again.

“While folks ask, ‘How much water do fish need?,’ they might well also ask, ‘How much habitat of different types and locations, suitable water quality, improved food supply and fewer invasive species that is maintained by better governance institutions, competent implementation and directed research do fish need?’” the report said. “The answers to these questions are interdependent. We cannot know all of this now, perhaps ever, but we do know things that should help us move in a better direction, especially the urgency for being proactive.”

Almost 40 years ago, California courts ruled that a water right could not be held for the sole purpose of keeping water within a system to benefit the environment. That decision led to the creation of Section 1707 in the Water Code, which allowed water rights holders to transfer the water they would otherwise be diverting back to instream flows for the environmental benefit.

“Unfortunately, it has been used on such a limited basis, it is easy to overlook,” Garner said. “Clarifying the process and establishing better rules and greater certainty would really help. The State Board has made a little progress, but if the Legislature is going to do something on an ‘environmental water right,’ then making this more workable would be a good place to start.”

More Water for Fish?

As California developed its water diversion, storage and conveyance systems over the decades, the needs of the environment were supplanted as wetlands were drained, rivers dammed and water diverted. Gradually though, the pendulum began to move toward implementing policies to protect the environment affected by the construction and operation of water projects. The court decisions involving Mono Lake were major milestones in that process.

Many people in the environmental advocacy community, however, believe that the playing field is far from level.

“I think at the time there was a lot of enthusiasm with … how public trust and the Fish and Game Code would be used to shape water policy,” said Knight, the California Trout executive director. “I think you could say they have been underutilized and maybe the impact isn’t quite what a lot of people had hoped. Maybe that’s because there’s not enough definition I think that’s where an environmental water right could come in and provide … a specific mechanism to help meet the public trust.”

Mount, with the PPIC, emphasized that what’s being talked about is a better use of the water dedicated for water quality and environmental needs.

“One of the things we apparently didn’t communicate well to some people is this notion of an environmental water budget. It’s not as if you suddenly go out and take water away from people,” he said. “The original asset is the water that is allocated to meet water quality and flow standards. That’s already there. That’s why you can call it an environmental water budget and even have it function like a water right without ever taking a drop away from anybody.”

While there are places in need of extra water for ecosystem and species objectives, Mount said efficiency of use and getting the highest return on investment in ecosystem water is paramount.

> “One of our biggest problems in the water community is we don’t believe that the people who manage water for the ecosystem are efficient with what they do,” said Tim Quinn, executive director, Association of California Water Agencies.

“One of the things that we would propose is that you just don’t grant an environmental water budget, but you actually determine pretty high standards for goals and objectives with that water and you have in place the ability to test the efficiency of its use,” he said. “Right now, we don’t do that.”

The notion of efficiency in environmental water allocations is likely to draw skeptical glances from urban water providers, who have long chafed against what they see as arbitrary and, at times, wasteful dedications of water to the environment.

“One of our biggest problems in the water community is we don’t believe that the people who manage water for the ecosystem are efficient with what they do,” Quinn with ACWA said. “If they had market tools that determine where and how water goes, then the way they are using water would have an opportunity cost.”

Economists such as Quinn say the true cost of something is what you give up to get it, otherwise known as the opportunity cost.

Marcus said the State Water Board’s plan seeks “the smartest way to manage this block of water to achieve the purposes and do it in a better way than just a flat percentage of unimpaired flow, but that takes people coming together to manage that block of water in concert with non-flow measures to make a real difference on the ground.

“That piece has been missing in the simplistic talking points about flow only,” she said, adding “we are as much about changing the dynamic to reward action as we are the numbers.”

The State Water Board also needs better and more timely data on water rights and flows “to manage a modern system,” she said.

The Way Forward

Whether the idea of an environmental water right or something like it gains traction remains to be seen. However, the challenge of providing enough water for people and the environment will continue to keep state officials and stakeholders busy for the foreseeable future.

The challenge of providing enough water for people and the environment will continue to keep state officials and stakeholders busy for the foreseeable future.

“The Public Trust Doctrine is potentially a very powerful tool that depends largely on litigation to implement,” PPIC’s Gray said. “That’s a document that has great influence, but it’s not well defined to do that, you need to bring a case before the board or before the courts to then define what the public trust means and requires, and what’s the reasonable allocation of water to meet the public trust given the competing demands on the resource. That’s a very time-consuming process and that’s why we have seen relatively few public trust cases.”

Scheuring said that most farmers “won’t stand in the way of any truly win-win proposition.” He added, “the key to that here is that it must be developed in a way that’s respectful of existing users.” The question remains of how to allocate water to people and the environment in a way in which the needs of both are met.

“Scarcity is a fundamental problem in a growing California,” Scheuring said. “We have tripled the population that was here when the system was largely built out. In the last generation we have overlaid a network of environmental regulations that have really ratcheted down the system, so it’s the zero-sum problem that any viable long-term solution should address.”

MWD's Patterson said there is potential in dedicating a block of water for fish and the environment. "Let's say that you were successful in securing an instream flow right and have a storage right that goes with that," he said. "That gives you flexibility to do whatever water users do and you may have conditions where you don't need water for instream flows for a certain period of time; you could essentially sell it and generate some money … for habitat and get more fishery benefit out of the flow you have."

Knight and others believe the environmental water right/budget has the necessary flexibility to work.

"The way things are done now, I think you can make an easy case that the status quo is not great and to me something like a water right that has a market side of it fits in well with our variable weather and water supplies that we are going to get and have always gotten," Knight said. "It seems like, if anything, it's getting more variable. That's the world we live in."

Source: http://www.watereducation.org/western-water/does-californias-environment-deserve-its-own-water-right?utm_campaign=AQUAFORNIA-Attorney%20General%20Launches%20EJ%20Effort%20Focused%20On%20Drinking%20Water%20Access%3B%20February%20Stays%20Dry%20&utm_medium=email&utm_source=bundle_and_blast

Presentations

Yucaipa Valley Water District

Yucaipa Valley Water District

Workshop Memorandum 18-067

Date: February 27, 2018

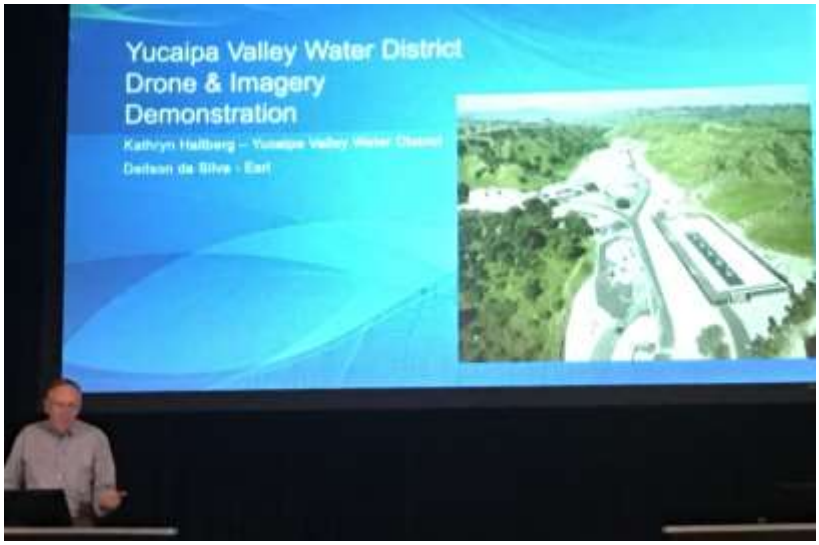
From: Kathryn Hallberg, Management Analyst

Subject: Applications and Uses of Photogrammetry Technology

Photogrammetry is the science of making measurements from photographs. With the cost-effectiveness of drone technology, global positioning systems (GPS), and geographical information systems (GIS), the District staff is using photogrammetry tools to document existing site conditions and develop models of various facilities.

To create 3D models, a drone mounted camera is used to capture several different perspectives of a structure at various elevations. Software is used to compile the images into a virtual replication of the structure that can be easily visualized and analyzed.

In January, representatives from Esri and District staff members presented the use of this technology at a geographical information system user conference in San Diego.



The purpose of this agenda item is to provide additional information and an overview of the use of this technology.

Yucaipa Valley Water District

Workshop Memorandum 18-068

Date: February 27, 2018

From: Jennifer Ares, Water Resource Manager
Kathryn Hallberg, Management Analyst
Matthew Porras, Management Analyst

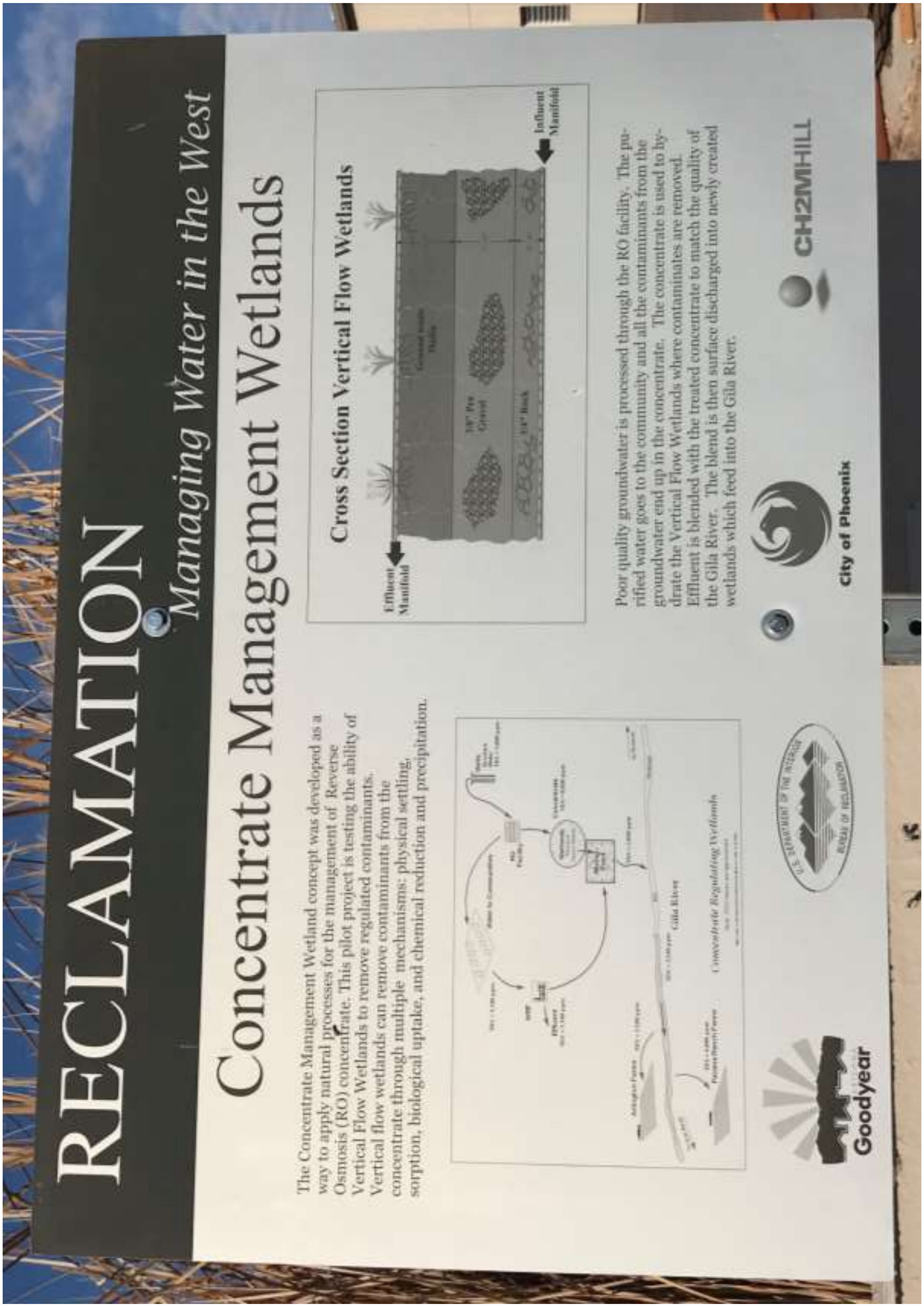
Subject: Overview of a Brine Management Wetland Project - Goodyear, Arizona

The City of Goodyear, Arizona partnered with the U.S. Bureau of Reclamation and the Maricopa County Parks and Recreation Department to develop a conceptual design for a demonstration scale wetland for brine disposal. The City of Goodyear currently uses a reverse osmosis (RO) plant for brackish groundwater producing 3.5 mgd of potable water and 0.5 mgd of concentrate that is currently discharged to the Water Reclamation Facility. This discharge has a significant effect on the quality of the reclaimed water, causing the salinity of the water to be too high to apply for irrigation purposes. Thus, the City of Goodyear is developing a more sustainable concentrate management method in the form of a wetland habitat.

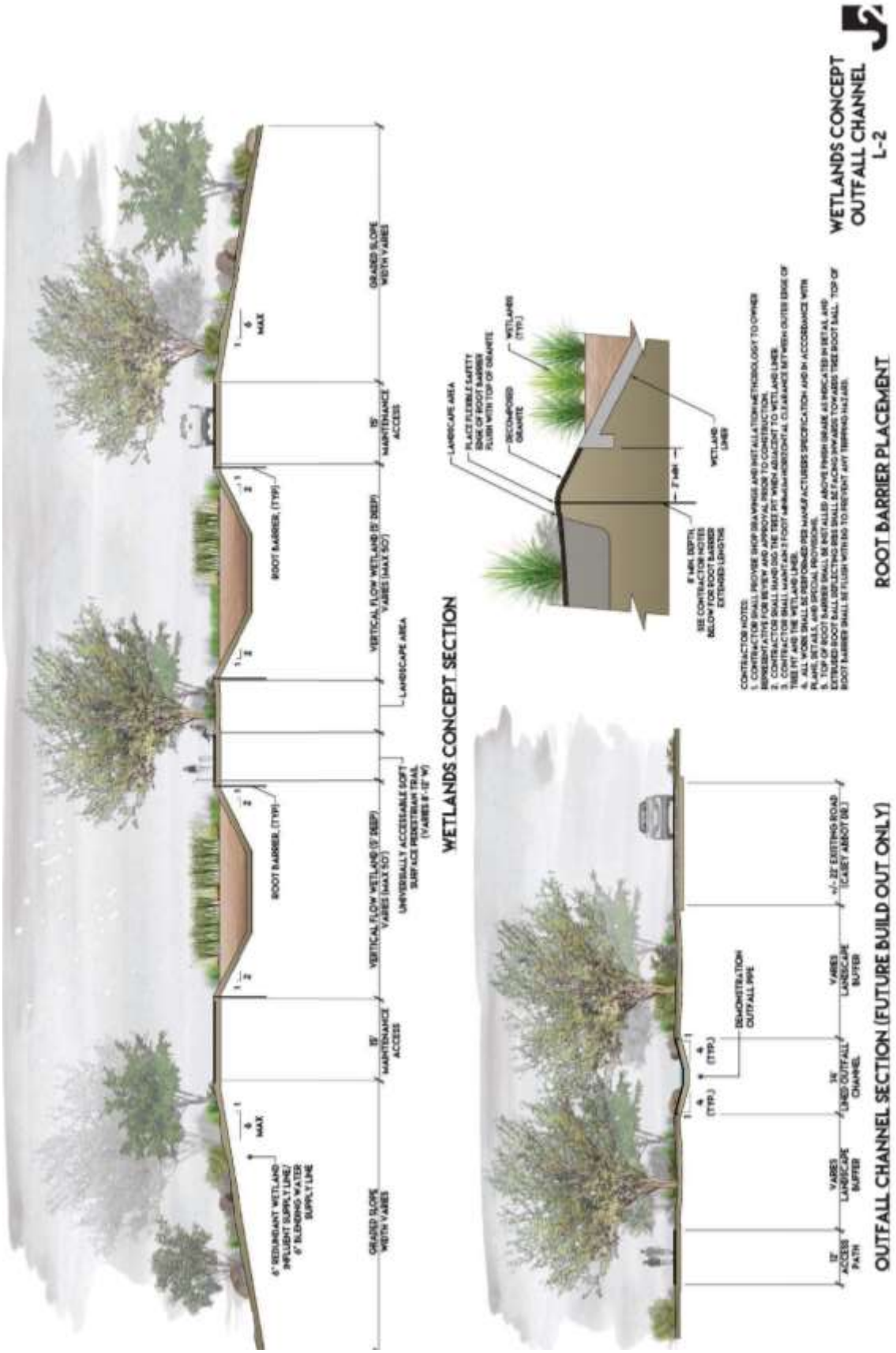
The concept calls for using engineered wetlands to remove contaminants such as arsenic, selenium, and nitrate–nitrogen from the City's RO concentrate. The wetland treated concentrate (still high in TDS) would be blended with a lower salinity water, then discharged to the Gila River to provide water for habitat creation and river flow. Under this concept, the blending ratios would be selected such that the blended wetland effluent salinity would match that of the Gila River.

The discharge of the blended wetland effluent will be integrated with the El Rio Watercourse that will be implemented in the near future. The El Rio Watercourse is an 18-mile stretch of the Gila River from the Agua Fria and Salt River west to State Route 85 that will be developed as part of a multiagency river restoration master plan completed by the Maricopa County Flood Control District in partnership with the cities of Avondale, Buckeye and Goodyear.

District staff recently toured the wetland site to learn more about brine disposal alternatives and wetland habitats.


RECLAMATION
Managing Water in the West
Concentrate Management Wetlands
The Concentrate Management Wetland concept was developed as a way to apply natural processes for the management of Reverse Osmosis (RO) concentrate. This pilot project is testing the ability of Vertical Flow Wetlands to remove regulated contaminants. Vertical flow wetlands can remove contaminants from the concentrate through multiple mechanisms: physical settling, sorption, biological uptake, and chemical reduction and precipitation.
Cross Section Vertical Flow Wetlands
Effluent Manifold
Influent Manifold
Poor quality groundwater is processed through the RO facility. The purified water goes to the community and all the contaminants from the groundwater end up in the concentrate. The concentrate is used to hydrate the Vertical Flow Wetlands where contaminates are removed. Effluent is blended with the treated concentrate to match the quality of the Gila River. The blend is then surface discharged into newly created wetlands which feed into the Gila River.
Gila River
Concentrate Regulating Wetlands
Goodyear
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
City of Phoenix
CH2MHILL


WETLANDS SYSTEM LAYOUT
L-1
FLAP GATE DETAIL
TREE LEGEND
WETLAND PLANTING
W VINEYARD AVENUE
CASEY ABBOTT DRIVE
S GOLF COURSE DRIVE
WETLAND PLANTING
PIPE - TO SLA RIVER
CONNECTION TO EL RIO PROJECT
PIPE - ROAD CROSSING
OUTFALL CHANNEL
PEDESTRIAN BRIDGE
6" DEMONSTRATION OUTFALL PIPE
PIPE - ROAD CROSSING
PEDESTRIAN BRIDGE
RAMADA
BLENDING POND
EXISTING PARK VISITOR CENTER
CONNECT TO NATURE CENTER TRAIL SYSTEM
6" BLENDING WATER SUPPLY LINE
RECHARGE PUMPSTATION
PEDESTRIAN BRIDGE OVER SPILLWAY
AEROBIC POLISHING CELL
VERTICAL DOWNFLOW WETLAND
SOFT SURFACE PEDESTRIAN TRAIL
NEW WELL
CONNECTION TO MAINTENANCE YARD
VERTICAL UPFLOW WETLAND (SEE SHEET L-2)
6" RECLAIMED WATER SUPPLY LINE
12'-15' MAINTENANCE ACCESS (TYP.)
FUTURE BASIN OUT AREA
6' RCP CONCRETE LINE


WETLANDS CONCEPT
OUTFALL CHANNEL
L-2
WETLANDS CONCEPT SECTION
ROOT BARRIER PLACEMENT
OUTFALL CHANNEL SECTION (FUTURE BUILD OUT ONLY)

Awards

Inland Brine Disposal Wetlands Innovation Project wins Water & Wastes Digest's 2016 Top Project

Submitted by CH2M on 3rd Nov 2016.

The CH2M-designed demonstration-scale wetland provides a new water supply for habitat restoration and will significantly help in flood control issues.

DENVER, Nov. 3, 2016 /PRNewswire/ -- Water industry publication, *Water & Wastes Digest* (W&WD), has selected the CH2M-designed Inland Brine Disposal Wetlands Innovation Project in Goodyear, Arizona, as its 2016 Top Project. Selected by W&WD editorial staff, the award recognizes the most innovative and remarkable water or wastewater projects in the U.S. that were in the design or construction phase over the past 18 months.

CH2M is currently partnering with the City of Goodyear, the U.S. Bureau of Reclamation (Reclamation) and Maricopa County Parks & Recreation to develop a preliminary design for a demonstration-scale wetland. The project will be sited at the Maricopa County Estrella Mountain Regional Park. Once constructed, the demonstration wetlands will discharge treated wetland effluent blended with groundwater into the Gila River.


City of Goodyear's Mark Holmes (left) and CH2M's Jim Bays accepts W&WD award

"The Maricopa County Estrella Mountain Regional Park will have significant enhancements through constructed wetlands at their facility, creating environmental enhancements, recreational trails, birding and a new artificial water feature at their visitor center," said Mark Holmes, water resources manager with Goodyear's Public Works Department. "The Maricopa County Flood Control District is eagerly anticipating discharge water from these into the dry Gila River, which will help restore the riparian environment, create environmental enhancements, help keep the invasive dry-loving salt cedar out of this riparian area and significantly help in flood control issues. Also, Reclamation will have water restored back into a river system."

The City, Reclamation and CH2M have been working together since 2007 to develop an approach to use brackish water wetlands to treat and reuse reverse osmosis (RO) concentrate. The concept uses engineered wetlands to remove contaminants such as arsenic, selenium and nitrate-nitrogen from the City's RO concentrate to make it suitable to be blended then discharged to the Gila River as a new water supply for habitat restoration.

After the preliminary studies, CH2M and Reclamation designed a pilot-scale wetlands facility at the City's Bullard Water Campus (BWC) which revealed that constructed wetlands can effectively reduce contaminants in RO concentrate. This significant finding opens the door for more water reuse options and opportunities in inland communities. Since operations began in 2010, the pilot has validated the basic concept of contaminant removal.

"This pilot project has been a strong collaboration between the City, Reclamation and CH2M since 2007," said CH2M Global Water Business Group President Peter Nicol. "We are honored to be recognized along with our client for the Inland Brine Disposable Wetlands Innovation Project, which has proven to be an effective method for managing RO concentrate, thus increasing water reuse capabilities and possibilities."

The RO process is an exceptionally effective treatment technology that produces high-quality water that can be used for drinking. However, the process of creating drinking water using the RO process generates a waste stream of concentrated contaminants that must be managed and disposed of. This is particularly challenging for inland communities where oceanic discharges are not available. Innovative, cost-effective alternative approaches are required for management, disposal and concentrate reuse, which is increasingly important as the world is challenged with water scarcity. The project demonstrates that a management and disposal approach using natural treatment systems such as constructed wetlands for volume reduction and contaminant removal can effectively reduce contaminants in RO concentrate.

The City has been evaluating this concept as an innovative method to treat RO concentrate while increasing their water reuse capability. Like other inland communities in the southwest, the City is challenged to develop more sustainable concentrate management methods that will reduce or eliminate the impact of the concentrate on water resources and the environment.

The W&WD award recognizes the value of the project for both Goodyear and other inland communities who are interested in beneficial reuse of RO concentrate. The award was presented at the Water Environment Federation's Annual Technical Exhibition and Conference (WEFTEC®), held September 24-28 in New Orleans, Louisiana and will be showcased in W&WD's December 2016 issue.

_____

About CH2M -

CH2Mleads the professional services industry delivering sustainable solutions benefiting societal, environmental and economic outcomes with the development of infrastructure and industry. In this way, CH2Mers make a positive difference providing consulting, design, engineering and management services for clients in water; environmentand nuclear; transportation; energyandindustrial markets, from iconic infrastructure to global programs like the Olympic Games. Ranked among the World's Most Ethical Companies and top firms in environmental consulting and program management, CH2M in 2016 became the first professional services firm honored with the World Environment Center Gold Medal Award for efforts advancing sustainable development. Connect with CH2M at www.ch2m.com; LinkedIn; Twitter; and Facebook.

Source: https://www.ch2m.com/newsroom/news/inland-brine-disposal-wetlands-innovation-project-wins-water-wastes-digests-2016-top

Operational Updates

Yucaipa Valley Water District

Yucaipa Valley Water District

Workshop Memorandum 18-069

Date: February 27, 2018

From: Kathryn Hallberg, Management Analyst

Subject: The Benefits of Implementing Water and Wastewater DNA Sequencing Strategy

The Yucaipa Valley Water District is exploring the use of DNA sequencing to fully understand the microbiological communities active at our wastewater treatment plant to: (1) reduce the need for chemicals and energy; (2) maintain treatment plant stability; (3) achieve consistent and improved effluent quality; and (4) to recover purified nutrients from the treatment process. Additionally, the use of DNA analyses will identify indicator species, to serve as an early warning for pathogens, and micro-pollutants, and allow for the development of control strategies.

For drinking water operations, DNA sequencing can provide information on source water quality. It can also clarify coliform tests or concerns about taste, odor, and color.

While the testing cannot replace regulation-driven testing, it is a new and more accurate solution for culture testing, contamination diagnosis, and troubleshooting.

Environmental Genomics™ Bacterial Community Analysis

Aster Bio's Environmental Genomics™ Bacterial Community Analysis is based on third-generation sequencing of the 16S rRNA genes present in a wastewater sample. Samples are collected by adding 2.5 milliliters of MLSS or equivalent to an EPS+ collection tube The EPS+ tube contains a proprietary preservative that does not require refrigeration for DNA preservation. Samples are then shipped to Aster Bio – at ambient temperature – for sequencing. Typically, sequencing reports are available within one week. For systems with lower biomass concentrations (aerated lagoons or storm water ponds), a larger sample is required. A swab collection system is available for fixed film/biofilm applications.

The service includes the following:

- EPS+ sample collection tube
  - Non-toxic, non-flammable preservative
  - Short-term storage at room temperature, long-term storage a 4˚C
  - Ambient temperature overnight shipping
- Genomic DNA isolation and QA/QC
  - DNAs are banked for a minimum of one year
  - Can reprocess or run additional tests
- 16S rRNA gene sequencing
  - 1-week turnaround time
- Bioinformatics
  - Quality filtering
  - Read classification
  - Microbial Community Analysis report
  - .fastq files and spreadsheets provided if desired

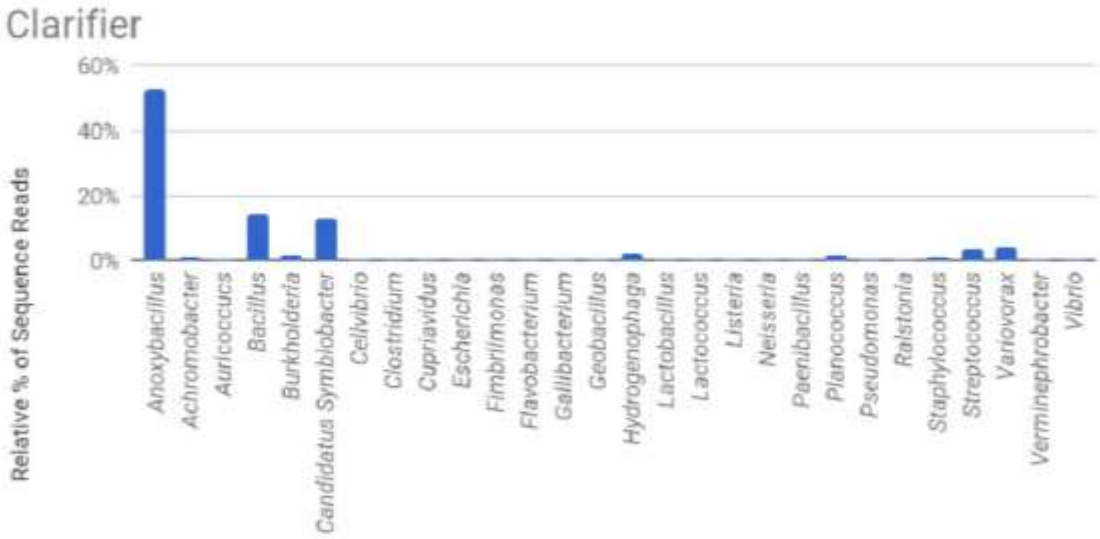
We understand that plant engineers want actionable reports rather than a list of 100+ microbes typically identified by sequencing. Our Microbial Community Analysis report includes suggestions and observations based on our experience with industrial wastewater. The following pages contain excerpts from several different reports prepared over the past year.

For more information, contact:

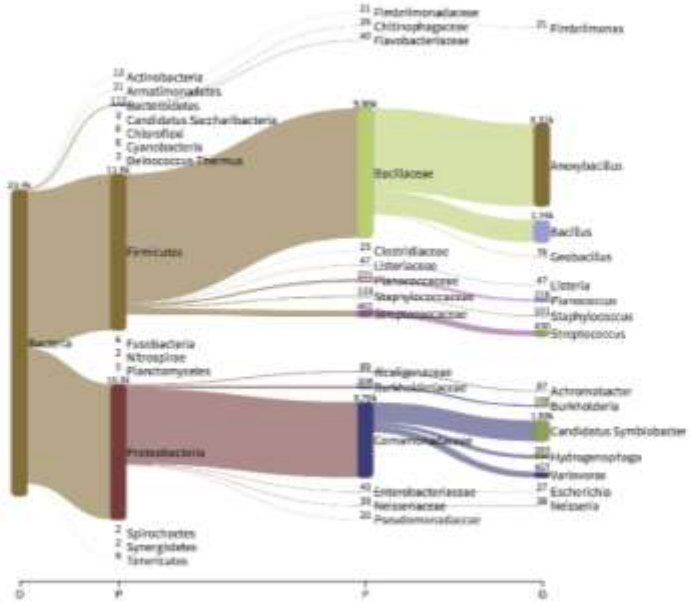
Paul Campbell, Ph.D.
pcampbell@asterbio.com
+1 832 605 3951 (mobile)

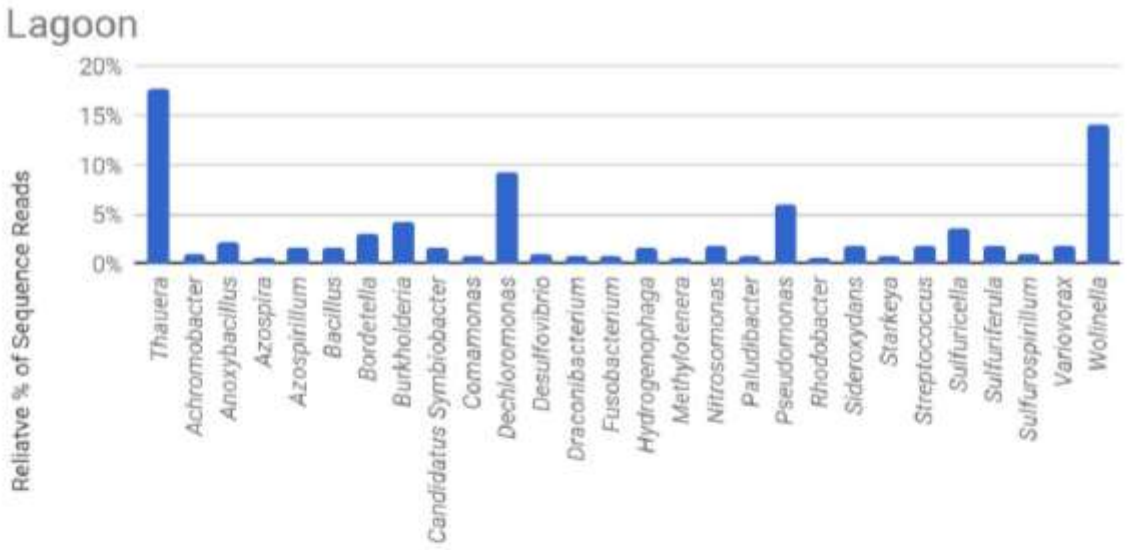
Example Bacterial Community Analysis – Pulp & Paper

On November 16, 2017, Aster Bio collected two samples at a domestic pulp & paper mill. The first sample came from the clarifier where conditions consisted of a high pH (~10) and and high temperature (~110+ °F). The second sample came from the middle of the lagoon system.



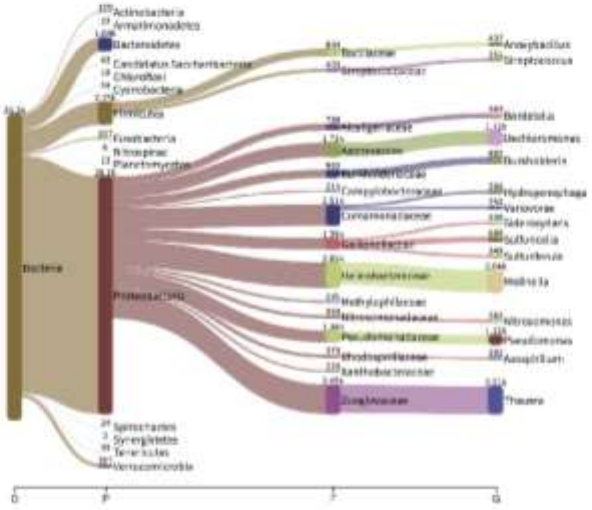
The bacterial community present in the clarifier was dominated by sequence reads from *Anoxybacillus* and *Bacillus*, two genera known for growth at elevated temperatures and pH. Likewise, *Geobacillus* and *Paenibacillus* were also present, leading the Firmicutes to dominate. This is easily seen in the Sankey chart, below. Most other genera identified in the top 28 hits were present at approximately 0.1% of sequencing reads.





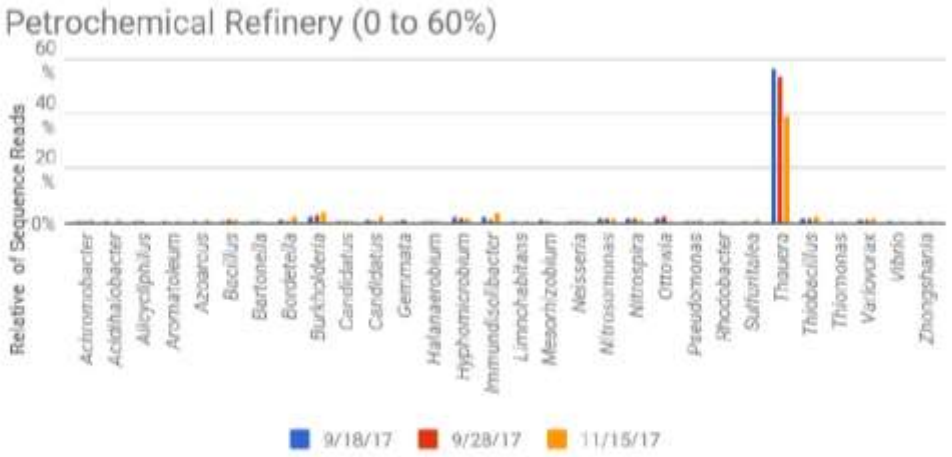
In contrast, the lagoon showed a much more diverse, with the 28 most frequent sequencing reads present at 0.5% or higher. Here, *Thauera* (closely related to *Zoogloea*) dominated. This genus is present in almost every industrial wastewater system. Several sulfur-oxidizing genera (*Sulfuricella*, *Sulfuriferula* and *Sulfurospirillum*) are also present, most likely because of the significant sulfide content of the influent.

The Sankey chart for the lagoon system helps visualize the diversity of the bacterial population and the shift away from Firmicutes and towards Proteobacteria. A Sankey diagram is a special type of chart where the width of an arrow is proportional to the flow (see https://en.wikipedia.org/wiki/Sankey_diagram). This type of chart helps visualize how child- or sibling-level classifications relate to parent-level classifications in microbial community analysis. The numbers indicate the number of sequencing reads assigned to a taxon.



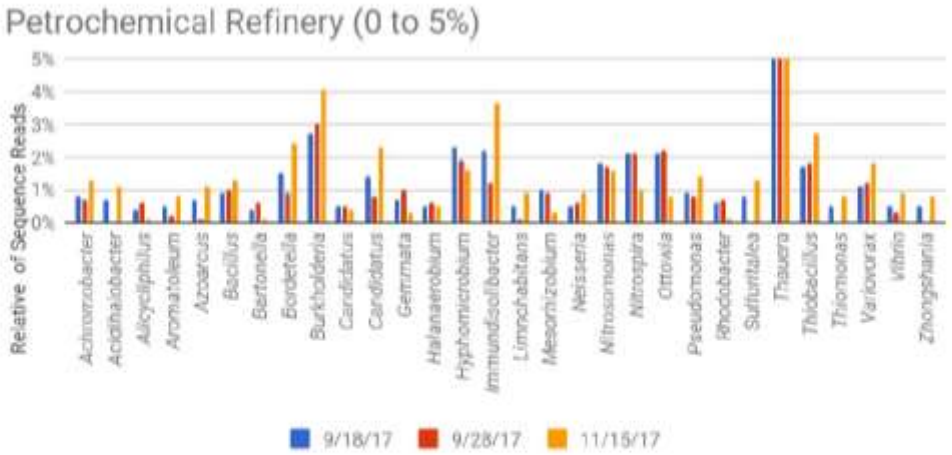
Example Bacterial Community Analysis – Petrochemical Refinery

Aster Bio collected wastewater samples from the aeration basin of a refinery at three different time points (918/17, 9/28/17 and 11/15/17). The samples were collected over a period of time where the plant was operating efficiently so that a baseline microbial community could be identified.



Sequence reads classified as members of the genus *Thauera* dominate the MLSS at all three time points. Thauera strains have the capacity to degrade aromatic compounds, including toluene, phenol, xylene, and haloaromatics such as chlorobenzene, under denitrifying conditions (that is, nitrate reduction is coupled to aromatics degradation).

The same data set is presented below, but with the vertical axis adjusted to cover the range of 0% to 5%. All strains in the graph are present at a level of 0.5% of the sequencing reads or higher for at least one sample.



The AOB populations (*Nitrospira* and *Nitrosomonas*) and NOB populations (*Nitrospira*) are present in significant quantities. We often see these strains present at read frequencies of 1% and higher in industrial wastewaters where the plant is operating efficiently. When the influent includes amines, the

AOB/NOB populations can be significantly higher. The high percentage of slower growing, chemoautotrophic AOB and NOB cultures are indicative of the following:

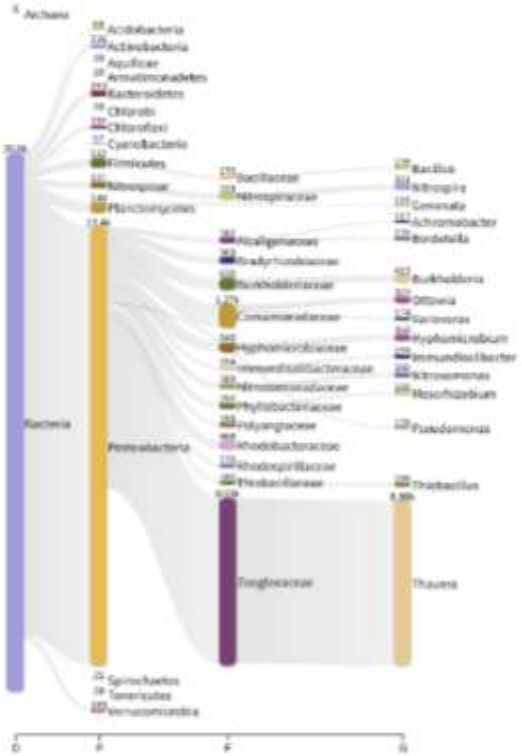
- Low and stable F/M
- Freedom from compounds that are toxic to AOB & NOB populations
- Influent TKN & ammonia at sufficient concentrations to support high concentrations of AOB & NOB organisms

The NRB (denitrifying) population is dominated by *Thauera*, but also includes Hyphomicrobium, *Thiobacillus*, *Bacillus* and *Pseudomonas* in significant numbers.

The sulfate-oxidizing bacteria are represented by *Thiobacillus*, *Thiomonas*, *Ottowia* and lower levels of *Thioalkalivibrio*. A healthy, sulfur-oxidizing population helps prevent sulfide toxicity to AOB and NOB populations – a good example of microbial population symbiosis.

The *Burkholderia* genus, previously part of *Pseudomonas*, is a group of Gram-negative, obligately aerobic, rod-shaped bacteria. Representatives of this genus can degrade chlororganic pesticides and polychlorinated biphenyls. *Immundisolibacter* are associated with the degradation of polycyclic aromatic hydrocarbons, including pyrene, phenanthrene, anthracene, benz[a]anthracene and fluorene, as well as the azaarene carbazole. *Ottowia* strains are often found in industrial wastewaters associated with coking units. Many strains degrade phenol and are capable of oxidizing thiosulfate to sulfate as a co-substrate for aerobic growth.

The Sankey chart for November 15 is presented below (all three charts looked very similar).



WATER ONLINE

Water | Wastewater | Industrial | Utility Management | Innovations

Guest Column | January 24, 2018

High-Throughput DNA Sequencing To Profile Microbial Water Quality Of Potable Reuse

By Menu B. Leddy, Megan H. Plumlee, Rose S. Kantor, Kara L. Nelson, Scott E. Miller, Lauren C. Kennedy, Blake W. Stamps, John R. Spear, Nur A. Hasan, Rita R. Colwell

Research scientists are making strides to advance the safety and application of potable water reuse through the use of metagenomics for water quality analysis.

Due to recent advances in high-throughput sequencing methods, identifying complete microbial communities present in environmental samples has become feasible, including those in water and biofilms. High-throughput sequencing refers to methods that sequence deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) at an unprecedented speed, with greater coverage (amount sequenced), and at a lower cost than previously possible. Also called next-generation sequencing, high-throughput sequencing is being used for the first time to evaluate the microbial water quality of purified recycled water, further advancing the practice of potable reuse and providing fascinating insights not possible with previous methods.

Potable Reuse and Microbial Water Quality

Many communities in the U.S. and around the world practice water reuse. Water is used more than once for beneficial purposes including drinking (i.e., potable use), irrigation, and industry. Wastewater is a valuable resource that can be appropriately treated and (re)used for potable and nonpotable applications in many regions where water demand exceeds supply. Potable reuse has gained significant attention and acceptance, and it is made possible through a combination of advanced water treatment technologies that together produce highly purified finished water. Technologies include ozone, biological activated carbon, microfiltration (MF), reverse osmosis (RO), and ultraviolet based

advanced oxidation processes (UV-AOP), of which a subset or all can be employed in an engineered treatment train to produce high-quality water.

In potable reuse, purified recycled water can be blended with the source water delivered to a conventional drinking water treatment facility or blended with finished drinking water. One form of potable reuse is groundwater augmentation, in which reclaimed water is percolated or injected into a groundwater aquifer to supplement a groundwater-based drinking water supply. One example is the Groundwater Replenishment System (GWRS) operated by Orange County Water District (OCWD) in Fountain Valley, CA. OCWD purifies local municipal wastewater, using advanced treatment to generate high-quality water that meets drinking water standards, and then injects and percolates the water into the ground. At downgradient locations, groundwater is pumped from the aquifer via production wells as a drinking water supply and then conventionally treated prior to use (e.g., disinfection). Some communities are evaluating more direct schemes in which purified recycled water is introduced into a drinking water treatment plant at the raw water supply (i.e., no groundwater storage) or blended with the treated water from the plant (e.g., El Paso, TX).

High-throughput sequencing is being used for the first time to evaluate the microbial water quality of purifi ed recycled water, further advancing the practice of potable reuse and providing fascinating insights not possible with previous methods.

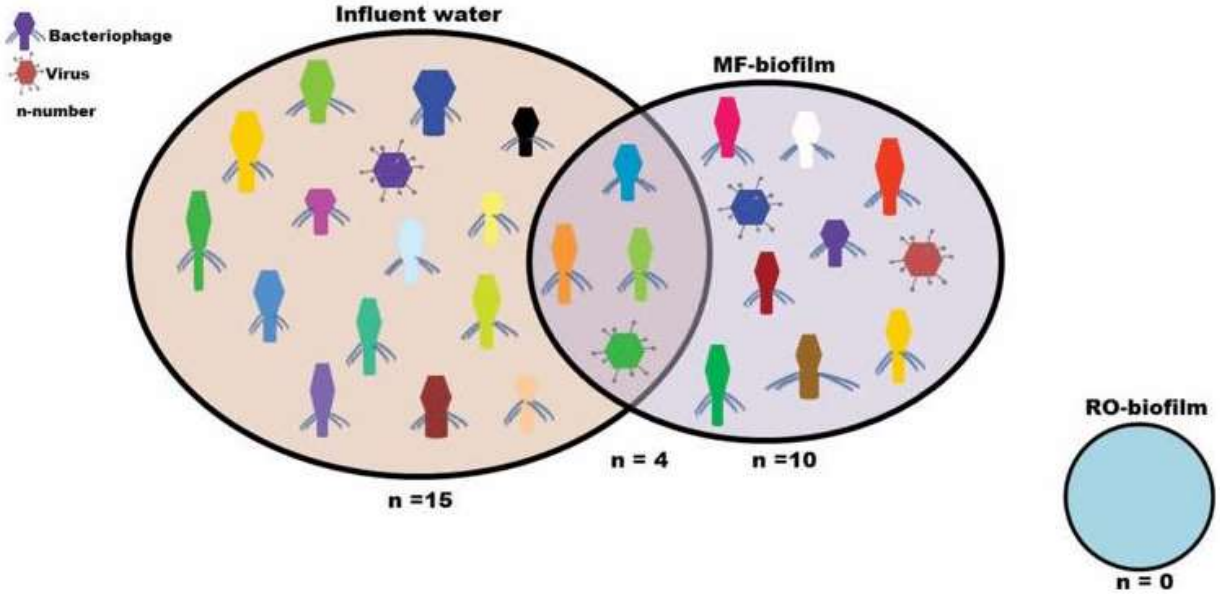


Figure 1. Venn diagram of total number of DNA viruses in secondary-treated wastewater that serves as the source water (influent) to GWRS, compared to MF and RO biofilm

For any of these approaches to achieve potable reuse, it is critical that water quality be accurately understood and monitored chemically and microbiologically. Regulatory

standards for potable reuse vary by location. In California, for example, the regulations require 12-, 10-, and 10-log10 removal of viruses, Cryptosporidium, and Giardia, respectively, before potable reuse of recycled water. These water quality standards protect public health by ensuring that recycled water does not contain pathogenic microorganisms. This approach has been successfully used to ensure safety of conventional drinking water as well as recycled water for many decades. Looking to the future, the propagation of more advanced techniques for water quality characterization and monitoring - such as high throughput sequencing - will provide a comprehensive and accurate assessment of microbial water quality, including potable reuse where microbial water quality is of particular concern.

Microbial Community Analysis

In nature, various microorganisms are found living together in complex mixtures in the same environment. These microbial communities can be highly variable in both composition and abundance of the constituent microbial species. Early studies to assess microbial communities used growth-dependent methods (Table 1). However, these methods identify only those organisms that can be grown in the laboratory when, in fact, the majority of microorganisms in the environment are difficult to grow (Staley and Konopka 1985; Rappe and Giovannoni 2003).

Metagenomics is being used to understand what microorganisms are associated with a particular treatment process, as well as their relative numbers in given samples and their potential activity and role.

To detect known species of interest, such as pathogens, researchers and utilities often use polymerase chain reaction (PCR). In this method, microorganisms are collected from an environment (e.g., via filtration of water), the bacteria are broken open, and their DNA extracted. The segments of DNA matching to a specific sequence of interest are copied repeatedly using an enzyme called DNA polymerase. This amplification process allows researchers to detect DNA sequences of interest in a sample, even if they are at very low prevalence. PCR used in this manner requires specific, specially optimized probes and thus requires a priori knowledge of the DNA sequence of interest. This method can be used to detect anything for which the DNA sequence is known, including many bacterial, viral, or fungal pathogens, as well as antibiotic resistance genes (ARGs). A more advanced method, called quantitative PCR (qPCR), uses calibration to a known standard to determine the exact number of copies of DNA within the original sample. This number corresponds to the number of organisms in the sample. PCR and qPCR have the advantages of detecting and quantifying specific microorganisms, respectively, regardless of whether the organisms can be grown in the laboratory. However, for many targets, a separate reaction must be performed for each species of interest, and these methods can only be used where DNA sequences are already known (i.e., requires a priori knowledge).

In recent years, high-throughput DNA sequencing technologies (e.g., Illumina, Thermo Fisher, PacBio, and Oxford Nanopore), have been developed that allow sequencing all the DNA present in a sample. Through computational methods (bioinformatics), the large volume of data generated by sequencing can be used to identify and characterize all microbial species within a community. This process is independent of whether the microorganisms can be cultured in the laboratory. However, sequencing alone does not determine viability of the organisms, only that their DNA is present (in other words, those organisms could be alive or dead).

The most commonly employed sequencing approach used to identify and analyze microbial communities is 16S ribosomal RNA (rRNA) gene amplicon sequencing (see Table 1). This method usually focuses on bacteria and uses a "fingerprint" region of DNA that is unique among various bacteria but similar enough across all bacteria to be targeted by PCR. To perform amplicon sequencing, samples are collected and DNA is extracted. Using semispecific probes targeted to the fingerprint region of interest, the DNA is amplified using PCR. The amplified DNA fragments, known as amplicons, are then sequenced using high-throughput sequencing. Amplicon sequencing allows identification of bacteria that are present in very low numbers, as well as those that make up the majority of the microbial community. 16S rRNA gene amplicon sequencing for bacteria is widely used in surveys of microbial communities, including in the Human Microbiome Project (HMP, Human Microbiome Project Consortium 2012) and in the Earth Microbiome Project (http://www.earthmicrobiome.org/).

This method is rapid, relatively inexpensive, and, due to the amplification process, can be performed on samples with very little biomass, such as highly purified water. Using amplicon sequencing, bacteria can be classified to the level of genus; the sequence-based fingerprint isn't specific enough to identify species or strain. Thus, pathogenic bacteria may not be distinguishable from their nonpathogenic relatives using this method. Depending on the study's objectives, this can be an important limitation, notably for accurate detection and characterization of pathogens.

A more precise approach, called metagenomics (see Table 1), uses high-throughput sequencing to recover the whole genomes of all organisms present in a sample, rather than only a single fingerprint region. This type of sequencing captures data about all types of microorganisms, including bacteria, viruses, fungi, and protozoa, and can identify them to species, subspecies, and strain level. Additionally, metagenomics can provide information on antibiotic resistance, pathogenicity, and virulence factors associated with organisms in the sample. This method can also establish the presence of those organisms involved in nitrification, sulfide-related corrosion, and other processes related to microbial water quality. In one of its earliest applications, metagenomics was used to learn about the microbial causes of acid mine drainage (Tyson et al., 2004), and more recently it has helped researchers discover new bacteria in wastewater (Sekiguchi et al., 2015), as well as identify nitrifiers in drinking water (Pinto et al., 2016).

Method	Description	Advantages	Limitations	Application
Conventional Culture	Growth-dependent identification of microorganisms	Inexpensive; limited expertise required; viability confirmed; phenotype characterization	Appropriate growth conditions required; only identifies organisms that can be grown in lab; only individual microorganisms identified/ detected; low sensitivity	Used to quantify organisms (e.g., total coliform) or collect organisms for further characterization.
Polymerase Chain Reaction (PCR)	Amplification of DNA/RNA/gene(s) to identify targeted organism(s); quantify gene(s) via quantitative polymerase chain reaction (qPCR)	Rapid; high sensitivity; usually bacteria/virus species identified independent of growth; can also target resistant or virulent genes	Individual microorganism(s) targeted and identified; viability not confirmed; greater expertise and relatively sophisticated instrumentation needed	Used to detect or quantify specific microorganisms for which there is a priori knowledge or expected presence (e.g., *Legionella pneumophila*)
Amplicon Sequencing	Uses high-throughput sequencing[(a)] to sequence PCR-amplified "fingerprint" regions of DNA from a microbial community	Rapid; high sensitivity; identifies entire community of either bacteria or fungi	Less rapid and more expensive than PCR; identifies bacteria to family/genus-level; pathogenicity not determined; greater expertise and instrumentation required; viability not confirmed	Used to identify entire communities of bacteria (with 16S rRNA gene amplicons) or fungi (ITS amplicons)
Metagenomics	Uses high-throughput sequencing[(a)] to sequence the whole genomes from all members of a microbial community, combined with data analysis (bioinformatics). DNA and RNA sequenced	High specificity; identifies in each sample the bacteria, viruses, protozoa, fungi, and pathogens to species and strain-level; antibiotic resistance, pathogenicity and functional genes identified; greater accuracy and utility	Less rapid (i.e., ~48 hr from sample to report); more expensive, with greater expertise and instrumentation required than amplicon sequencing; more complex database and advanced computation required; viability not confirmed with DNA sequencing alone but coupled with RNA sequencing functionality may be determined	Used to identify communities of all types of microorganisms and their potential activity in every sample tested

a. High-throughput sequencing methods sequence DNA and RNA at an unprecedented speed, with greater coverage (amount sequenced) and at a lower cost than previously possible. Encompasses technologies such as Illumina, PacBio, and others. The term "next-generation sequencing" is also used, but as a term can be less clear since newer generations of sequencing technologies continue to emerge.

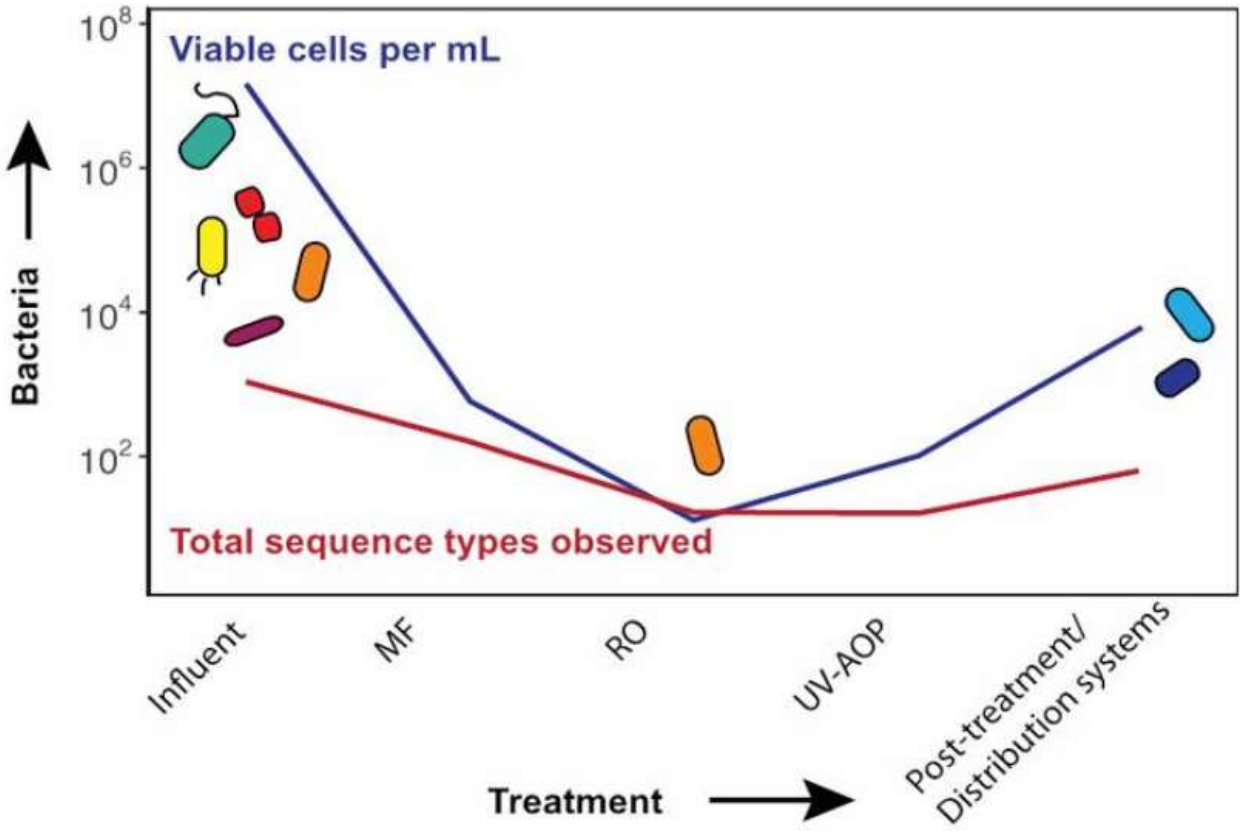


Figure 2. Changes in microbial water quality during advanced treatment. Influent is secondary-treated wastewater.

Compared to amplicon sequencing, metagenomics is more precise in the identification and abundance information it provides. Because of this, metagenomics is better suited for source-tracking investigations and assessing public health risks posed by microorganisms. However, metagenomics (in this early stage of its application) can also be more costly and time-consuming and usually requires more starting biomass, meaning larger volumes of water may be needed for analysis. The cost of metagenomics is decreasing relatively rapidly.

These technologies provide an incredible amount of information that can be used to define the microbial signature of potable reuse treatment facilities and the subsequent distribution system.

Both amplicon sequencing and metagenomics are used to identify microorganisms in microbial communities rapidly, accurately, and actionably. Selection of one approach over the other depends on the study's objectives and resources available.

Whole Genome Studies Underway At OCWD's Water Recycling Facility

Scientists at OCWD are using a metagenomic approach to identify and compare microbial communities in water reuse. In an initial proof-of-concept study, samples of secondary-treated wastewater (feedwater to the GWRS) were characterized, along with samples of biofilms from the feed side of the MF and RO membranes, using high-throughput sequencing to recover the whole genomes of all organisms present in the samples (Leddy et al., 2017). The investigation showed that certain viruses and bacteriophages (viruses that infect bacteria) were unique to the MF biofilm, compared to the feed (influent) water (Figure 1), while no viruses or bacteriophages were detected in the RO biofilm, among other findings. Subsequently, additional water samples were collected at each stage of treatment in the threestep GWRS process (MF, RO, and UV-AOP) for a study funded by the U.S. Bureau of Reclamation. That study aims to further characterize microbial communities in the reuse facility and document the degree of water quality improvement with each stage of treatment (i.e., reductions in microbial abundance and diversity, as well as removal of specific pathogens and reduction of microbial properties such as antibiotic resistance, etc.), with a final report expected in early 2018.

In a concurrent study, OCWD is using metagenomics to understand differences in microbial communities between GWRS and a more conventional drinking water treatment plant. Microbial communities of fungi, protozoa, bacteria, viruses, pathogens, and nonpathogens associated with treatment processes such as ozone and granular activated carbon (GAC) at the plant are being compared to the process used in GWRS. The source water reservoir to the conventional drinking water plant receives upstream treated wastewater discharges. At both facilities, many organisms that are common to wastewater have been identified, and the number and diversity of microbial species were found to substantially decrease after treatment. Metagenomics is being used to understand what microorganisms are associated with a particular treatment process, as well as their relative numbers in given samples and their potential activity and role.

Research On Treated Water Augmentation And The Distribution System

Researchers at the University of California, Berkeley, are also investigating the microorganisms found throughout advanced treatment trains for water reuse. Currently, they are evaluating two demonstration-scale potable reuse facilities in the U.S. using high-throughput sequencing methods, complemented by advanced techniques for quantifying live and dead microorganisms. They have found that bacterial concentrations decreased substantially through advanced treatment: Secondary wastewater (the source water) can contain as many as 10 million live cells per milliliter, while the final advanced treated water contains approximately 100 live cells per milliliter, or 0.001 percent of the initial concentration (Figure 2). This finding is important because bacterial quantity can impact overall microbial water quality. Using 16S rRNA gene amplicon sequencing, they found that the bacterial diversity, or the number of different types of bacteria present, decreases throughout advanced treatment. As many as 600 different types of bacteria may be present in secondary wastewater, while fewer than 65 types of bacteria (10 percent of the initial number) were found in purified water. Through their ongoing

metagenomics efforts, researchers hope to learn more about why particular organisms are found in purified water.

Compared to conventional drinking water, purified water contains much lower levels of microorganisms and other nutrients (as was found in the metagenomics analyses for the OCWD study described above) but is still capable of supporting bacterial growth, as observed in model distribution systems (Figure 2). In some locations, such as a planned water reuse project in El Paso, TX, purified water will be introduced directly into existing drinking water distribution systems (i.e., treated water augmentation). Given that conventional drinking water and pipes in the distribution system contain their own microbial communities, the researchers are investigating what will happen when microbial communities from purified water and conventional drinking water mix together in the distribution system. Specifically, the team is investigating the effects that the new water might have on the occurrence of opportunistic pathogens, nitrification, and overall water quality in the distribution system. This work will help to identify potential benefits as well as unintended consequences of more direct potable reuse and recommend strategies for utilities adopting this new practice.

Conclusions

Microbial community analysis is rapidly advancing with the development and application of tools such as amplicon sequencing and metagenomics to identify and study microbial communities present in a given environment. These technologies provide an incredible amount of information that can be used to define the microbial signature of potable reuse treatment facilities and the subsequent distribution system both under normal operating conditions and to understand variabilities in performance.

References

1. Human Microbiome Project Consortium. 2012. Structure, function and diversity of the healthy human microbiome. Nature, 486(7402), 207-214.

2. Leddy, M. B., Hasan, N., Subramanian, P., Heberling, C., Cotruvo, J., and Colwell, R. R., 2017. Characterization of Microbial Signatures From Advanced Treated Wastewater Biofilms. Journal-American Water Works Association, 109(11), E503-E512.

3. Pinto, A. J., Marcus, D. N., Ijaz, U. Z., Bautista-de lose Santos, Q. M., Dick, G. J., and Raskin, L. (2016). Metagenomic Evidence for the Presence of Comammox Nitrospira-Like Bacteria in a Drinking Water System. mSphere, 1(1). http://doi.org/10.1128/mSphere.00054-15

4. Rappé, M.S., Giovannoni, S.J., 2003. The Uncultured Microbial Majority. Annual Review of Microbiology, 57, 369-394.

5. Sekiguchi, Y., Ohashi, A., Parks, D. H., Yamauchi, T., Tyson, G. W., and Hugenholtz, P. (2015). First genomic insights into members of a candidate bacterial phylum responsible for wastewater bulking. PeerJ, 3, e740. http://doi.org/10.7717/peerj.740

6. Staley, J.T., Konopka, A., 1985. Measurement of in Situ Activities of Nonphotosynthetic Microorganisms in Aquatic and Terrestrial Habitats. Annual Review of Microbiology, 39, 321-346. http://doi.org/10.1146/annurev.mi.39.100185.001541

7. Tyson, G. W., Chapman, J., Hugenholtz, P., Allen, E. E., Ram, R. J., Richardson, P. M., et al. (2004). Community structure and metabolism through reconstruction of microbial genomes from the environment. Nature, 428(6978), 37–43. http://doi.org/10.1038/nature02340

About the Authors

Menu B. Leddy Principal Scientist, Research & Development Department, Orange County Water District, Fountain Valley, CA

Megan H. Plumlee Director of Research, Research & Development Department, Orange County Water District, Fountain Valley, CA

Rose S. Kantor Postdoctoral Fellow, Civil & Environmental Engineering Department, UC Berkeley, Berkeley, CA

Kara L. Nelson Professor, Civil & Environmental Engineering Department, UC Berkeley, Berkeley, CA

Scott E. Miller Graduate Student, Civil & Environmental Engineering Department, UC Berkeley, Berkeley, CA

Lauren C. Kennedy Graduate Student, Civil & Environmental Engineering Department, UC Berkeley, Berkeley, CA

Blake W. Stamps Postdoctoral Fellow, Civil & Environmental Engineering Department, Colorado School of Mines, Golden, CO

John R. Spear Professor, Civil & Environmental Engineering Department, Colorado School of Mines, Golden, CO

Nur A. Hasan Adjunct Associate Professor, Center of Bioinformatics and Computational Biology, University of Maryland, College Park, MD, and Vice President, CosmosID, Inc., Rockville, MD

Rita R. Colwell Distinguished University Professor, Center of Bioinformatics and Computational Biology, University of Maryland, College Park, MD; Johns Hopkins Bloomberg School of Public Health; and Founder, CosmosID Inc., Rockville, MD

Source: https://www.wateronline.com/doc/high-throughput-dna-sequencing-to-profile-microbial-water-quality-of-potable-reuse-0001

Yucaipa Valley Water District

Workshop Memorandum 18-070

Date: February 27, 2018

From: Mike Kostelecky, Operations Manager
John Wrobel, Public Works Manager

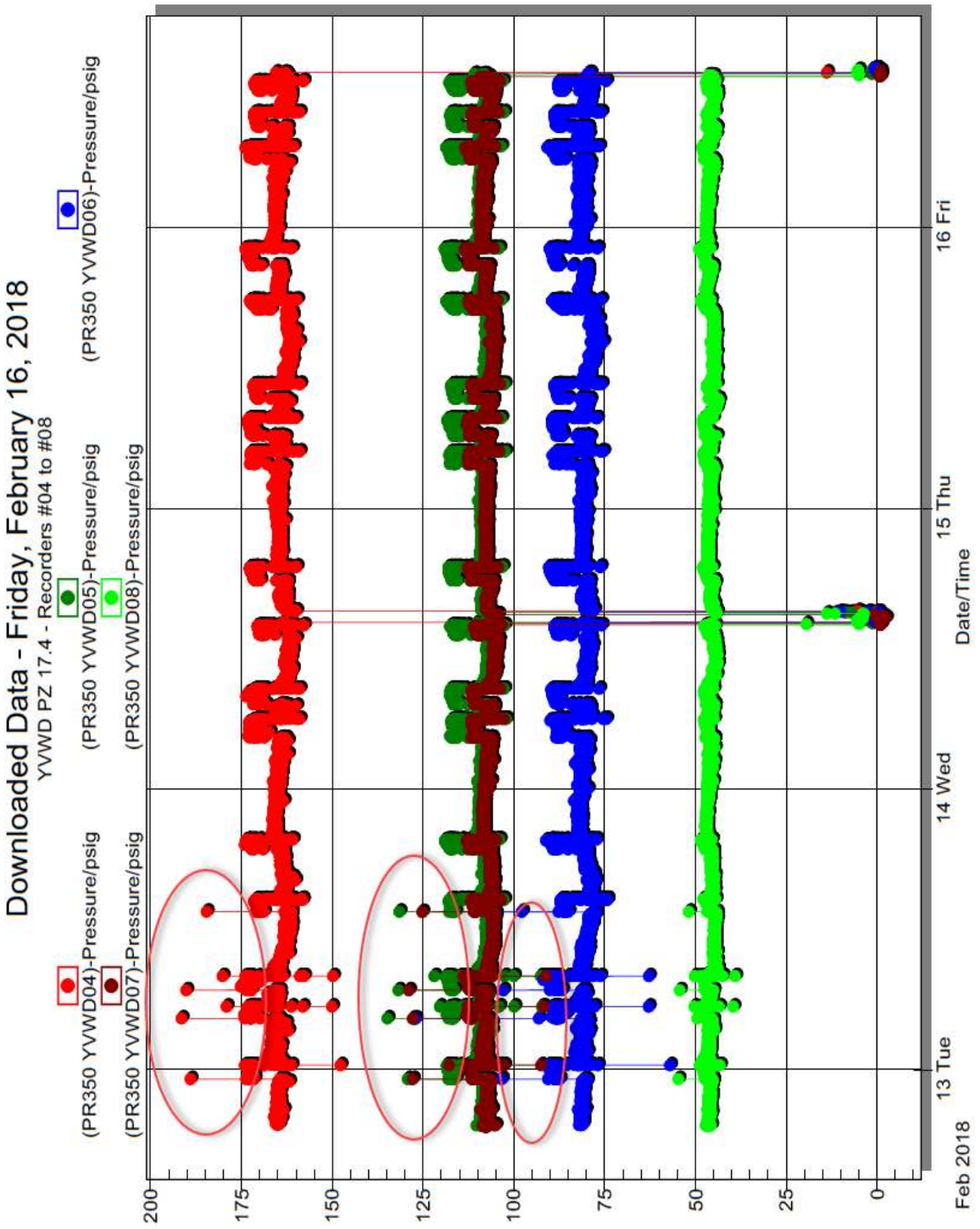
Subject: Status Report of Water Mainline Breaks in the Wildwood Canyon Area

On January 30, 2018, the District staff reported on recent water pipeline leaks in the Wildwood Canyon area [Workshop Memorandum No. 18-033].

As discussed at the workshop meeting, the District staff constantly strives to improve the water and sewer infrastructure within our community. An important aspect of the ongoing maintenance activity is to identify reoccurring pipeline breaks to prioritize pipelines for replacement.

The recent leaks in the Wildwood area have been largely attributed to pressure variations in the area. While pressure fluctuations are common in booster pumping corridors, there are steps that can be taken to reduce the pressure spikes that will cause fatigue in plastic water pipelines.

The purpose of this workshop presentation is to provide an overview of the changes to the drinking water system and the need to replace the plastic water pipelines in this area.


Downloaded Data - Friday, February 16, 2018
YVWD PZ 17.4 - Recorders #04 to #08
(PR350 YVWD04)-Pressure/psig
(PR350 YVWD05)-Pressure/psig
(PR350 YVWD06)-Pressure/psig
(PR350 YVWD07)-Pressure/psig
(PR350 YVWD08)-Pressure/psig
200
175
150
125
100
75
50
25
0
13 Tue
14 Wed
15 Thu
16 Fri
Feb 2018
Date/Time

Capital Improvement Projects

Yucaipa Valley Water District

Workshop Memorandum 18-071

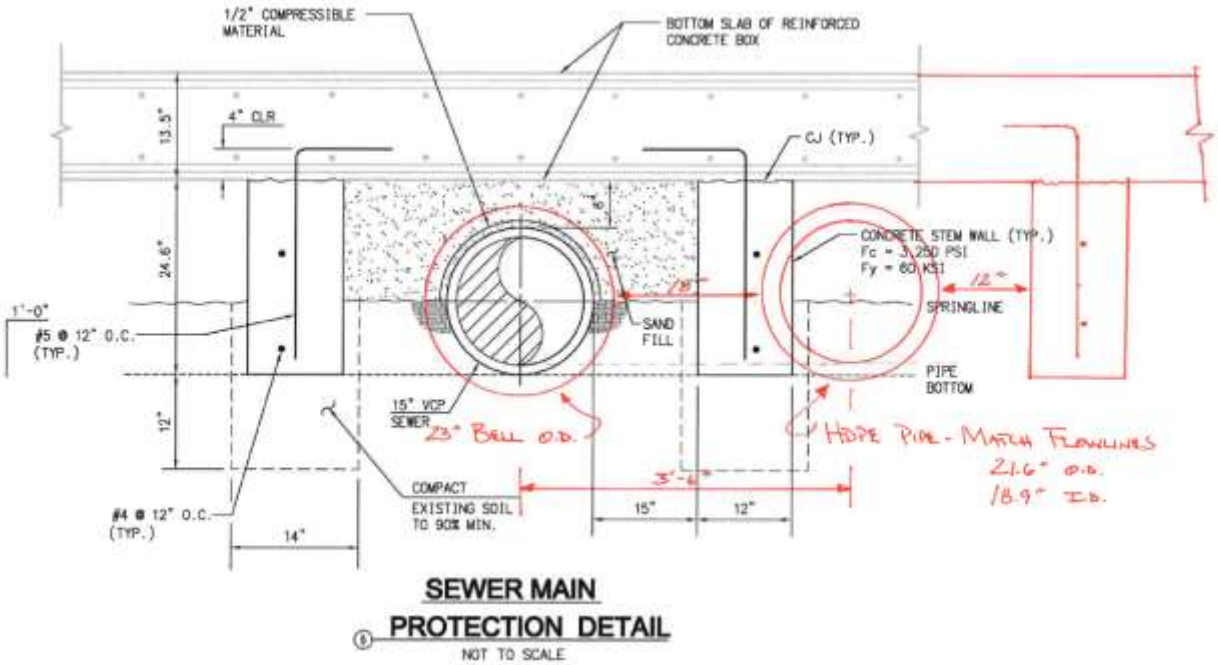
Date: February 27, 2018

From: Matt Porras, Management Analyst

Subject: Status Report on the Installation of a Parallel Sewer Segment of Mainline on 6th Place as part of the Proposed Wildwood Creek Bridge Improvements

The District staff has been coordinating with the City of Yucaipa for the construction of a bridge on Sixth Place to at the crossing of Wildwood Creek.

The District staff is proposing to install a spare sewer mainline in Sixth Place together with the box culvert construction proposed by the City of Yucaipa. The installation of this segment of sewer will provide alternatives for the replacement and extension of sewer mainlines in the Districts' service area.



SEWER MAIN PROTECTION DETAIL

NOT TO SCALE

Yucaipa Valley Water District

Workshop Memorandum 18-072

Date: February 27, 2018

From: Mike Kostelecky, Operations Manager

Subject: Status Report on the Emergency Repairs for Drinking Water Reservoir 17.1.1

On November 21, 2017, the Board of Directors authorized emergency coating repairs for drinking water reservoir R-17.1.1 with Superior Tank Solutions [Director Memorandum No. 17-108].

On Monday, January 29, 2018, Superior Tank Solutions began repairs. Upon removing the coal tar enamel from the floor it was evident that the floor is in need of replacement, not repair. The existing floor consists of numerous welded patches in various sizes and thousands of pits from erosion. This metal has been worn thin and is now a liability to the District. The side shell has approximately ten holes that will be repaired.

At the board meeting on February 20, 2018, the Board of Directors ratified the authorization for Superior Tank Solutions to proceed with the necessary repair work.

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

Policy Issues

Yucaipa Valley Water District

Yucaipa Valley Water District

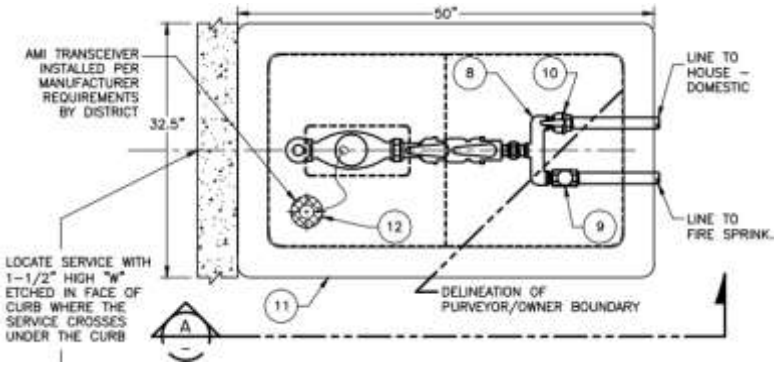
Workshop Memorandum 18-073

Date: February 27, 2018

From: Joseph Zoba, General Manager

Subject: Discussion Regarding a Draft Resolution for the Implementation of 50" Water Meter Boxes for Drinking Water and Recycled Water Infrastructure

At the board workshop on December 12, 2017, the Board of Directors discussed the installation of the 50" long water meter boxes for new development. These larger water meter boxes are useful to protect the Advance Meter Infrastructure (AMI) equipment as well as provide ample space to meet the fire sprinkler requirements for new construction.



YVWD standard meter boxes for dual-plumbed communities.

YVWD meter box without a sidewalk for a large-lot, rural application.

DRAFT RESOLUTION NO 2018-12

A RESOLUTION OF THE YUCAIPA VALLEY WATER DISTRICT UPDATING THE WATER METER INSTALLATION FEES FOR DRINKING WATER AND RECYCLED WATER AND IDENTIFYING THE USE OF 50" WATER METER BOXES FOR DRINKING WATER AND RECYCLED WATER INFRASTRUCTURE

WHEREAS, the Yucaipa Valley Water District (the "District") has updated the cost for installing drinking water and recycled water meters based on a cost evaluation associated with providing this service; and

WHEREAS, the District has updated the water meter service standards and individual parts list to address residential fire sprinkler requirements, dual-plumbed backflow protection, and automated meter infrastructure technology; and

WHEREAS, the District staff has presented the cost information and options for cost recovery at publicly noticed meetings and workshops; and

WHEREAS, the District desires to implement the use of 50" water meter boxes for the protection of drinking water and recycled water infrastructure.

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the District that the following Guidelines are hereby adopted:

1. Drinking Water and Recycled Water Meter Installation Charge. The cost associated with the installation of water meters shall be as follows:

Classification of Water Meter Installation	Water Meter Installation Fee
¾" Drinking Water Meter Installation	$490
¾" Recycled Water Meter Installation	$490
1" Recycled Water Meter Installation	$560
1" Drinking Water Meter Installation with Fire Sprinklers	$860
1" Drinking Water Meter Installation with Fire Sprinklers at a Dual-Plumbed Residential Dwelling	$1,030

The Water Meter Installation Fee shall be paid prior to scheduling the installation of the water meter.

2. Larger Drinking Water and Recycled Water Meter Installation Charge. The charge for the installation of a larger water meter and/or a water meter classification not provided above shall be the actual cost of all labor, material, and equipment charges, plus employee benefits,

overhead, and administrative surcharges pursuant to the latest District resolution. A deposit of the estimated water meter installation cost shall be paid prior to scheduling the work. Any variance from the estimated water meter installation cost shall be remedied by District staff and the customer within 30 days following the activation of the water meter. Typical delinquent charges shall apply for unpaid amounts owed to the District.

3. Requirements for the Installation of a 50" Water Meter Box. The Yucaipa Valley Water District has adopted standard drawings and specifications related to the use of a 50" water meter box to protect the infrastructure necessary to provide drinking water and recycled water service to our customers. The following conditions will require the installation of a 50" water meter box for drinking water and recycled water applications:

   A. All new residential developments required to install curb, gutters and sidewalks.

      i. Residential developments consisting of four (4) or less dwelling units on individual parcels will be provided an opportunity to purchase a 50" water meter box from the District inventory as provided below:

50" Water Meter Box		$195.83
Solid Cover for Half of Box		$109.86
AMI Preparation and Reading Lid Cutout		$122.06
Reading Lid Insert		$ 16.00
	Total	$443.75
	Rounded	**$445.00**

      The 50" water meter box will be available for pickup from the District office by the property owner and does not include the cost of water meter related appurtenances.

   B. All non-residential development, including but not limited to commercial, institutional, and industrial projects.

   C. All installations of recycled water meters and infrastructure.

   D. When an existing drinking water or recycled water service pipeline is replaced in a sidewalk, a 50" water meter box will be installed. If a sidewalk does not exist, written authorization is required from the property owner prior to the installation of a 50" water meter box at the time of service line replacement. Without prior written authorization, a meter box that matches the existing meter box will be installed at the time of service line replacement.

3. Effective Date. Previous resolutions regarding water meter installation charges are hereby superseded and replaced by the applicable sections identified above. This Resolution shall be effective immediately and shall remain in effect until it is rescinded or superseded.

PASSED, APPROVED and ADOPTED this 6th day of March 2018.

YUCAIPA VALLEY WATER DISTRICT

Jay Bogh, President Board of Directors

ATTEST:

Joseph B. Zoba, General Manager

STATE OF CALIFORNIA
COUNTY OF RIVERSIDE
AND SAN BERNARDINO

I, Joseph B. Zoba, Secretary of the Board of Directors of the Yucaipa Valley Water District, California, do hereby certify that the foregoing resolution being Resolution No. 2018-12 was duly passed, approved and adopted by said Board, approved and signed by the President, and attested by the Secretary at the Regular Meeting held on the 6th day of March 2018, and that the same was passed and adopted by the following vote:

AYES:

NOES:

ABSTAIN:

ABSENT:

Joseph B. Zoba, Secretary of the Yucaipa Valley
Water District and of the Board of Directors

(Seal)

Yucaipa Valley Water District

Workshop Memorandum 18-074

Date: February 27, 2018

From: Joseph Zoba, General Manager

Subject: Discussion Regarding the Development of a Policy Related to Accessory Dwelling Units and Other Multiple Unit Developments

The District staff is in the process of developing a standardized policy for Accessory Dwelling Units (ADUs).

The general concepts will be presented and discussed at the board workshop to further develop the overall business process for the construction of ADUs in the District's service area.

NEXT CITY Inspiring Better Cities

California ADU Applications Skyrocket After Regulatory Reform

BY JOSH COHEN | JANUARY 4, 2018

Nonprofit urban design organization LA-Más designed this 1,000-square-foot ADU as part of a Los Angeles pilot to show "how an ADU can be both affordable and contextual." This ADU, in Los Angeles's historic Highland Park, is under construction. (Credit: LA-Más)

In 2016 and 2017, the California state legislature passed a slew of reforms reducing regulations on accessory dwelling units (ADU) such as basement apartments, garage conversions and backyard cottages. The reforms address ADU parking requirements, the permitting process, design requirements, fees and more. The state sees ADUs as a small part of a broad effort to address its housing crisis as demand outpaces housing supply and housing costs rocket ever higher.

It's too early to see the impacts of the ADU reforms on the ground, but there's already been a massive uptick in ADU permit applications in many California cities. In December, researchers at University of California Berkley's Terner Center for Housing Innovation released a report looking at ADU applications from 2015 through 2017 to understand how the regulatory changes are spurring ADU construction.

"I expected to see a jump, given the recent legislation, but I didn't expect to see such a dramatic jump," says report author David Garcia, Terner Center's policy director. "California basically legalized ADUs throughout the state on January 1, 2017. It turned out, there was quite a pent-up demand from homeowners."

Los Angeles saw the most dramatic jump, from 90 applications in 2015 and 80 in 2016 to a whopping 1,970 applications as of November 2017. Oakland, which had 33 and 99 applications in 2015 and 2016, jumped to 247 in 2017. Long Beach had zero applications in 2015 and just one in 2016. In 2017, it had 42. San Francisco has been experimenting with looser ADU regulations since 2013, but still saw applications increase from 384 in 2016 to 593 in 2017.

The legislation did several important things to encourage ADU construction. For one, it made ADUs legal in all California cities. It also established design standards that, when met, allow ADU development to receive "ministerial approval" instead of discretionary approval. In other words, ADU builders can apply for and receive construction permits over the counter at their city planning office, instead of seeking approval from a design commission or city council. When the proposed ADU is located within a half-mile of transit, is in a designated historic district, is attached to the existing unit and in several other instances, homeowners are not required to build an off-street parking space for the ADU. The 2016 legislation also creates a path for illegal ADUs to become official. In Los Angeles, for example, there may be as many as 50,000 unpermitted ADUs.

Garcia says it's two reforms—easier permitting and reduced parking requirements—that have had the biggest impact on the increased ADU applications. Time is money in housing construction, and complicated permitting delays the process. Similarly, the parking requirement adds construction cost and complexity to projects. For would-be ADU builders, that can be a dealbreaker, Garcia explains. "ADUs are not driven by big real estate companies. They're driven by homeowners."

Though ADUs are just a small part of the housing crisis solution, some housing advocates such as Stuart Cohen are excited to see an easier path to their construction. Cohen is executive director of TransForm, a nonprofit focused on transportation, housing and sustainability issue in California. He says, "I think they fit a very important niche [in the housing market]. ADUs are naturally on the lower end of the cost spectrum, so part of solving the affordability crisis is having more ADU construction."

Still, Cohen says it's important to remember, "there's no substitute for having a massive infusion of funding and construction of dedicated affordable housing. ADUs are a great complement to, not a replacement for that funding."

ADUs are rarely used as subsidized affordable housing. But because of their size, cost of construction and the fact that they're usually built by individual homeowners instead of development companies, ADUs are often rented at below market rate. Another Terner Center report from 2017 found that 58 percent of ADU owners rent their units at below-market rates.

According to a recent *New York Times* report on California housing, more than half the land in both San Francisco and Los Angeles is filled by neighborhoods in which 90 percent of the housing is single family homes. Most California cities have similarly prevalent single-family zoning. ADUs could greatly increase the housing stock in those zones.

Though there are fewer barriers to ADU construction now, Garcia and Cohen still want to see future reforms. They say size and setback requirements for detached ADUs need to be clarified. Because the rules are still "fuzzy," Cohen says it can still be difficult for builders to get that over-the-counter approval.

In some cities, detached ADUs are still subject to many of the same fees as a much larger, single family home, such as impact fees, utility fees and school district fees. Garcia says adjusting fees and building codes to account for the fact that ADUs are far smaller and often have fewer people living in them than typical single family homes will further bolster the ADU boom.

Finally, Garcia wants to see a change to owner-occupancy rules. Currently, California requires homeowners to live on site in the main dwelling in order to build an ADU. He points out that there are many single-family homes on the rental market already on lots that could also house an ADU. But under current law they cannot.

According to the Terner Center report, it takes 18 months or less to take the majority of ADUs from design to completion. Though some cities such as San Francisco that loosened ADU regulations before the state are already seeing the uptick in finished ADUs, the wave of new units spurred on by the change in state law should begin midway through 2018.

Josh Cohen is a freelance writer in Seattle. His work has also appeared in The Guardian, The Nation, Pacific Standard and Vice.

FOLLOW JOSH EMAIL JOSH

Source: https://nextcity.org/daily/entry/california-adu-applications-skyrocket-after-regulatory-reform

California Department of Housing and Community Development
Where Foundations Begin

Accessory Dwelling Unit Memorandum

December 2016

Table of Contents

Understanding Accessory Dwelling Units and Their Importance

Courtesy of Karen Chapple, UC Berkeley

California's housing production is not keeping pace with demand. In the last decade less than half of the needed housing was built. This lack of housing is impacting affordability with average housing costs in California exceeding the rest of the nation. As affordability becomes more problematic, people drive longer distances between a home that is affordable and where they work, or double up to share space, both of which reduces quality of life and produces negative environmental impacts.

Beyond traditional market-rate construction and government subsidized production and preservation there are alternative housing models and emerging trends that can contribute to addressing home supply and affordability in California. One such example gaining popularity are Accessory Dwelling Units (ADUs) (also referred to as second units, in-law units, or granny flats).

What is an ADU

An ADU is a secondary dwelling unit with complete independent living facilities for one or more persons and generally takes three forms:

- *Detached*: The unit is separated from the primary structure
- *Attached*: The unit is attached to the primary structure
- *Repurposed Existing Space*: Space (e.g., master bedroom) within the primary residence is converted into an independent living unit
- *Junior Accessory Dwelling Units*: Similar to repurposed space with various streamlining measures

ADUs offer benefits that address common development barriers such as affordability and environmental quality. ADUs are an affordable type of home to construct in California because they do not require paying for land, major new infrastructure, structured parking, or elevators. ADUs are built with cost-effective one- or two-story wood frame construction, which is significantly less costly than homes in new multifamily infill buildings. ADUs can provide as much living space as the new apartments and condominiums being built in new infill buildings and serve very well for couples, small families, friends, young people, and seniors.

ADUs are a different form of housing that can help California meet its diverse housing needs. Young professionals and students desire to live in areas close to jobs, amenities, and schools. The problem with high-opportunity areas is that space is limited. There is a shortage of affordable units and the units that are available can be out of reach for many people. To address the needs of individuals or small families seeking living quarters in high opportunity areas, homeowners can construct an ADU on their lot or convert an underutilized part of their home like a garage

into a junior ADU. This flexibility benefits not just people renting the space, but the homeowner as well, who can receive an extra monthly rent income.

ADUs give homeowners the flexibility to share independent living areas with family members and others, allowing seniors to age in place as they require more care and helping extended families to be near one another while maintaining privacy.

Relaxed regulations and the cost to build an ADU make it a very feasible affordable housing option. A UC Berkeley study noted that one unit of affordable housing in the Bay Area costs about $500,000 to develop whereas an ADU can range anywhere up to $200,000 on the expensive end in high housing cost areas.

ADUs are a critical form of infill-development that can be affordable and offer important housing choices within existing neighborhoods. ADUs are a powerful type of housing unit because they allow for different uses, and serve different populations ranging from students and young professionals to young families, people with disabilities and senior citizens. By design, ADUs are more affordable and can provide additional income to homeowners. Local governments can encourage the development of ADUs and improve access to jobs, education and services for many Californians.

Summary of Recent Changes to ADU Laws

Courtesy of Karen Chapple, UC Berkeley

The California legislature found and declared that, among other things, allowing accessory dwelling units (ADUs) in single family and multifamily zones provides additional rental housing and are an essential component in addressing housing needs in California. Over the years, ADU law has been revised to improve its effectiveness such as recent changes in 2003 to require ministerial approval. In 2017, changes to ADU laws will further reduce barriers, better streamline approval and expand capacity to accommodate the development of ADUs.

ADUs are a unique opportunity to address a variety of housing needs and provide affordable housing options for family members, friends, students, the elderly, in-home health care providers, the disabled, and others. Further, ADUs offer an opportunity to maximize and integrate housing choices within existing neighborhoods.

Within this context, the Department has prepared this guidance to assist local governments in encouraging the development of ADUs. Please see Attachment 1 for the complete statutory changes. The following is a brief summary of the changes for each bill.

SB 1069 (Wieckowski)

S.B. 1069 (Chapter 720, Statutes of 2016) made several changes to address barriers to the development of ADUs and expanded capacity for their development. The following is a brief summary of provisions that go into effect January 1, 2017.

Parking

SB 1069 reduces parking requirements to one space per bedroom or unit. The legislation authorizes off street parking to be tandem or in setback areas unless specific findings such as fire and life safety conditions are made. SB 1069 also prohibits parking requirements if the ADU meets any of the following:

- Is within a half mile from public transit.
- Is within an architecturally and historically significant historic district.
- Is part of an existing primary residence or an existing accessory structure.
- Is in an area where on-street parking permits are required, but not offered to the occupant of the ADU.
- Is located within one block of a car share area.

Fees

SB 1069 provides that ADUs shall not be considered new residential uses for the purpose of calculating utility connection fees or capacity charges, including water and sewer service. The bill prohibits a local agency from requiring an ADU applicant to install a new or separate utility connection or impose a related connection fee or capacity charge for ADUs that are contained within an existing residence or accessory structure. For attached and detached ADUs, this fee or charge must be proportionate to the burden of the unit on the water or sewer system and may not exceed the reasonable cost of providing the service.

Fire Requirements

SB 1069 provides that fire sprinklers shall not be required in an accessory unit if they are not required in the primary residence.

ADUs within Existing Space

Local governments must ministerially approve an application to create within a single family residential zone one ADU per single family lot if the unit is:

- contained within an existing residence or accessory structure.
- has independent exterior access from the existing residence.
- has side and rear setbacks that are sufficient for fire safety.

These provisions apply within all single family residential zones and ADUs within existing space must be allowed in all of these zones. No additional parking or other development standards can be applied except for building code requirements.

No Total Prohibition

SB 1069 prohibits a local government from adopting an ordinance that precludes ADUs.

AB 2299 (Bloom)

Generally, AB 2299 (Chapter 735, Statutes of 2016) requires a local government (beginning January 1, 2017) to ministerially approve ADUs if the unit complies with certain parking requirements, the maximum allowable size of an attached ADU, and setback requirements, as follows:

- The unit is not intended for sale separate from the primary residence and may be rented.
- The lot is zoned for single-family or multifamily use and contains an existing, single-family dwelling.
- The unit is either attached to an existing dwelling or located within the living area of the existing dwelling or detached and on the same lot.
- The increased floor area of the unit does not exceed 50% of the existing living area, with a maximum increase in floor area of 1,200 square feet.
- The total area of floorspace for a detached accessory dwelling unit does not exceed 1,200 square feet.
- No passageway can be required.
- No setback can be required from an existing garage that is converted to an ADU.

- Compliance with local building code requirements.
- Approval by the local health officer where private sewage disposal system is being used.

Impact on Existing Accessory Dwelling Unit Ordinances

AB 2299 provides that any existing ADU ordinance that does not meet the bill's requirements is null and void upon the date the bill becomes effective. In such cases, a jurisdiction must approve accessory dwelling units based on Government Code Section 65852.2 until the jurisdiction adopts a compliant ordinance.

AB 2406 (Thurmond)

AB 2406 (Chapter 755, Statutes of 2016) creates more flexibility for housing options by authorizing local governments to permit junior accessory dwelling units (JADU) through an ordinance. The bill defines JADUs to be a unit that cannot exceed 500 square feet and must be completely contained within the space of an existing residential structure. In addition, the bill requires specified components for a local JADU ordinance. Adoption of a JADU ordinance is optional.

Required Components

The ordinance authorized by AB 2406 must include the following requirements:

- Limit to one JADU per residential lot zoned for single-family residences with a single-family residence already built on the lot.
- The single-family residence in which the JADU is created or JADU must be occupied by the owner of the residence.
- The owner must record a deed restriction stating that the JADU cannot be sold separately from the single-family residence and restricting the JADU to the size limitations and other requirements of the JADU ordinance.
- The JADU must be located entirely within the existing structure of the single-family residence and JADU have its own separate entrance.
- The JADU must include an efficiency kitchen which includes a sink, cooking appliance, counter surface, and storage cabinets that meet minimum building code standards. No gas or 220V circuits are allowed.
- The JADU may share a bath with the primary residence or have its own bath.

Prohibited Components

This bill prohibits a local JADU ordinance from requiring:

- Additional parking as a condition to grant a permit.
- Applying additional water, sewer and power connection fees. No connections are needed as these utilities have already been accounted for in the original permit for the home.

Fire Safety Requirements

AB 2406 clarifies that a JADU is to be considered part of the single-family residence for the purposes of fire and life protections ordinances and regulations, such as sprinklers and smoke alarms. The bill also requires life and protection ordinances that affect single-family residences to be applied uniformly to all single-family residences, regardless of the presence of a JADU.

JADUs and the RHNA

As part of the housing element portion of their general plan, local governments are required to identify sites with appropriate zoning that will accommodate projected housing needs in their regional housing need allocation (RHNA) and report on their progress pursuant to Government Code Section 65400. To credit a JADU toward the RHNA, HCD and the Department of Finance (DOF) utilize the census definition of a housing unit which is fairly flexible. Local government count units as part of reporting to DOF. JADUs meet these definitions and this bill would allow cities and counties to earn credit toward meeting their RHNA allocations by permitting residents to create less costly accessory units. See additional discussion under JADU frequently asked questions.

Frequently Asked Questions: Accessory Dwelling Units

Should an Ordinance Encourage the Development of ADUs?

Yes, ADU law and recent changes intend to address barriers, streamline approval and expand potential capacity for ADUs recognizing their unique importance in addressing California's housing needs. The preparation, adoption, amendment and implementation of local ADU ordinances must be carried out consistent with Government Code Section 65852.150:

(a) The Legislature finds and declares all of the following:

(1) Accessory dwelling units are a valuable form of housing in California.

(2) Accessory dwelling units provide housing for family members, students, the elderly, in-home health care providers, the disabled, and others, at below market prices within existing neighborhoods.

(3) Homeowners who create accessory dwelling units benefit from added income, and an increased sense of security.

(4) Allowing accessory dwelling units in single-family or multifamily residential zones provides additional rental housing stock in California.

(5) California faces a severe housing crisis.

(6) The state is falling far short of meeting current and future housing demand with serious consequences for the state's economy, our ability to build green infill consistent with state greenhouse gas reduction goals, and the well-being of our citizens, particularly lower and middle-income earners.

(7) Accessory dwelling units offer lower cost housing to meet the needs of existing and future residents within existing neighborhoods, while respecting architectural character.

(8) Accessory dwelling units are, therefore, an essential component of California's housing supply.

(b) It is the intent of the Legislature that an accessory dwelling unit ordinance adopted by a local agency has the effect of providing for the creation of accessory dwelling units and that provisions in this ordinance relating to matters including unit size, parking, fees, and other requirements, are not so arbitrary, excessive, or burdensome so as to unreasonably restrict the ability of homeowners to create accessory dwelling units in zones in which they are authorized by local ordinance.

Are Existing Ordinances Null and Void?

Yes, any local ordinance adopted prior to January 1, 2017 that is not in compliance with the changes to ADU law will be null and void. Until an ordinance is adopted, local governments must apply "state standards" (See Attachment 4 for State Standards checklist). In the absence of a local ordinance complying with ADU law, local review must be limited to "state standards" and cannot include additional requirements such as those in an existing ordinance.

Are Local Governments Required to Adopt an Ordinance?

No, a local government **is not required** to adopt an ordinance. ADUs built within a jurisdiction that lacks a local ordinance must comply with state standards (See Attachment 4). Adopting an ordinance can occur through different forms such as a new ordinance, amendment to an existing ordinance, separate section or special regulations within the zoning code or integrated into the zoning code by district. However, the ordinance should be established legislatively through a public process and meeting and not through internal administrative actions such as memos or zoning interpretations.

Can a Local Government Preclude ADUs?

No local government cannot preclude ADUs.

Can a Local Government Apply Development Standards and Designate Areas?

Yes, local governments may apply development standards and may designate where ADUs are permitted (GC Sections 65852.2(a)(1)(A) and (B)). However, ADUs within existing structures must be allowed in all single family residential zones.

For ADUs that require an addition or a new accessory structure, development standards such as parking, height, lot coverage, lot size and maximum unit size can be established with certain limitations. ADUs can be avoided or allowed through an ancillary and separate discretionary process in areas with health and safety risks such as high fire hazard areas. However, standards and allowable areas must not be designed or applied in a manner that burdens the development of ADUs and should maximize the potential for ADU development. Designating areas where ADUs are allowed should be approached primarily on health and safety issues including water, sewer, traffic flow and public safety. Utilizing approaches such as restrictive overlays, limiting ADUs to larger lot sizes, burdensome lot coverage and setbacks and particularly concentration or distance requirements (e.g., no less than 500 feet between ADUs) may unreasonably restrict the ability of the homeowners to create ADUs, contrary to the intent of the Legislature.

Requiring large minimum lot sizes and not allowing smaller lot sizes for ADUs can severely restrict their potential development. For example, large minimum lot sizes for ADUs may constrict capacity throughout most of the community. Minimum lot sizes cannot be applied to ADUs within existing structures and could be considered relative to health and safety concerns such as areas on septic systems. While larger lot sizes might be targeted for various reasons such as ease of compatibility, many tools are available (e.g., maximum unit size, maximum lot coverage, minimum setbacks, architectural and landscape requirements) that allows ADUs to fit well within the built environment.

Can a Local Government Adopt Less Restrictive Requirements?

Yes, ADU law is a minimum requirement and its purpose is to encourage the development of ADUs. Local governments can take a variety of actions beyond the statute that promote ADUs such as reductions in fees, less restrictive parking or unit sizes or amending general plan policies.

Santa Cruz has confronted a shortage of housing for many years, considering its growth in population from incoming students at UC Santa Cruz and its proximity to Silicon Valley. The city promoted the development of ADUs as critical infill-housing opportunity through various strategies such as creating a manual to promote ADUs. The manual showcases prototypes of ADUs and outlines city zoning laws and requirements to make it more convenient for homeowners to get information. The City found that homeowners will take time to develop an ADU only if information is easy to find, the process is simple, and there is sufficient guidance on what options they have in regards to design and planning.

The city set the minimum lot size requirement at 4,500 sq. ft. to develop an ADU in order to encourage more homes to build an ADU. This allowed for a majority of single-family homes in Santa Cruz to develop an ADU. For more information, see http://www.cityofsantacruz.com/departments/planning-and-community-development/programs/accessory-dwelling-unit-development-program.

Can Local Governments Establish Minimum and Maximum Unit Sizes?

Yes, a local government may establish minimum and maximum unit sizes (GC Section 65852.2(c). However, like all development standards (e.g., height, lot coverage, lot size), unit sizes should not burden the development of ADUs. For example, setting a minimum unit size that substantially increases costs or a maximum unit size that unreasonably restricts opportunities would be inconsistent with the intent of the statute. Typical maximum unit sizes range from 800 square feet to 1,200 square feet. Minimum unit size must at least allow for an efficiency unit as defined in Health and Safety Code Section 17958.1.

ADU law requires local government approval if meeting various requirements (GC Section 65852.2(a)(1)(D)), including unit size requirements. Specifically, attached ADUs shall not exceed 50 percent of the existing living area or 1,200 square feet and detached ADUs shall not exceed 1,200 square feet. A local government may choose a maximum unit size less than 1,200 square feet as long as the requirement is not burdensome on the creation of ADUs.

Can ADUs Exceed General Plan and Zoning Densities?

An ADU is an accessory use for the purposes of calculating allowable density under the general plan and zoning. For example, if a zoning district allows one unit per 7,500 square feet, then an ADU would not be counted as an additional unit. Minimum lot sizes must not be doubled (e.g., 15,000 square feet) to account for an ADU. Further, local governments could elect to allow more than one ADU on a lot.

New developments can increase the total number of affordable units in their project plans by integrating ADUs. Aside from increasing the total number of affordable units, integrating ADUs also promotes housing choices within a development. One such example is the Cannery project in Davis, CA. The Cannery project includes 547 residential units with up to 60 integrated ADUs. ADUs within the Cannery blend in with surrounding architecture, maintaining compatibility with neighborhoods and enhancing community character. ADUs are constructed at the same time as the primary single-family unit to ensure the affordable rental unit is available in the housing supply concurrent with the availability of market rate housing.

How Are Fees Charged to ADUs?

All impact fees, including water, sewer, park and traffic fees must be charged in accordance with the Fee Mitigation Act, which requires fees to be proportional to the actual impact (e.g., significantly less than a single family home).

Fees on ADUs, must proportionately account for impact on services based on the size of the ADU or number of plumbing fixtures. For example, a 700 square foot new ADU with one bathroom that results in less landscaping should be charged much less than a 2,000 square foot home with three bathrooms and an entirely new landscaped parcel which must be irrigated. Fees for ADUs should be significantly less and should account for a lesser impact such as lower sewer or traffic impacts.

What Utility Fee Requirements Apply to ADUs?

Cities and counties cannot consider ADUs as new residential uses when calculating connection fees and capacity charges.

Where ADUs are being created within an existing structure (primary or accessory), the city or county cannot require a new or separate utility connections for the ADU and cannot charge any connection fee or capacity charge.

For other ADUs, a local agency may require separate utility connections between the primary dwelling and the ADU, but any connection fee or capacity charge must be proportionate to the impact of the ADU based on either its size or the number of plumbing fixtures.

What Utility Fee Requirements Apply to Non-City and County Service Districts?

All local agencies must charge impact fees in accordance with the Mitigation Fee Act (commencing with Government Code Section 66000), including in particular Section 66013, which requires the connection fees and capacity charges to be proportionate to the burden posed by the ADU. Special districts and non-city and county service districts must account for the lesser impact related to an ADU and should base fees on unit size or number of plumbing fixtures. Providers should consider a proportionate or sliding scale fee structures that address the smaller size and lesser impact of ADUs (e.g., fees per square foot or fees per fixture). Fee waivers or deferrals could be considered to better promote the development of ADUs.

Do Utility Fee Requirements Apply to ADUs within Existing Space?

No, where ADUs are being created within an existing structure (primary or accessory), new or separate utility connections and fees (connection and capacity) must not be required.

Does "Public Transit" Include within One-half Mile of a Bus Stop and Train Station?

Yes, "public transit" may include a bus stop, train station and paratransit if appropriate for the applicant. "Public transit" includes areas where transit is available and can be considered regardless of tighter headways (e.g., 15 minute intervals). Local governments could consider a broader definition of "public transit" such as distance to a bus route.

Can Parking Be Required Where a Car Share Is Available?

No, ADU law does not allow parking to be required when there is a car share located within a block of the ADU. A car share location includes a designated pick up and drop off location. Local governments can measure a block from a pick up and drop off location and can decide to adopt broader distance requirements such as two to three blocks.

Is Off Street Parking Permitted in Setback Areas or through Tandem Parking?

Yes, ADU law deliberately reduces parking requirements. Local governments may make specific findings that tandem parking and parking in setbacks are infeasible based on specific site, regional topographical or fire and life safety conditions or that tandem parking or parking in setbacks is not permitted anywhere else in the jurisdiction. However, these determinations should be applied in a manner that does not unnecessarily restrict the creation of ADUs.

Local governments must provide reasonable accommodation to persons with disabilities to promote equal access housing and comply with fair housing laws and housing element law. The reasonable accommodation procedure must provide exception to zoning and land use regulations which includes an ADU ordinance. Potential exceptions are not limited and may include development standards such as setbacks and parking requirements and permitted uses that further the housing opportunities of individuals with disabilities.

Is Covered Parking Required?

No, off street parking must be permitted through tandem parking on an existing driveway, unless specific findings are made.

Is Replacement Parking Required When the Parking Area for the Primary Structure Is Used for an ADU?

Yes, but only if the local government requires off-street parking to be replaced in which case flexible arrangements such as tandem, including existing driveways and uncovered parking are allowed. Local governments have an opportunity to be flexible and promote ADUs that are being created on existing parking space and can consider not requiring replacement parking.

Are Setbacks Required When an Existing Garage Is Converted to an ADU?

No, setbacks must not be required when a garage is converted or when existing space (e.g., game room or office) above a garage is converted. Rear and side yard setbacks of no more than five feet are required when new space is added above a garage for an ADU. In this case, the setbacks only apply to the added space above the garage, not the existing garage and the ADU can be constructed wholly or partly above the garage, including extending beyond the garage walls.

Also, when a garage, carport or covered parking structure is demolished or where the parking area ceases to exist so an ADU can be created, the replacement parking must be allowed in any "configuration" on the lot, "...including, but not limited to, covered spaces, uncovered spaces, or tandem spaces, or...." Configuration can be applied in a flexible manner to not burden the creation of ADUs. For example, spatial configurations like tandem on existing driveways in setback areas or not requiring excessive distances from the street would be appropriate.

Are ADUs Permitted in Existing Residence or Accessory Space?

Yes, ADUs located in single family residential zones and existing space of a single family residence or accessory structure must be approved regardless of zoning standards (Section 65852.2(a)(1)(B)) for ADUs, including locational requirements (Section 65852.2(a)(1)(A)), subject to usual non-appealable ministerial building permit requirements. For example, ADUs in existing space does not necessitate a zoning clearance and must not be limited to certain zones or areas or subject to height, lot size, lot coverage, unit size, architectural review, landscape or parking requirements. Simply, where a single family residence or accessory structure exists in any single family residential zone, so can an ADU. The purpose is to streamline and expand potential for ADUs where impact is minimal and the existing footprint is not being increased.

Zoning requirements are not a basis for denying a ministerial building permit for an ADU, including non-conforming lots or structures. The phrase, "within the existing space" includes areas within a primary home or within an attached or detached accessory structure such as a garage, a carriage house, a pool house, a rear yard studio and similar enclosed structures.

Are Owner Occupants Required?

No, however, a local government can require an applicant to be an owner occupant. The owner may reside in the primary or accessory structure. Local governments can also require the ADU to not be used for short term rentals (terms lesser than 30 days). Both owner occupant use and prohibition on short term rentals can be required on the same property. Local agencies which impose this requirement should require recordation of a deed restriction regarding owner occupancy to comply with GC Section 27281.5

Are Fire Sprinklers Required for ADUs?

Depends, ADUs shall not be required to provide fire sprinklers if they are not or were not required of the primary residence. However, sprinklers can be required for an ADU if required in the primary structure. For example, if the primary residence has sprinklers as a result of an existing ordinance, then sprinklers could be required in the ADU. Alternative methods for fire protection could be provided.

If the ADU is detached from the main structure or new space above a detached garage, applicants can be encouraged to contact the local fire jurisdiction for information regarding fire sprinklers. Since ADUs are a unique opportunity to address a variety of housing needs and provide affordable housing options for family members, students, the elderly, in-home health care providers, the disabled, and others, the fire departments want to ensure the safety of these populations as well as the safety of those living in the primary structure. Fire Departments can help educate property owners on the benefits of sprinklers, potential resources and how they can be installed cost effectively. For example, insurance rates are typically 5 to 10 percent lower where the unit is sprinklered. Finally, other methods exist to provide additional fire protection. Some options may include additional exits, emergency escape and rescue openings, 1 hour or greater fire-rated assemblies, roofing materials and setbacks from property lines or other structures.

Is Manufactured Housing Permitted as an ADU?

Yes, an ADU is any residential dwelling unit with independent facilities and permanent provisions for living, sleeping, eating, cooking and sanitation. An ADU includes an efficiency unit (Health and Safety Code Section 17958.1) and a manufactured home (Health and Safety Code Section 18007).

Health and Safety Code Section 18007(a) **"Manufactured home,"** for the purposes of this part, means a structure that was constructed on or after June 15, 1976, is transportable in one or more sections, is eight body feet or more in width, or 40 body feet or more in length, in the traveling mode, or, when erected on site, is 320 or more square feet, is built on a permanent chassis and designed to be used as a single-family dwelling with or without a foundation when connected to the required utilities, and includes the plumbing, heating, air conditioning, and electrical systems contained therein. "Manufactured home" includes any structure that meets all the requirements of this paragraph except the size requirements and with respect to which the manufacturer voluntarily files a certification and complies with the standards established under the National Manufactured Housing Construction and Safety Act of 1974 (42 U.S.C., Sec. 5401, and following).

Can an Efficiency Unit Be Smaller than 220 Square Feet?

Yes, an efficiency unit for occupancy by no more than two persons, by statute (Health and Safety Code Section 17958.1), can have a minimum floor area of 150 square feet and can also have partial kitchen or bathroom facilities, as specified by ordinance or can have the same meaning specified in the Uniform Building Code, referenced in the Title 24 of the California Code of Regulations.

The 2015 International Residential Code adopted by reference into the 2016 California Residential Code (CRC) allows residential dwelling units to be built considerably smaller than an Efficiency Dwelling Unit (EDU). Prior to this code change an EDU was required to have a minimum floor area not less than 220 sq. ft unless modified by local ordinance in accordance with the California Health and Safety Code which could allow an EDU to be built no less than 150 sq. ft. For more information, see HCD's Information Bulletin at http://www.hcd.ca.gov/codes/manufactured-housing/docs/ib2016-06.pdf .

Does ADU Law Apply to Charter Cities and Counties?

Yes. ADU law explicitly applies to "local agencies" which are defined as a city, county, or city and county whether general law or chartered (Section 65852.2(i)(2)).

Do ADUs Count toward the Regional Housing Need Allocation?

Yes, local governments may report ADUs as progress toward Regional Housing Need Allocation pursuant to Government Code Section 65400 based on the actual or anticipated affordability. See below frequently asked questions for JADUs for additional discussion.

Must ADU Ordinances Be Submitted to the Department of Housing and Community Development?

Yes, ADU ordinances must be submitted to the State Department of Housing and Community Development within 60 days after adoption, including amendments to existing ordinances. However, upon submittal, the ordinance is not subject to a Department review and findings process similar to housing element law (GC Section 65585)

Frequently Asked Questions: Junior Accessory Dwelling Units

Is There a Difference between ADU and JADU?

Courtesy of Lilypad Homes and Photo Credit to Jocelyn Knight

Yes, AB 2406 added Government Code Section 65852.22, providing a unique option for Junior ADUs. The bill allows local governments to adopt ordinances for JADUs, which are no more than 500 square feet and are typically bedrooms in a single-family home that have an entrance into the unit from the main home and an entrance to the outside from the JADU. The JADU must have cooking facilities, including a sink, but is not required to have a private bathroom. Current law does not prohibit local governments from adopting an ordinance for a JADU, and this bill explicitly allows, not requires, a local agency to do so. If the ordinance requires a permit, the local agency shall not require additional parking or charge a fee for a water or sewer connection as a condition of granting a permit for a JADU. For more information, see below.

ADUs and JADUs

REQUIREMENTS	ADU	JADU
Maximum Unit Size	Yes, generally up to 1,200 Square Feet or 50% of living area	Yes, 500 Square Foot Maximum
Kitchen	Yes	Yes
Bathroom	Yes	No, Common Sanitation is Allowed
Separate Entrance	Depends	Yes
Parking	Depends, Parking May Be Eliminated and Cannot Be Required Under Specified Conditions	No, Parking Cannot Be Required
Owner Occupancy	Depends, Owner Occupancy *May* Be Required	Yes, Owner Occupancy Is Required
Ministerial Approval Process	Yes	Yes
Prohibition on Sale of ADU	Yes	Yes

Why Adopt a JADU Ordinance?

JADUs offer the simplest and most affordable housing option. They bridge the gap between a roommate and a tenant by offering an interior connection between the unit and main living area. The doors between the two spaces can be secured from both sides, allowing them to be easily privatized or incorporated back into the main living area. These units share central systems, require no fire separation, and have a basic kitchen, utilizing small plug in appliances, reducing development costs. This provides flexibility and an insurance policy in homes in case additional income or housing is needed. They present no additional stress on utility services or infrastructure because they simply repurpose spare bedrooms that do not expand the homes planned occupancy. No additional address is required on the property because an interior connection remains. By adopting a JADU ordinance, local governments can offer homeowners additional options to take advantage of underutilized space and better address its housing needs.

Can JADUs Count towards the RHNA?

Yes, as part of the housing element portion of their general plan, local governments are required to identify sites with appropriate zoning that will accommodate projected housing needs in their regional housing need allocation (RHNA) and report on their progress pursuant to Government Code Section 65400. To credit a unit toward the RHNA, HCD and the Department of Finance (DOF) utilize the census definition of a housing unit. Generally, a JADU, including with shared sanitation facilities, that meets the census definition and is reported to the Department of Finance as part of the DOF annual City and County Housing Unit Change Survey can be credited toward the RHNA based on the appropriate income level. Local governments can track actual or anticipated affordability to assure the JADU is counted to the appropriate income category. For example, some local governments request and track information such as anticipated affordability as part of the building permit application.

> A housing unit is a house, an apartment, a mobile home or trailer, a group of rooms, or a single room that is occupied, or, if vacant, is intended for occupancy as separate living quarters. Separate living quarters are those in which the occupants live separately from any other persons in the building and which have direct access from the outside of the building or through a common hall.

Can the JADU Be Sold Independent of the Primary Dwelling?

No, the JADU cannot be sold separate from the primary dwelling.

Are JADUs Subject to Connection and Capacity Fees?

No, JADUs shall not be considered a separate or new dwelling unit for the purposes of fees and as a result should not be charged a fee for providing water, sewer or power, including a connection fee. These requirements apply to all providers of water, sewer and power, including non-municipal providers.

Local governments may adopt requirements for fees related to parking, other service or connection for water, sewer or power, however, these requirements must be uniform for all single family residences and JADUs are not considered a new or separate unit.

Are There Requirements for Fire Separation and Fire Sprinklers?

Yes, a local government may adopt requirements related to fire and life protection requirements. However, a JADU shall not be considered a new or separate unit. In other words, if the primary unit is not subject to fire or life protection requirements, then the JADU must be treated the same.

Resources

Courtesy of Karen Chapple, UC Berkeley

Attachment 1: Statutory Changes (Strikeout/Underline)

Government Code Section 65852.2

(a) (1) ~~Any~~ *A* local agency may, by ordinance, provide for the creation of ~~second~~ *accessory dwelling* units in single-family and multifamily residential zones. The ordinance ~~may~~ *shall* do ~~any~~ *all* of the following:

(A) Designate areas within the jurisdiction of the local agency where ~~second~~ *accessory dwelling* units may be permitted. The designation of areas may be based on criteria, that may include, but are not limited to, the adequacy of water and sewer services and the impact of ~~second~~ *accessory dwelling* units on traffic ~~flow.~~ *flow and public safety*.

(B) *(i)* Impose standards on ~~second~~ *accessory dwelling* units that include, but are not limited to, parking, height, setback, lot coverage, *landscape,* architectural review, maximum size of a unit, and standards that prevent adverse impacts on any real property that is listed in the California Register of Historic Places.

(ii) Notwithstanding clause (i), a local agency may reduce or eliminate parking requirements for any accessory dwelling unit located within its jurisdiction.

(C) Provide that ~~second~~ *accessory dwelling* units do not exceed the allowable density for the lot upon which the ~~second~~ *accessory dwelling* unit is located, and that ~~second~~ *accessory dwelling* units are a residential use that is consistent with the existing general plan and zoning designation for the lot.

(D) Require the accessory dwelling units to comply with all of the following:

(i) The unit is not intended for sale separate from the primary residence and may be rented.

(ii) The lot is zoned for single-family or multifamily use and contains an existing, single-family dwelling.

(iii) The accessory dwelling unit is either attached to the existing dwelling or located within the living area of the existing dwelling or detached from the existing dwelling and located on the same lot as the existing dwelling.

(iv) The increased floor area of an attached accessory dwelling unit shall not exceed 50 percent of the existing living area, with a maximum increase in floor area of 1,200 square feet.

(v) The total area of floorspace for a detached accessory dwelling unit shall not exceed 1,200 square feet.

(vi) No passageway shall be required in conjunction with the construction of an accessory dwelling unit.

(vii) No setback shall be required for an existing garage that is converted to a accessory dwelling unit, and a setback of no more than five feet from the side and rear lot lines shall be required for an accessory dwelling unit that is constructed above a garage.

(viii) Local building code requirements that apply to detached dwellings, as appropriate.

(ix) Approval by the local health officer where a private sewage disposal system is being used, if required.

(x) (I) Parking requirements for accessory dwelling units shall not exceed one parking space per unit or per bedroom. These spaces may be provided as tandem parking on an existing driveway.

(II) Offstreet parking shall be permitted in setback areas in locations determined by the local agency or through tandem parking, unless specific findings are made that parking in setback areas or tandem parking is not feasible based upon specific site or regional topographical or fire and life safety conditions, or that it is not permitted anywhere else in the jurisdiction.

(III) This clause shall not apply to a unit that is described in subdivision (d).

(xi) When a garage, carport, or covered parking structure is demolished in conjunction with the construction of an accessory dwelling unit, and the local agency requires that those offstreet parking spaces be replaced, the replacement spaces may be located in any configuration on the same lot as the accessory dwelling unit, including, but not limited to, as covered spaces, uncovered spaces, or tandem spaces, or by the use of mechanical automobile parking lifts. This clause shall not apply to a unit that is described in subdivision (d).

(2) The ordinance shall not be considered in the application of any local ordinance, policy, or program to limit residential growth.

(3) When a local agency receives its first application on or after July 1, 2003, for a permit pursuant to this subdivision, the application shall be considered ministerially without discretionary review or a hearing, notwithstanding Section 65901 or 65906 or any local ordinance regulating the issuance of variances or special use ~~permits. Nothing in this paragraph may be construed to require a local government to adopt or amend an ordinance for the creation of ADUs.~~ *permits, within 120 days after receiving the application*. A local agency may charge a fee to reimburse it for costs that it incurs as a result of amendments to this paragraph enacted during the 2001–02 Regular Session of the Legislature, including the costs of adopting or amending any ordinance that provides for the creation of ADUs. *an accessory dwelling unit*.

~~(b)~~ *(4)* ~~(1)~~ *An* ~~When~~ *existing ordinance governing the creation of an accessory dwelling unit by* a local agency ~~which has not adopted an ordinance governing ADUs in accordance with subdivision (a) or (c) receives its first application on or after July 1, 1983, for a permit pursuant to this subdivision, the local agency shall accept the application and approve or disapprove the application ministerially without discretionary review pursuant to this subdivision unless it~~ *or an accessory dwelling ordinance adopted by a local agency subsequent to the effective date of the act adding this paragraph shall provide an approval process that includes only ministerial provisions for the approval of accessory dwelling units and shall not include any discretionary processes, provisions, or requirements for those units, except as otherwise provided in this subdivision. In the event that a local agency has an existing accessory dwelling unit ordinance that fails to meet the requirements of this subdivision, that ordinance shall be null and void upon the effective date of the act adding this paragraph and that agency shall thereafter apply the standards established in this subdivision for the approval of accessory dwelling units, unless and until the agency* adopts an ordinance ~~in accordance with subdivision (a) or (c) within 120 days after receiving the application. Notwithstanding Section 65901 or 65906, every local agency shall grant a variance or special use permit for the creation of a ADU if the ADU complies with all of the following:~~ *that complies with this section*.

~~(A) The unit is not intended for sale and may be rented.~~

~~(B) The lot is zoned for single-family or multifamily use.~~

~~(C) The lot contains an existing single-family dwelling.~~

~~(D) The ADU is either attached to the existing dwelling and located within the living area of the existing dwelling or detached from the existing dwelling and located on the same lot as the existing dwelling.~~

~~(E) The increased floor area of an attached ADU shall not exceed 30 percent of the existing living area.~~

~~(F) The total area of floorspace for a detached ADU shall not exceed 1,200 square feet.~~

~~(G) Requirements relating to height, setback, lot coverage, architectural review, site plan review, fees, charges, and other zoning requirements generally applicable to residential construction in the zone in which the property is located.~~

~~(H) Local building code requirements which apply to detached dwellings, as appropriate.~~

~~(I) Approval by the local health officer where a private sewage disposal system is being used, if required.~~

~~(2)~~ *(5)* No other local ordinance, policy, or regulation shall be the basis for the denial of a building permit or a use permit under this subdivision.

~~(3)~~ *(6)* This subdivision establishes the maximum standards that local agencies shall use to evaluate ~~proposed ADUs on lots~~ *a proposed accessory dwelling unit on a lot* zoned for residential use ~~which contain~~ *that contains* an existing single-family dwelling. No additional standards, other than those provided in this~~subdivision or subdivision (a),~~ *subdivision,* shall be utilized or imposed, except that a local agency may require an applicant for a permit issued pursuant to this subdivision to be an ~~owner-occupant.~~ *owner-occupant or that the property be used for rentals of terms longer than 30 days*.

~~(4)~~ *(7)* ~~No changes in zoning ordinances or other ordinances or any changes in the general plan shall be required to implement this subdivision. Any~~ *A* local agency may amend its zoning ordinance or general plan to incorporate the policies, procedures, or other provisions applicable to the creation of ADUs *an accessory dwelling unit* if these provisions are consistent with the limitations of this subdivision.

~~(5)~~ *(8)* ~~A ADU which conforms to the requirements of~~ *An accessory dwelling unit that conforms to* this subdivision shall *be deemed to be an accessory use or an accessory building and shall* not be considered to exceed the allowable density for the lot upon which it is located, and shall be deemed to be a residential use~~which~~ *that* is consistent with the existing general plan and zoning designations for the lot. The ~~ADUs~~ *accessory dwelling unit* shall not be considered in the application of any local ordinance, policy, or program to limit residential growth.

~~(c)~~ *(b)* ~~No~~ *When a* local agency ~~shall adopt an ordinance which totally precludes ADUs within single-family or multifamily zoned areas unless the ordinance contains findings acknowledging that the ordinance may limit housing opportunities of the region and further contains findings that specific adverse impacts on the public health, safety, and welfare that would result from allowing ADUs within single-family and multifamily zoned areas justify adopting the ordinance.~~ *that has not adopted an ordinance governing accessory dwelling units in accordance with subdivision (a) receives its first application on or after July 1, 1983, for a permit to create an accessory dwelling unit pursuant to this subdivision, the local agency shall accept the application and approve or disapprove the application ministerially without discretionary review pursuant to subdivision (a) within 120 days after receiving the application*.

~~(d)~~ *(c)* A local agency may establish minimum and maximum unit size requirements for both attached and detached ~~second~~ *accessory dwelling* units. No minimum or maximum size for ~~a second~~ *an accessory dwelling* unit, or size based upon a percentage of the existing dwelling, shall be established by ordinance for either attached or detached dwellings ~~which~~ *that* does not permit at least an efficiency unit to be constructed in compliance with local development standards. *Accessory dwelling units shall not be required to provide fire sprinklers if they are not required for the primary residence.*

(d) Notwithstanding any other law, a local agency, whether or not it has adopted an ordinance governing accessory dwelling units in accordance with subdivision (a), shall not impose parking standards for an accessory dwelling unit in any of the following instances:

(1) The accessory dwelling unit is located within one-half mile of public transit.

(2) The accessory dwelling unit is located within an architecturally and historically significant historic district.

(3) The accessory dwelling unit is part of the existing primary residence or an existing accessory structure.

(4) When on-street parking permits are required but not offered to the occupant of the accessory dwelling unit.

(5) When there is a car share vehicle located within one block of the accessory dwelling unit.

(e) ~~Parking requirements for ADUs shall not exceed one parking space per unit or per bedroom. Additional parking may be required provided that a finding is made that the additional parking requirements are directly related to the~~

~~use of the ADU and are consistent with existing neighborhood standards applicable to existing dwellings. Off-street parking shall be permitted in setback areas in locations determined by the local agency or through tandem parking, unless specific findings are made that parking in setback areas or tandem parking is not feasible based upon specific site or regional topographical or fire and life safety conditions, or that it is not permitted anywhere else in the jurisdiction.~~ *Notwithstanding subdivisions (a) to (d), inclusive, a local agency shall ministerially approve an application for a building permit to create within a single-family residential zone one accessory dwelling unit per single-family lot if the unit is contained within the existing space of a single-family residence or accessory structure, has independent exterior access from the existing residence, and the side and rear setbacks are sufficient for fire safety. Accessory dwelling units shall not be required to provide fire sprinklers if they are not required for the primary residence.*

(f) *(1)* Fees charged for the construction of ~~second~~ *accessory dwelling* units shall be determined in accordance with Chapter 5 (commencing with Section~~66000~~) *66000) and Chapter 7 (commencing with Section 66012)*.

(2) Accessory dwelling units shall not be considered new residential uses for the purposes of calculating local agency connection fees or capacity charges for utilities, including water and sewer service.

(A) For an accessory dwelling unit described in subdivision (e), a local agency shall not require the applicant to install a new or separate utility connection directly between the accessory dwelling unit and the utility or impose a related connection fee or capacity charge.

(B) For an accessory dwelling unit that is not described in subdivision (e), a local agency may require a new or separate utility connection directly between the accessory dwelling unit and the utility. Consistent with Section 66013, the connection may be subject to a connection fee or capacity charge that shall be proportionate to the burden of the proposed accessory dwelling unit, based upon either its size or the number of its plumbing fixtures, upon the water or sewer system. This fee or charge shall not exceed the reasonable cost of providing this service.

(g) This section does not limit the authority of local agencies to adopt less restrictive requirements for the creation of ADUs. *an accessory dwelling unit.*

(h) Local agencies shall submit a copy of the ~~ordinances~~ *ordinance* adopted pursuant to subdivision (a) ~~or (c)~~ to the Department of Housing and Community Development within 60 days after adoption.

(i) As used in this section, the following terms mean:

(1) "Living ~~area,~~" *area"* means the interior habitable area of a dwelling unit including basements and attics but does not include a garage or any accessory structure.

(2) "Local agency" means a city, county, or city and county, whether general law or chartered.

(3) For purposes of this section, "neighborhood" has the same meaning as set forth in Section 65589.5.

(4) "~~Second~~ *"Accessory dwelling* unit" means an attached or a detached residential dwelling unit which provides complete independent living facilities for one or more persons. It shall include permanent provisions for living, sleeping, eating, cooking, and sanitation on the same parcel as the single-family dwelling is situated. ~~A second~~ *An accessory dwelling* unit also includes the following:

(A) An efficiency unit, as defined in Section 17958.1 of Health and Safety Code.

(B) A manufactured home, as defined in Section 18007 of the Health and Safety Code.

(5) "Passageway" means a pathway that is unobstructed clear to the sky and extends from a street to one entrance of the accessory dwelling unit.

(j) Nothing in this section shall be construed to supersede or in any way alter or lessen the effect or application of the California Coastal Act (Division 20 (commencing with Section 30000) of the Public Resources Code), except that the local government shall not be required to hold public hearings for coastal development permit applications for ~~second~~ *accessory dwelling* units.

Government Code Section 65852.22.

(a) Notwithstanding Section 65852.2, a local agency may, by ordinance, provide for the creation of junior accessory dwelling units in single-family residential zones. The ordinance may require a permit to be obtained for the creation of a junior accessory dwelling unit, and shall do all of the following:

(1) Limit the number of junior accessory dwelling units to one per residential lot zoned for single-family residences with a single-family residence already built on the lot.

(2) Require owner-occupancy in the single-family residence in which the junior accessory dwelling unit will be permitted. The owner may reside in either the remaining portion of the structure or the newly created junior accessory dwelling unit. Owner-occupancy shall not be required if the owner is another governmental agency, land trust, or housing organization.

(3) Require the recordation of a deed restriction, which shall run with the land, shall be filed with the permitting agency, and shall include both of the following:

(A) A prohibition on the sale of the junior accessory dwelling unit separate from the sale of the single-family residence, including a statement that the deed restriction may be enforced against future purchasers.

(B) A restriction on the size and attributes of the junior accessory dwelling unit that conforms with this section.

(4) Require a permitted junior accessory dwelling unit to be constructed within the existing walls of the structure, and require the inclusion of an existing bedroom.

(5) Require a permitted junior accessory dwelling to include a separate entrance from the main entrance to the structure, with an interior entry to the main living area. A permitted junior accessory dwelling may include a second interior doorway for sound attenuation.

(6) Require the permitted junior accessory dwelling unit to include an efficiency kitchen, which shall include all of the following:

(A) A sink with a maximum waste line diameter of 1.5 inches.

(B) A cooking facility with appliances that do not require electrical service greater than 120 volts, or natural or propane gas.

(C) A food preparation counter and storage cabinets that are of reasonable size in relation to the size of the junior accessory dwelling unit.

(b) (1) An ordinance shall not require additional parking as a condition to grant a permit.

(2) This subdivision shall not be interpreted to prohibit the requirement of an inspection, including the imposition of a fee for that inspection, to determine whether the junior accessory dwelling unit is in compliance with applicable building standards.

(c) An application for a permit pursuant to this section shall, notwithstanding Section 65901 or 65906 or any local ordinance regulating the issuance of variances or special use permits, be considered ministerially, without discretionary review or a hearing. A permit shall be issued within 120 days of submission of an application for a

permit pursuant to this section. A local agency may charge a fee to reimburse the local agency for costs incurred in connection with the issuance of a permit pursuant to this section.

(d) For the purposes of any fire or life protection ordinance or regulation, a junior accessory dwelling unit shall not be considered a separate or new dwelling unit. This section shall not be construed to prohibit a city, county, city and county, or other local public entity from adopting an ordinance or regulation relating to fire and life protection requirements within a single-family residence that contains a junior accessory dwelling unit so long as the ordinance or regulation applies uniformly to all single-family residences within the zone regardless of whether the single-family residence includes a junior accessory dwelling unit or not.

(e) For the purposes of providing service for water, sewer, or power, including a connection fee, a junior accessory dwelling unit shall not be considered a separate or new dwelling unit.

(f) This section shall not be construed to prohibit a local agency from adopting an ordinance or regulation, related to parking or a service or a connection fee for water, sewer, or power, that applies to a single-family residence that contains a junior accessory dwelling unit, so long as that ordinance or regulation applies uniformly to all single-family residences regardless of whether the single-family residence includes a junior accessory dwelling unit.

(g) For purposes of this section, the following terms have the following meanings:

(1) "Junior accessory dwelling unit" means a unit that is no more than 500 square feet in size and contained entirely within an existing single-family structure. A junior accessory dwelling unit may include separate sanitation facilities, or may share sanitation facilities with the existing structure.

(2) "Local agency" means a city, county, or city and county, whether general law or chartered.

Attachment 2: Sample ADU Ordinance

Section XXX1XXX: Purpose

This Chapter provides for accessory dwelling units on lots developed or proposed to be developed with single-family dwellings. Such accessory dwellings contribute needed housing to the community's housing stock. Thus, accessory dwelling units are a residential use which is consistent with the General Plan objectives and zoning regulations and which enhances housing opportunities, including near transit on single family lots.

Section XXX2XXX: Applicability

The provisions of this Chapter apply to all lots that are occupied with a single family dwelling unit and zoned residential. Accessory dwelling units do exceed the allowable density for the lot upon which the accessory dwelling unit is located, and are a residential use that is consistent with the existing general plan and zoning designation for the lot.

Section XXX3XXX: Development Standards

Accessory Structures within Existing Space

An accessory dwelling unit within an existing space including the primary structure, attached or detached garage or other accessory structure shall be permitted ministerially with a building permit regardless of all other standards within the Chapter if complying with:

1. Building and safety codes
2. Independent exterior access from the existing residence
3. Sufficient side and rear setbacks for fire safety.

Accessory Structures (Attached and Detached)

General:

1. The unit is not intended for sale separate from the primary residence and may be rented.
2. The lot is zoned for residential and contains an existing, single-family dwelling.
3. The accessory dwelling unit is either attached to the existing dwelling or detached from the existing dwelling and located on the same lot as the existing dwelling.
4. The increased floor area of an attached accessory dwelling unit shall not exceed 50 percent of the existing living area, with a maximum increase in floor area of 1,200 square feet.
5. The total area of floor space for a detached accessory dwelling unit shall not exceed 1,200 square feet.
6. Local building code requirements that apply to detached dwellings, as appropriate.
7. No passageway shall be required in conjunction with the construction of an accessory dwelling unit.
8. No setback shall be required for an existing garage that is converted to a accessory dwelling unit, and a setback of no more than five feet from the side and rear lot lines shall be required for an accessory dwelling unit that is constructed above a garage.
9. Accessory dwelling units shall not be required to provide fire sprinklers if they are not required for the primary residence and may employ alternative methods for fire protection.

Parking:

1. Parking requirements for accessory dwelling units shall not exceed one parking space per unit or per bedroom. These spaces may be provided as tandem parking, including on an existing driveway or in setback areas, excluding the non-driveway front yard setback.
2. Parking is not required in the following instances:
    - The accessory dwelling unit is located within one-half mile of public transit, including transit stations and bus stations.

- The accessory dwelling unit is located in the WWWW Downtown, XXX Area, YYY Corridor and ZZZ Opportunity Area.
- The accessory dwelling unit is located within an architecturally and historically significant historic district.
- When on-street parking permits are required but not offered to the occupant of the accessory dwelling unit.
- When there is a car share vehicle located within one block of the accessory dwelling unit.

3. Replacement Parking: When a garage, carport, or covered parking structure is demolished or converted in conjunction with the construction of an accessory dwelling unit, replacement parking shall not be required and may be located in any configuration on the same lot as the accessory dwelling unit.

Section XXX4XXX: Permit Requirements

ADUs shall be permitted ministerially, in compliance with this Chapter within 120 days of application. The Community Development Director shall issue a building permit or zoning certificate to establish an accessory dwelling unit in compliance with this Chapter if all applicable requirements are met in Section XXX3XXXXX, as appropriate. The Community Development Director may approve an accessory dwelling unit that is not in compliance with Section XXX3XXXX as set forth in Section XXX5XXXX. The XXXX Health Officer shall approve an application in conformance with XXXXXX where a private sewage disposal system is being used.

Section XXX5XXX: Review Process for Accessory Structure Not Complying with Development Standards

An accessory dwelling unit that does not comply with standards in Section XXX3XX may permitted with a zoning certificate or an administrative use permit at the discretion of the Community Development Director subject to findings in Section XXX6XX

Section XXX6XXX: Findings

A. In order to deny an administrative use permit under Section XXX5XXX, the Community Development Director shall find that the Accessory Dwelling Unit would be detrimental to the public health and safety or would introduce unreasonable privacy impacts to the immediate neighbors.

B. In order to approve an administrative use permit under Section XXX5XXX to waive required accessory dwelling unit parking, the Community Development Director shall find that additional or new on-site parking would be detrimental, and that granting the waiver will meet the purposes of this Chapter.

Section XXX7XXX: Definitions

(1) "Living area means the interior habitable area of a dwelling unit including basements and attics but does not include a garage or any accessory structure.

(2) "Accessory dwelling unit" means an attached or a detached residential dwelling unit which provides complete independent living facilities for one or more persons. It shall include permanent provisions for living, sleeping, eating, cooking, and sanitation on the same parcel as the single-family dwelling is situated. An accessory dwelling unit also includes the following:

(A) An efficiency unit, as defined in Section 17958.1 of Health and Safety Code.

(B) A manufactured home, as defined in Section 18007 of the Health and Safety Code.

(3) "Passageway" means a pathway that is unobstructed clear to the sky and extends from a street to one entrance of the accessory dwelling unit.

(4) (1) "Existing Structure" for the purposes of defining an allowable space that can be converted to an ADU means within the four walls and roofline of any structure existing on or after January 1, 2017 that can be made safely habitable under local building codes at the determination of the building official regardless of any non-compliance with zoning standards.

Attachment 3: Sample JADU Ordinance

(Lilypad Homes at http://lilypadhomes.org/)

Draft Junior Accessory Dwelling Units (JADU) – Flexible Housing

Findings:

1. Causation: Critical need for housing for lower income families and individuals given the high cost of living and low supply of affordable homes for rent or purchase, and the difficulty, given the current social and economic environment, in building more affordable housing
2. Mitigation: Create a simple and inexpensive permitting track for the development of junior accessory dwelling units that allows spare bedrooms in homes to serve as a flexible form of infill housing
3. Endangerment: Provisions currently required under agency ordinances are so arbitrary, excessive, or burdensome as to restrict the ability of homeowners to legally develop these units therefore encouraging homeowners to bypass safety standards and procedures that make the creation of these units a benefit to the whole of the community
4. Co-Benefits: Homeowners (particularly retired seniors and young families, groups that tend to have the lowest incomes) – generating extra revenue, allowing people facing unexpected financial obstacles to remain in their homes, housing parents, children or caregivers; Homebuyers - providing rental income which aids in mortgage qualification under new government guidelines; Renters – creating more low-cost housing options in the community where they work, go to school or have family, also reducing commute time and expenses; Municipalities – helping to meet RHNA goals, increasing property and sales tax revenue, insuring safety standard code compliance, providing an abundant source of affordable housing with no additional infrastructure needed; Community - housing vital workers, decreasing traffic, creating economic growth both in the remodeling sector and new customers for local businesses; Planet - reducing carbon emissions, using resources more efficiently;
5. Benefits of Junior ADUs: offer a more affordable housing option to both homeowners and renters, creating economically healthy, diverse, multi-generational communities;

Therefore, the following ordinance is hereby enacted:

This Section provides standards for the establishment of junior accessory dwelling units, an alternative to the standard accessory dwelling unit, permitted as set forth under State Law AB 1866 (Chapter 1062, Statutes of 2002) Sections 65852.150 and 65852.2 and subject to different provisions under fire safety codes based on the fact that junior accessory dwelling units do not qualify as "complete independent living facilities" given that the interior connection from the junior accessory dwelling unit to the main living area remains, therefore not redefining the single-family home status of the dwelling unit.

A) *Development Standards.* Junior accessory dwelling units shall comply with the following standards, including the standards in Table below:

   1) *Number of Units Allowed.* Only one accessory dwelling unit or, junior accessory dwelling unit, may be located on any residentially zoned lot that permits a single-family dwelling except as otherwise regulated or restricted by an adopted Master Plan or Precise Development Plan. A junior accessory dwelling unit may only be located on a lot which already contains one legal single-family dwelling.
   2) *Owner Occupancy:* The owner of a parcel proposed for a junior accessory dwelling unit shall occupy as a principal residence either the primary dwelling or the accessory dwelling, except when the home is held by an agency such as a land trust or housing organization in an effort to create affordable housing.
   3) *Sale Prohibited:* A junior accessory dwelling unit shall not be sold independently of the primary dwelling on the parcel.

29

4) *Deed Restriction:* A deed restriction shall be completed and recorded, in compliance with Section B below.
5) *Location of Junior Accessory Dwelling Unit:* A junior accessory dwelling unit must be created within the existing walls of an existing primary dwelling, and must include conversion of an existing bedroom.
6) *Separate Entry Required:* A separate exterior entry shall be provided to serve a junior accessory dwelling unit.
7) *Interior Entry Remains:* The interior connection to the main living area must be maintained, but a second door may be added for sound attenuation.
8) *Kitchen Requirements:* The junior accessory dwelling unit shall include an efficiency kitchen, requiring and limited to the following components:
   a) A sink with a maximum waste line diameter of one-and-a-half (1.5) inches,
   b) A cooking facility with appliance which do not require electrical service greater than one-hundred-and-twenty (120) volts or natural or propane gas, and
   c) A food preparation counter and storage cabinets that are reasonable to size of the unit.
9) Parking: No additional parking is required beyond that required when the existing primary dwelling was constructed.

Development Standards for Junior Accessory Dwelling Units

SITE OR DESIGN FEATURE	SITE AND DESIGN STANDARDS
Maximum unit size	500 square feet
Setbacks	As required for the primary dwelling unit
Parking	No additional parking required

B) *Deed Restriction:* Prior to obtaining a building permit for a junior accessory dwelling unit, a deed restriction, approved by the City Attorney, shall be recorded with the County Recorder's office, which shall include the pertinent restrictions and limitations of a junior accessory dwelling unit identified in this Section. Said deed restriction shall run with the land, and shall be binding upon any future owners, heirs, or assigns. A copy of the recorded deed restriction shall be filed with the Department stating that:
   1) The junior accessory dwelling unit shall not be sold separately from the primary dwelling unit;
   2) The junior accessory dwelling unit is restricted to the maximum size allowed per the development standards;
   3) The junior accessory dwelling unit shall be considered legal only so long as either the primary residence, or the accessory dwelling unit, is occupied by the owner of record of the property, except when the home is owned by an agency such as a land trust or housing organization in an effort to create affordable housing;
   4) The restrictions shall be binding upon any successor in ownership of the property and lack of compliance with this provision may result in legal action against the property owner, including revocation of any right to maintain a junior accessory dwelling unit on the property.

C) *No Water Connection Fees:* No agency should require a water connection fee for the development of a junior accessory dwelling unit. An inspection fee to confirm that the dwelling unit complies with development standard may be assessed.

D) *No Sewer Connection Fees:* No agency should require a sewer connection fee for the development of a junior accessory dwelling unit. An inspection fee to confirm that the dwelling unit complies with development standard may be assessed.

E) *No Fire Sprinklers and Fire Attenuation:* No agency should require fire sprinkler or fire attenuation specifications for the development of a junior accessory dwelling unit. An inspection fee to confirm that the dwelling unit complies with development standard may be assessed.

Definitions of Specialized Terms and Phrases.

"Accessory dwelling unit" means an attached or a detached residential dwelling unit which provides complete independent living facilities for one or more persons. It shall include permanent provisions for living, sleeping, eating, cooking, and sanitation on the same parcel as the single-family dwelling is situated. An accessory dwelling unit also includes the following:

(1) An efficiency unit, as defined in Section 17958.1 of Health and Safety Code.

(2) A manufactured home, as defined in Section 18007 of the Health and Safety Code.

"Junior accessory dwelling unit" means a unit that is no more than 500 square feet in size and contained entirely within an existing single-family structure. A junior accessory dwelling unit may include separate sanitation facilities, or may share sanitation facilities with the existing structure.

Attachment 4: State Standards Checklist (As of January 1, 2017)

YES/NO	STATE STANDARD*	GOVERNMENT CODE SECTION
	Unit is not intended for sale separate from the primary residence and may be rented.	65852.2(a)(1)(D)(i)
	Lot is zoned for single-family or multifamily use and contains an existing, single-family dwelling.	65852.2(a)(1)(D))ii)
	Accessory dwelling unit is either attached to the existing dwelling or located within the living area of the existing dwelling or detached from the existing dwelling and located on the same lot as the existing dwelling.	65852.2(a)(1)(D)(iii)
	Increased floor area of an attached accessory dwelling unit does not exceed 50 percent of the existing living area, with a maximum increase in floor area of 1,200 square feet.	65852.2(a)(1)(D)(iv)
	Total area of floor space for a detached accessory dwelling unit dies not exceed 1,200 square feet.	65852.2(a)(1)(D)(v)
	Passageways are not required in conjunction with the construction of an accessory dwelling unit.	65852.2(a)(1)(D)(vi)
	Setbacks are not required for an existing garage that is converted to an accessory dwelling unit, and a setback of no more than five feet from the side and rear lot lines are not required for an accessory dwelling unit that is constructed above a garage.	65852.2(a)(1)(D)(vii)
	(Local building code requirements that apply to detached dwellings are met, as appropriate.	65852.2(a)(1)(D)(viii)
	Local health officer approval where a private sewage disposal system is being used, if required.	65852.2(a)(1)(D)(ix)
	Parking requirements do not exceed one parking space per unit or per bedroom. These spaces may be provided as tandem parking on an existing driveway.	65852.2(a)(1)(D)(x)

* Other requirements may apply. See Government Code Section 65852.2

Attachment 5: Bibliography

Reports

ACCESSORY DWELLING UNITS: CASE STUDY (26 pp.)

By United States Department of Housing and Urban Development, Office of Policy Development and Research. (2008)

Introduction: Accessory dwelling units (ADUs) — also referred to as accessory apartments, ADUs, or granny flats — are additional living quarters on single-family lots that are independent of the primary dwelling unit. The separate living spaces are equipped with kitchen and bathroom facilities, and can be either attached or detached from the main residence. This case study explores how the adoption of ordinances, with reduced regulatory restrictions to encourage ADUs, can be advantageous for communities. Following an explanation of the various types of ADUs and their benefits, this case study provides examples of municipalities with successful ADU legislation and programs. Section titles include: History of ADUs; Types of Accessory Dwelling Units; Benefits of Accessory Dwelling Units; and Examples of ADU Ordinances and Programs.

THE MACRO VIEW ON MICRO UNITS (46 pp.)

By Bill Whitlow, et al. – Urban Land Institute (2014)
Library Call #: H43 4.21 M33 2014

The Urban Land Institute Multifamily Housing Councils were awarded a ULI Foundation research grant in fall 2013 to evaluate from multiple perspectives the market performance and market acceptance of micro and small units.

RESPONDING TO CHANGING HOUSEHOLDS: Regulatory Challenges for Micro-units and Accessory Dwelling Units (76 pp.)

By Vicki Been, Benjamin Gross, and John Infranca (2014)
New York University: Furman Center for Real Estate & Urban Policy
Library Call # D55 3 I47 2014

This White Paper fills two gaps in the discussion regarding compact units. First, we provide a detailed analysis of the regulatory and other challenges to developing both ADUs and micro-units, focusing on five cities: New York; Washington, DC; Austin; Denver; and Seattle. That analysis will be helpful not only to the specific jurisdictions we study, but also can serve as a model for those who what to catalogue regulations that might get in the way of the development of compact units in their own jurisdictions. Second, as more local governments permit or encourage compact units, researchers will need to evaluate how well the units built serve the goals proponents claim they will.

SCALING UP SECONDARY UNIT PRODUCTION IN THE EAST BAY: Impacts and Policy Implications (25 pp.)

By Jake Webmann, Alison Nemirow, and Karen Chapple (2012)
UC Berkeley: Institute of Urban and Regional Development (IURD)
Library Call # H44 1.1 S33 2012

This paper begins by analyzing how many secondary units of one particular type, detached backyard cottages, might be built in the East Bay, focusing on the Flatlands portions of Berkeley, El Cerrito, and Oakland. We then investigate the potential impacts of scaling up the strategy with regard to housing affordability, smart growth, alternative transportation, the economy, and city budgets. A final section details policy recommendations, focusing on regulatory reforms and other actions cities can take to encourage secondary unit construction, such as promoting carsharing programs, educating residents, and providing access to finance.

SECONDARY UNITS AND URBAN INFILL: A literature Review (12 pp.)

By Jake Wegmann and Alison Nemirow (2011)
UC Berkeley: IURD
Library Call # D44 4.21 S43 2011

This literature review examines the research on both infill development in general, and secondary units in particular, with an eye towards understanding the similarities and differences between infill as it is more traditionally understood – i.e., the development or redevelopment of entire parcels of land in an already urbanized area – and the incremental type of infill that secondary unit development constitutes.

YES, BUT WILL THEY LET US BUILD? The Feasibility of Secondary Units in the East Bay (17 pp.)

By Alison Nemirow and Karen Chapple (2012)
UC Berkeley: IURD
Library Call # H44.5 1.1 Y47 2012

This paper begins with a discussion of how to determine the development potential for secondary units, and then provides an overview of how many secondary units can be built in the East Bay of San Francisco Bay Area under current regulations. The next two sections examine key regulatory barriers in detail for the five cities in the study (Albany, Berkeley, El Cerrito, Oakland, and Richmond), looking at lot size, setbacks, parking requirements, and procedural barriers. A sensitivity analysis then determines how many units could be built were the regulations to be relaxed.

YES IN MY BACKYARD: Mobilizing the Market for Secondary Units (20 pp.)

By Karen Chapple, J. Weigmann, A. Nemirow, and C. Dentel-Post (2011)
UC Berkeley: Center for Community Innovation.
Library Call # B92 1.1 Y47 2011

This study examines two puzzles that must be solved in order to scale up a secondary unit strategy: first, how can city regulations best enable their construction? And second, what is the market for secondary units? Because parking is such an important issue, we also examine the potential for secondary unit residents to rely on alternative transportation modes, particular car share programs. The study looks at five adjacent cities in the East Bay of the San Francisco Bay Area (Figure 1) -- Oakland, Berkeley, Albany, El Cerrito, and Richmond -- focusing on the areas within ½ mile of five Bay Area Rapid Transit (BART) stations.

Journal Articles and Working Papers:

BACKYARD HOMES LA (17 pp.)

By Dana Cuff, Tim Higgins, and Per-Johan Dahl, Eds. (2010)
Regents of the University of California, Los Angeles.
City Lab Project Book.

DEVELOPING PRIVATE ACCESSORY DWELLINGS (6 pp.)

By William P. Macht. Urbanland online. (June 26, 2015)
Library Location: Urbanland 74 (3/4) March/April 2015, pp. 154-161.

GRANNY FLATS GAINING GROUND (2 pp.)

By Brian Barth. Planning Magazine: pp. 16-17. (April 2016)
Library Location: Serials

"HIDDEN" DENSITY: THE POTENTIAL OF SMALL-SCALE INFILL DEVELOPMENT (2 pp.)

By Karen Chapple (2011)
UC Berkeley: IURD Policy Brief.
Library Call # D44 1.2 H53 2011

California's implementation of SB 375, the Sustainable Communities and Climate Protection Act of 2008, is putting new pressure on communities to support infill development. As metropolitan planning organizations struggle to communicate the need for density, they should take note of strategies that make increasing density an attractive choice for neighborhoods and regions.

HIDDEN DENSITY IN SINGLE-FAMILY NEIGHBORHOODS: Backyard cottages as an equitable smart growth strategy (22 pp.)

By Jake Wegmann and Karen Chapple. Journal of Urbanism 7(3): pp. 307-329. (2014)

Abstract (not available in full text): Secondary units, or separate small dwellings embedded within single-family residential properties, constitute a frequently overlooked strategy for urban infill in high-cost metropolitan areas in the United States. This study, which is situated within California's San Francisco Bay Area, draws upon data collected from a homeowners' survey and a Rental Market Analysis to provide evidence that a scaled-up strategy emphasizing one type of secondary unit – the backyard cottage – could yield substantial infill growth with minimal public subsidy. In addition, it is found that this strategy compares favorably in terms of affordability with infill of the sort traditionally favored in the 'smart growth' literature, i.e. the construction of dense multifamily housing developments.

RETHINKING PRIVATE ACCESSORY DWELLINGS (5 pp.)

By William P. Macht. Urbanland online. (March 6, 2015)
Library Location: Urbanland 74 (1/2) January/February 2015, pp. 87-91.

ADUS AND LOS ANGELES' BROKEN PLANNING SYSTEM (4 pp.)

By CARLYLE W. Hall. The Planning Report. (April 26, 2016).
Land-use attorney Carlyle W. Hall comments on building permits for accessory dwelling units.

News:

HOW ONE COLORADO CITY INSTANTLY CREATED AFFORDABLE HOUSING

By Anthony Flint. The Atlantic-CityLab. (May 17, 2016).

In Durango, Colorado, zoning rules were changed to allow, for instance, non-family members as residents in already-existing accessory dwelling units.

NEW HAMPSHIRE WINS PROTECTIONS FOR ACCESSORY DWELLING UNITS (1 p.)

NLIHC (March 28, 2016)

Affordable housing advocates in New Hampshire celebrated a significant victory this month when Governor Maggie Hassan (D) signed Senate Bill 146, legislation that allows single-family homeowners to add an accessory

dwelling unit as a matter of right through a conditional use permit or by special exception as determined by their municipalities. The bill removes a significant regulatory barrier to increasing rental homes at no cost to taxpayers.

NEW IN-LAW SUITE RULES BOOST AFFORDABLE HOUSING IN SAN FRANCISCO. (3 pp.)

By Rob Poole. Shareable. (June 10, 2014).

The San Francisco Board of Supervisors recently approved two significant pieces of legislation that support accessory dwelling units (ADUs), also known as "in-law" or secondary units, in the city…

USING ACCESSORY DWELLING UNITS TO BOLSTER AFFORDABLE HOUSING (3 pp.)

By Michael Ryan. Smart Growth America. (December 12, 2014).

Yucaipa Valley Water District

Workshop Memorandum 18-075

Date: February 27, 2018

From: Kathryn Hallberg, Management Analyst

Subject: Overview of the Western Coalition of Arid States (WESTCAS) Legislative Workshop

The Western Coalition of Arid States (WESTCAS) is an organization of water and wastewater service providers who advocate for logical regulatory implementation consistent with the conditions in the arid southwest.

The recent legislative and regulatory workshop was designed to identify issues of concern, educate the attendees on the current government administration stance, and identify and build WESTCAS positions and policies on pertinent regulation and legislative issues affecting the arid southwest.

The attached "WESTCAS Position Statement" was presented regarding the definition of the waters of the United States and was open for comments and concerns.

Record of Review & Completion	
WESTCAS REVIEW RECORD:	*2016/2017 Fly-in & several recent conferences/Board conference calls*
POLICY DRAFT REVIEWED:	*October 26, 2017 – Fall Conference*
BOARD CONSIDERATION:	*February 22, 2018 – Regulatory/Legislative Workshop*
COMPLETION:	TBD

WESTCAS Position Statement

I. Definition of "Waters of the United States"

II. Summary of the Issue

a. Introduction

The Federal Water Pollution Control Act Amendments of 1972, also known as the Clean Water Act (CWA), is a comprehensive statute that partners federal, state and local governments, and deploys a number of programs--both regulatory and non-regulatory--to "restore and maintain the chemical, physical and biological integrity of the Nation's waters (CWA §101(a)).

The responsibility for protection of surface waters is divided between federal and state water quality agencies. The U.S. EPA (EPA) and the U.S. Army Corps of Engineers (Corps) are responsible for protecting federal navigable waters, while state agencies are responsible for protecting non-navigable intrastate waters and groundwater. In doing so, Congress chose to regulate only pollutant discharges into those waters in which the federal government has an interest--not as all waters within the United States.

When Congress stated the objectives of the CWA, and the scope of waters that warrant protection, it did not define "waters of the United States." Congress left it upon the EPA and the Corps to develop, through rulemaking, a comprehensive regulatory definition that would be used to establish the jurisdictional reach for all CWA regulatory programs.

However, over the past 45 years, numerous administrative actions have attempted to expand jurisdiction beyond "navigable" by claiming jurisdiction over "other waters" that Congress could regulate under the Commerce Clause of the U.S. Constitution. As a result, petitions for review of key agency decisions have provided some effect for limiting the scope of non-navigable intrastate waters that can be swept into CWA jurisdiction.

b. U.S. Supreme Court Decisions

In **Riverside Bayview Homes** (1985), the court found that the Act's definition of navigable waters as the waters of the United States indicated an intent to regulate "at least some waters" that were not navigable in the traditional sense, and upheld Corps jurisdiction over wetlands that "actually abut a navigable waterway."

In **Solid Waste Agency of Northern Cook County** (2001), the court evaluated the Corps determination of jurisdiction over small isolated ponds, which were created when rain filled abandoned sand and gravel pits, and used by migratory birds. Rejecting jurisdiction over these ponds--and the Migratory Bird Rule generally--the Court explained that the CWA's use of the term "navigable waters" demonstrates Congress'

understanding that its "authority for enacting the CWA was its traditional jurisdiction over waters that were or had been navigable-in-fact or which could reasonably be so made."

In **Rapanos** (2006), the plurality criticized the agencies for extending jurisdiction to, "ephemeral streams, wet meadows, storm sewers and culverts, directional sheet flow during storm events, drain tiles, man-made drainage ditches, and dry arroyos in the middle of the desert." Moreover, the court also stated that, "Wetlands are waters of the United States if they bear the "significant nexus" of physical connection, which makes them as a practical matter **indistinguishable** from waters of the United States."

c. Regulatory History of Ditches

Congress included the term "ditch" in the statutory definition of a "point source" under the CWA. Beginning in 1975, and continuing through 1986, the Corps issued a series of administrative actions that excluded "drainage and irrigation ditches" from the definition of waters of the United States. In the 1990 preamble to EPA's Phase I storm water regulations, the agency made it clear that storm water runoff into municipal sewers (roads, ditches, storm drains, etc.) is not a discharge of a pollutant to a water of the United States. The plurality and Kennedy opinions in **Rapanos** also made it clear that most drainage and irrigation ditches are not jurisdictional waters of the United States.

III. Description of Impacts to Arid West States

WESTCAS members operate surface water transmission and distribution systems, stormwater conveyance and retention systems, groundwater recharge projects, and discharge wastewaters under state and EPA authorized National Pollution Discharge Elimination System (NPDES) permits or Corps authorized dredge and fill permits. In addition, many members routinely seek coverage under general NPDES discharge permits or prepare and implement oil pollution prevention and response plans for facilities that are subject to the Act. In order to maintain, develop and construct its facilities, WESTCAS desires regulatory clarity and the ability to easily identify jurisdictional waters without having to rely upon lengthy agency review.

IV. Principles and Guidelines

- The definition of waters of the United States should be consistent with **Riverside Bayview**, **SWANCC**, and meet both the plurality and Kennedy tests from **Rapanos**.
- The term "navigable waters" must be given consideration.
- Recognition from the EPA and Corps that the primary responsibility for and rights over land and water resources resides with the states, i.e., §101(b).
- Clarity that empowers the states to identify and distinguish waters subject to Clean Water Act jurisdiction and "waters of the state."

V. Priorities and Action Plan

Since 1992, WESTCAS has advocated for the use of sound science with the interpretation and application of the CWA and its underlying regulatory programs. WESTCAS also recognizes the importance of having regulatory clarity and the ability

for stakeholders to easily identify navigable waters of the United States. And finally, WESTCAS strongly supports cooperative federalism as the basis of the CWA; arid west water quality agencies should be empowered and authorized to identify navigable waters within their jurisdictions.

To attain these priorities, over the next three to five years WESTCAS plans to:

1. Actively engage and participate in waters of the United States rulemakings to promote the incorporation of sound science, relevant legal principals, and widely accepted agency guidance.
2. Advocate for the development of an appropriate regulatory definition of waters of the United States that recognizes the unique climatic, geographical and hydrological features in the arid west.
3. Seek opportunities to assist state clean water agencies with developing and implementing water quality regulations, policies, procedures and guidance that are uniquely tailored to the arid west.

February __, 2018.

###

Announcing a WESTCAS Workshop

February 22, 2018 – Phoenix, AZ

One Year into the Trump Administration and the first session of the 115th Congress: *Building a WESTCAS Portfolio of Positions and Action Plan for the Arid West…Integrating Regulatory and Legislative actions in the Federal sector.*

SESSION ONE: Actions Focused on Legislative Issues

9:00 AM – 10:00 AM

Welcome and Overview of Workshop

This is a unique opportunity to build positive WESTCAS responses to the actions of the first year of the Trump administration and the 115th Congress through the development of WESTCAS Position Papers.

10:00 AM – 12:00 PM

Overview and Status of Key 2018 Federal Issues
Hicks-Ray Associates

- DC Update 2018 Outlook
- Changes at EPA and other federal agencies

Development of WESTCAS Position Papers

- Lacey Act
- Water Conservation Rebate
- Title XVI Competitive Grant
- Salinity Standards
- Waters of the United States
- Arid West Water Quality Research & Standards

SESSION TWO: Building a WESTCAS Action Portfolio for the Arid West

12:00 PM – 1:00 PM

Expectations for Second Year

- What to expect in the second year of the new Administration?
- Actions expected early in the 2nd Session of 115th Congress (Emerging issues)
    - *Infrastructure funding – where to emphasize water/wastewater/water quality/desal funding recommendations for the Arid West*
    - *Update on continuing WESTCAS issues*
    - *WOTUS*
    - *Water Quality Criteria And Effluent Limits*
    - *Drinking Water*
    - *Stormwater*

SESSION THREE: WESTCAS Initiative Development

1:00 PM – 4:00 PM

An Overall Arid-West Strategy

- **POSTIVE STEPS,** suggestions and technical understanding to build WESTCAS positions/policies on pertinent regulations and legislative issues affecting the Arid West.
- **IDENTIFY** rules, regulations, guidance of concern to the arid-West: (either to rescind, revise or to protect); anticipated legislative actions and needed legislative actions
- **ACT** with specific actions at agency, Administration or Congressional level
- **COORDINATION/COOPERATION** with other water associations
- **PRIORITIZE and SCHEDULE** regulatory and legislative actions

Development Projects

Yucaipa Valley Water District

Workshop Memorandum 18-076

Date: February 27, 2018

From: Joseph Zoba, General Manager

Subject: Discussion Regarding a Development Agreement for Sewer Service to Property Located on Avenue H, Yucaipa as Tract No. 18167 - MBTK Homes

The District staff is working together with MBTK Homes for the development of 57 detached condominium units on 7.6 acres near Avenue H and 4th Street. The District staff is in the process of preparing a development agreement to document the terms and conditions for sewer service to this project.

AGREEMENT TO PROVIDE SEWER SERVICE TO TRACT NUMBER 18167 IN THE CITY OF YUCAIPA, COUNTY OF SAN BERNARDINO

This Agreement is made and effective this 6th day of March 2018, by and between the Yucaipa Valley Water District, a public agency ("District") and MBTK Homes, LLC, ("Developer"). Each is sometimes referred to herein as a "Party" and jointly as the "Parties".

Project File	Work Order
P-65-318	#65-22398

For contractual issues, the Parties are represented by the following responsible individuals authorized to execute this Agreement:

District
Yucaipa Valley Water District
12770 Second Street
Post Office Box 730
Yucaipa, California 92399
Attention: Joseph Zoba, General Manager
Telephone: (909) 797-5119 x2
Email: jzoba@yvwd.us

Developer
MBTK Homes, LLC
11154 Walnut Avenue
Redlands, California 92374
Attention: Mark Buoye
Telephone: (909) 499-8353
Email: _____

The Developer has represented to the District that they are the owner of the following parcel(s) which is/are the subject of this Agreement and described herein as the "Property":

Assessor Parcel Numbers	County
0319-233-2, 0319-233-13, and 0319-233-88	San Bernardino

RECITALS

WHEREAS, the Developer desires to develop its Property situated within the service area of the District as shown on Exhibit A attached hereto with 57 lots; and

WHEREAS, the Developer has provided plans, drawings, and/or concepts to the District to construct the proposed "Project" as shown on Exhibit B attached hereto; and

WHEREAS, the Developer desires to obtain drinking water service from the District for the Project in accordance with the current Rules, Regulations, and Policies of the District; and General Construction Conditions as provided in Exhibit C attached hereto; and

WHEREAS, it is the purpose of this Agreement to set forth the terms and conditions by which the District will provide service to the Project.

AGREEMENT

NOW, THEREFORE, in consideration of the mutual promises and covenants contained herein, the Developer and the District agree as follows:

A. **Project Overview.** The Proposed development consists of 57 detached condominium housing units, shared open space with amenities including clubhouse, pool and spa ("Project"). The Project is located near the intersection of Avenue H and Fourth Street in Yucaipa, California. The Project will receive sewer service only from the Yucaipa Valley Water District.

B. **Special Conditions.** The following conditions, being contained herein, will be required by the Yucaipa Valley Water District for the Developer to receive service for the Project.

1. Project Specific Drinking Water Conditions: The Project will be served drinking water from South Mesa Mutual Water Company. The Developer will provide approved plans, specifications, and construction drawings to Yucaipa Valley Water District for review and identification of potential utility conflicts prior to activation of water service for the Project.

2. Project Specific Recycled Water Conditions: The Project will not receive recycled water service from Yucaipa Valley Water District or South Mesa Mutual Water Company.

3. Project Specific Stormwater Conditions. The City of Yucaipa and/or the County of San Bernardino will retain responsibility and authority for stormwater related to the Project. The Developer will provide approved plans, specifications, and construction drawings to Yucaipa Valley Water District for review and identification of onsite stormwater collection facilities and retention basins. In some cases, special construction will be required to protect District Facilities from interference with the infrastructure and/or operations of the stormwater facilities.

4. Project Specific Sewer Conditions. The Developer shall design and construct onsite sewer infrastructure and related appurtenances pursuant to the District approved plans and construction drawings to serve the Parcels within the Project.

    a. The Yucaipa Valley Water District will not provide sewer service to the Project until all sewer infrastructure is completed and accepted by the District.

    b. Developer shall pay all rates, fees, and charges as required herein and in effect at the time the sewer service is available to any Project phase.

    c. The Developer is responsible for the construction and maintenance of all on-site sewer Facilities.

    d. Monthly sewer charges for this project, as established and approved by the District Board of Directors, will be invoiced to the property owner as an annual property tax lien or assessment pursuant to the Rules and Regulations of the District.

5. Rates, Fees and Charges. The most current rates, fees and charges will be payable pursuant to the Resolution/Ordinance in effect at the time connection to the sewer system is completed and service is provided.

6. Project Related Invoices. The Developer agrees to pay invoices related to this project as presented and deposit funds with the District, as required herein, prior to receiving a grading permit for the Project. The Developer acknowledges and hereby agrees that the District is authorized, from time-to-time, to reimburse itself from the funds on deposit for Project costs incurred and that the District will not release any structure for occupancy unless there is a minimum balance in the Project Cash Account.

7. Ownership; Operation and Maintenance. Once constructed and accepted by the District, title to the Facilities, excluding the on-site Facilities, will be conveyed by the Developer to the District, and the District will operate and maintain the Facilities and provide service to the Developer's Property in accordance with the District's Rules, Regulations and Policies and the provisions of this Agreement.

8. Easements, Dedications, and Recorded Documentation: All easements, dedications and recorded documentation required by the District shall be provided by the Developer to the District in a timely manner as required by the District.

9. Annexation. This Project is located within the service area of the District, so an annexation is not required.

10. Annual Review of Construction Drawings. The District requires an annual review of approved construction drawings related to this Project. The District will not charge the Developer for the annual construction drawing review. However, the Developer will be required to update and resubmit construction drawings based on comments provided by the District at the sole cost and expense of the Developer prior to the start of construction.

11. Amendment. This Agreement may be amended, from time-to-time, by mutual agreement, in writing signed by both Parties. The District and the Developer further agree that to the extent this Agreement does not address all aspects of the Developer's Property and/or Project, the Parties will meet and confer and negotiate in good faith and execute a written amendment or supplement to this Agreement.

12. Assignment. This Agreement will not be assigned, whether in whole or in part by either Party.

13. Term and Termination of Agreement. Unless extended by mutual agreement of the parties in writing, this Agreement shall terminate at 5:00 p.m., on the day before the sixth (6^{th}) anniversary date of this Agreement; provided, however, that this Agreement shall automatically terminate, without further liability to either party, as follows:

    a. Immediately, upon abandonment by the Developer of the Developer's Property and/or the work hereunder. "Abandonment" is defined as the act

of bankruptcy or Developer's failure to improve the Property in a manner consistent with the proposed development plan within twelve months of the effective date of this Agreement; and/or

b. Within 45 days of the date of the issuance of a Notice of Default by the District to the Developer in the event the Developer fails or refuses to perform, keep or observe any of the terms, conditions or covenants set forth in this Agreement.

IN WITNESS WHEREOF, the parties have executed is Agreement to be effective on the day and year first above written.

YUCAIPA VALLEY WATER DISTRICT

Dated: _____ By: _____
Jay Bogh, Board President

DEVELOPER

Dated: _____ By: _____

Print Name: _____

Print Title: _____

Exhibit A - Project Location and District Boundary

Exhibit B - Proposed Development Concept

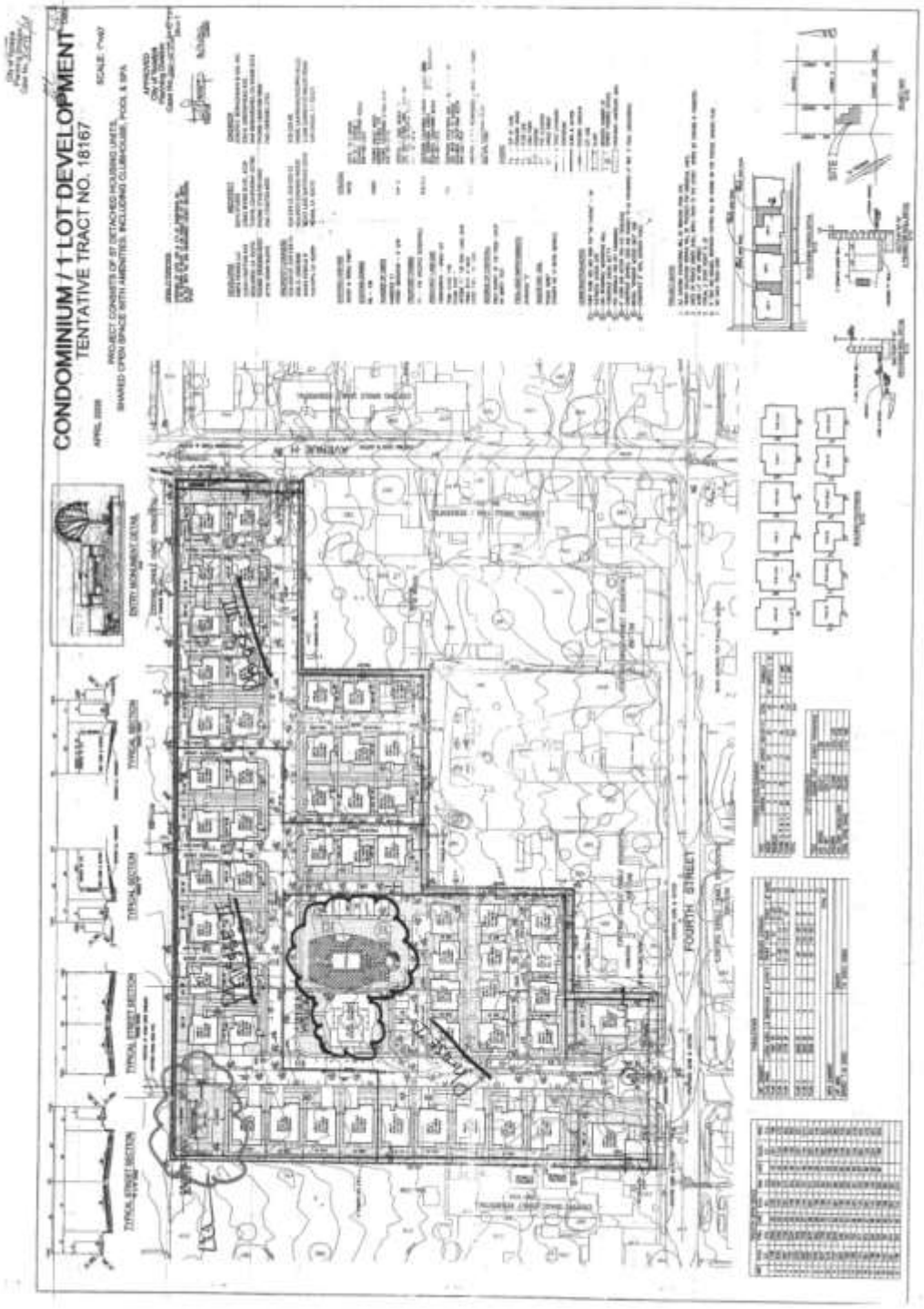


Exhibit C - General Construction Conditions

DESIGN AND CONSTRUCTION

A. Licensed Professionals. All work, labor and services performed and provided in connection with, for example, the preparation of surveys and descriptions of real property and rights-of-way, the preparation of construction specifications, plans and drawings, and the construction of all Facilities shall be performed by or under the direction of professionals appropriately licensed by the State of California and in good standing.

B. Plan Acceptance; Facility Acceptance. Upon its final review and approval of the plans and specifications ("Plans"), the District shall sign the construction drawings ("Approved Plans") indicating such approval ("Plan Acceptance"). Plans are subject to an annual review by the District and modifications will be required by the District to conform to revised construction standards and policies as part of the Plan Acceptance. The Developer shall update and resubmit the Plans for final approval by the District.

1. The Developer shall not permit, or suffer to permit, the construction of any Facility without having first obtained Plan Acceptance or completed modifications required by annual updates. In the event the Developer fails or refuses to obtain the District's Plan Acceptance, the District may refuse, in its sole discretion and without liability to the Developer, to issue its Facility Acceptance (as that term is defined below) as to such Facility when completed.

2. The Developer shall not deviate from any Approved Plans and/or specifications without the District's prior written approval.

C. Facility Inspection. All construction work shall be inspected on a timely basis by District personnel and/or by District's consultants at the sole cost of the Developer. The Developer acknowledges that the inspector(s) shall have the authority to require that any and all unacceptable materials, workmanship, construction and/or installation not in conformance with either (i) the Approved Plans, or (ii) standard practices, qualities and standards in the industry, as reasonably determined by the District, shall be replaced, repaired or corrected at Developer's sole cost and expense.

1. In the event the Developer's contractor proposes to work overtime and beyond normal business hours, the Developer shall obtain the District's approval at least 24 hours in advance so that inspection services may be appropriately scheduled. The Developer shall be solely responsible for paying all costs and expenses associated with such inspection services.

2. The District shall promptly upon request of Developer cause the final inspection of a Facility which Developer indicates is completed. If the District finds such Facilities to have been completed in conformance with the Approved Plans for which a Plan Acceptance has been issued, then District shall issue to Developer its letter ("Facility Acceptance") indicating satisfactory completion of the Facility and District's acceptance thereof. Neither inspection nor issuance of the Facility Acceptance shall constitute a waiver by District of any claims it might have against

Developer for any defects in the work performed, the materials provided, or the Facility constructed arising during the one-year warranty period.

D. Project Coordination and Designation of Developer's Representative. The Developer shall be solely responsible for coordinating the provision of all work, labor, material and services associated with the planning, design and construction of the Facilities required for the Project.

1. The Developer shall be solely responsible for compliance with all applicable federal, state and local safety rules and regulations, and shall conduct periodic safety conferences as required by law and common sense.

2. Prior to proceeding with any Facility construction, the Developer shall schedule and conduct a preconstruction conference with the District. In the event the Developer fails or refuses to conduct any such conference, the District may refuse, in its sole discretion, to accept the Facilities constructed by the Developer.

3. The District and the Developer hereby designate the individual identified on page 1 of this Agreement as the person who shall have the authority to represent the District and Developer in matters concerning this Agreement. In order to ensure maximum continuity and coordination, the District and Developer agree not to arbitrarily remove or replace the authorized representative, but in the event of a substitution, the substituting Party shall promptly advise the other Party of such substitution, in writing.

E. District's Right to Complete Facilities. The District is hereby granted the unqualified right to complete, construct or repair all or any portion of the water and/or sewer Facilities, at Developer's sole cost and expense in the event there is a threat to the public's health, safety or welfare.

F. Construction of Connections to District Facilities. Unless otherwise agreed to in writing by the District, the District shall furnish all labor, materials and equipment necessary to construct and install connections between the Developer's Facilities and the District's water, recycled water, and sewer systems. All costs and expenses associated therewith shall be paid by the Developer.

G. Compliance with Law and District Regulations. The Developer hereby agrees that all Facilities shall be planned, designed and constructed in accordance with all applicable laws, and the District's Rules, Regulations and Policies in effect at the time of construction. The Developer shall keep fully informed of and obey all laws, rules and regulations, and shall indemnify the District against any liability arising from Developer's violation of any such law, rule or regulation.

H. Developer's Warranties. The Developer shall unconditionally guaranty, for a period of one year following the District's Facility Acceptance thereof, any and all materials and workmanship, at the Developer's sole cost and expense. The provision of temporary water service through any of the Developer's Facilities, prior to District's acceptance of same, shall not nullify nor diminish the Developer's warranty obligation, nor shall the Developer's warranty obligation be voided if the District determines, in its sole discretion, to make any emergency repairs necessary to protect the public's health, safety or welfare or to ensure

continuity of water or sewer service. The District shall notify Developer of such emergency repairs.

I. Testing and Disinfection. Upon approval by the District, the Developer, at its sole cost and expense, shall undertake and satisfactorily complete a testing program, including without limitation, compaction, cleaning, video and air testing, and pressurized and disinfection testing (drinking water Facilities), for all Facilities prior to acceptance by the District.

J. Bond Requirements. The Developer shall provide to the District, in a form satisfactory to the District, the following bonds:

1. Performance and Warranty Bond. A performance bond issued by a corporate surety or sureties licensed and permitted to do business by and within the State of California in an amount representing not less than one hundred percent (100%) of any and all construction work to be conducted or performed under this Agreement. A warranty bond issued by a corporate surety or sureties licensed and permitted to do business by and within the State of California in an amount representing not less than fifty percent (50%) of the total cost of any and all construction performed hereunder, insuring against any and all defects in the Facilities constructed hereunder, for a period of not less than one full year after the date of acceptance thereof by the District.

2. Labor and Materials Payment Bond. A labor and materials payment bond issued by a corporate surety or sureties licensed and permitted to do business by and within the State of California in an amount representing not less than one hundred percent (100%) of the total cost of any and all construction performed hereunder per California Civil Code Sections 9550 and following.

3. Miscellaneous Bond Requirements. All bonds required by this section are subject to the approval as to form and content by the General Manager and District's Legal Counsel. All bonds required by this section shall be provided by a surety that is an "admitted" surety insurer authorized to transact surety insurance in California, with assets exceeding its liabilities in the amount equal to or in excess of the amount of the bonds, and each bond shall not be in excess of ten percent (10%) of the surety insurer's assets. The bond shall be duly executed and shall meet all of the requirements of Section 995.660 of the Code of Civil Procedure.

K. Title to Facilities and Right-of-Way. Provided that the Developer's Facilities are designed and constructed as required hereunder and the District proposes to issue its Facility Acceptance, the Developer shall, concurrently with the District's Facility Acceptance, convey ownership title to all Facilities (and right-of-way, if applicable) to the District, free and clear of any and all liens and encumbrances except those that are expressly agreed to by the District. The District may require fee title or an easement, depending upon the location of the Facility through action by the Board of Directors. Upon conveyance of title, the District shall assume the responsibility of operating and maintaining the Facilities, subject to the Developer's warranty as provided herein. The Developer acknowledges and agrees that the District shall not be obligated to operate and maintain the Facilities and to provide service to and through them until all applicable conditions imposed by this

Agreement hereunder are satisfied and title to the Facilities has been conveyed and delivered to the District in recordable form.

L. Risk of Loss. Until such time as acceptance thereof by the District, and until good and marketable title to the easements, rights-of-way and Facilities are conveyed and delivered to the District in recordable form, the Developer shall be solely and completely responsible for any and all losses and/or damage of every kind or nature to the easements, rights-of-way and Facilities. In the event Developer believes the loss and/or damages arose from or are related to acts performed by the District, this provision does not preclude Developer's insurance carrier from seeking indemnity and/or reimbursement from the District.

M. Conditions Precedent to the Provision of Water and Sewer Service. Unless the District otherwise agrees in writing, the District shall not be obligated to provide any water and/or sewer service to the Developer's Property or any part thereof, including model homes, until Facility Acceptance by the District and Developer conveys to the District the right-of-way and Facilities associated with the requested service. Upon acceptance of the right-of-way and appurtenant Facilities, the District shall provide the service requested and assume the responsibility for operating and maintaining the affected Facilities. Service provided by the District shall be in accordance with its Rules, Regulations and Policies and shall be comparable in quality of service to that provided all similarly situated customers.

FEES AND CREDITS

N. Developer Fees, Charges, Costs and Expenses. The Developer shall be solely responsible for the payment to the District of all fees, charges, costs and expenses related to this Project.

O. Developer Cash Account Deposit. The Developer acknowledges and hereby agrees that the District is authorized, from time-to-time, to reimburse itself from the funds on deposit for Project costs incurred.

1. The Developer shall provide the initial deposit to the District, and maintain the minimum balance in the Cash Account for the Project as provided below:

   a. An initial deposit of $2,500 and a minimum balance of $1,000 for a Project that involves the construction of 1 to 2 proposed structures;

   b. An initial deposit of $5,000 and a minimum balance of $2,000 for a Project that involves the construction of 3 to 5 proposed structures;

   c. An initial deposit of $10,000 and a minimum balance of $3,000 for a Project that involves the construction of 6 to 20 proposed structures;

   d. An initial deposit of $25,000 and a minimum balance of $5,000 for all other Projects.

2. The initial deposit shall be received by the District within 10 business days following the District's approval of this Agreement.

3. The District shall provide a monthly accounting of how funds were disbursed.

4. The Developer agrees to deposit funds with the District within 30 calendar days upon the date an invoice is issued by the District or a Notice of Default will be issued by the District.

5. The District will not release any structure for occupancy unless the minimum balance is available to the District in the Project Cash Account.

6. Should any unexpended funds remain in the Cash Account upon completion of the Project or termination of this Agreement, then such funds shall be reimbursed to the Developer within 60 days.

P. Current Fees and Charges. In the event of a change in the District's schedule of fees and charges, such change shall automatically be incorporated into this Agreement as though set forth in full. Unless otherwise agreed to in writing by the District, the Developer shall pay, when due, the then-current amount of the applicable fee or charge.

Q. Sustainability Water. The Developer shall pay for the purchase of a quantity of imported water pursuant to the Sustainability Policy adopted by the Board of Directors as a Resolution No. 11-2008 on August 20, 2008, or the latest version with a revised quantity or fee structure. The imported water rate shall be the rate in effect at the time water is secured from the San Bernardino Valley Municipal Water District. Imported water for compliance with the Yucaipa Valley Water District's Sustainability Policy may be pre-paid to lock in the Development Sustainability fee or purchased prior to the issuance of building permits and pay the fee in effect at that time.

R. San Gorgonio Pass Water Agency Facility Capacity Charges. If the Project is within the service area of the San Gorgonio Pass Water Agency, the Developer will be required to pay the latest San Gorgonio Pass Water Agency Facility Capacity Charge as set forth by District resolution.

S. District Financial Participation; Credits. The District may agree to participate in certain Facilities for this Project. Any participation or financial contribution to construct the water and/or sewer infrastructure associated with this Project is identified in the Special Conditions at the beginning of the Agreement.

PERMITS AND DOCUMENTATION

T. Permits, Licenses and CEQA Documentation. The Developer shall be solely responsible for securing and paying for all permits and licenses necessary to develop its project. The Developer shall be solely responsible for complying with the California Environmental Quality Act under the auspices of the City and/or County within which the Property is situated. However, upon request, the Developer shall furnish to the District all relevant environmental documentation and information.

1. The Developer, at its sole cost and expense, shall be solely responsible for defending against any and all legal challenges, including but not limited to permits, licenses and CEQA documentation.

U. Documents Furnished by the Developer. The Developer shall furnish to the District documentation as required by the District specified below, within the time periods specified. Each and every document submittal shall consist of a fully executed original or certified copy (in recordable form, if applicable) and two copies.

Document(s)	Due Date
Certification of Streets to Rough Grade	Prior to Construction
City/County Encroachment Permits and Conditions	Prior to Construction
Field Engineering Surveys ("Cut Sheets")	Prior to Construction
Grant of Easements and Rights-of-Way	Prior to Construction
Labor and Materials Bond	Prior to Construction
Liability Insurance Certificate(s)	Prior to Construction
Performance Bond	Prior to Construction
Soil Compaction Tests	Prior to Acceptance
Warranty Bond	Prior to Acceptance
List of Approved Street Addresses and Assessor Parcel Numbers	Prior to Setting Meter
Notice of High/Low Water Pressure	Prior to Setting Meter
Notice of Water Pumping Facility	Prior to Construction
Mechanic's Lien Releases	Upon Request of District

NOTE: The DEVELOPER hereby acknowledges and agrees that the foregoing list is not intended to be exclusive; therefore, the DISTRICT reserves the right to request, from time-to-time, additional documents or documentation.

INSURANCE AND INDEMNIFICATION

V. Indemnification and Hold Harmless. The Developer and the District agree that the District should, to the extent permitted by law, be fully protected from any loss, injury, damage, claim, lawsuit, cost, expense, attorneys' fees, litigation costs, defense costs, court costs or any other costs arising out of or in any way related to the performance by Developer of this Agreement. Accordingly, the provisions of this indemnity provision are intended by the Parties to be interpreted and construed to provide the fullest protection possible under the law to the District, except for liability attributable to the District's intentional and/or negligent acts. Developer acknowledges that the District would not enter into this Agreement in the absence of this commitment from the Developer to indemnify and protect the District as set forth here.

Therefore, the Developer shall defend, indemnify and hold harmless the District, its employees, agents and officials, from any liability, claims, suits, actions, arbitration proceedings, administrative proceedings, regulatory proceedings, losses, expenses or costs of any kind, whether actual, alleged or threatened, actual attorneys' fees incurred by the District, court costs, interest, defense costs including expert witness fees and any other costs or expenses of any kind whatsoever without restriction or limitation incurred in relation to, as a consequence of or arising out of or in any way attributable actually, allegedly or impliedly, in whole or in part in the performance by Developer of this

Agreement. All obligations under this provision are to be paid by the Developer as incurred by the District. Notwithstanding the foregoing, the Developer shall have no obligation to defend, indemnify or hold harmless the District, its employees, agents or officials from any liability arising, in whole or in part, from the District's intentional and/or negligent acts.

W. Insurance. The Developer agrees to provide insurance in accordance with the requirements set forth here throughout the term of this Agreement. If the Developer uses existing coverage to comply with these requirements and that coverage does not meet the requirements set forth herein, the Developer agrees to amend, supplement or endorse the existing coverage to do so. The following coverages will be provided by the Developer and maintained on behalf of the District and in accordance with the requirements set forth herein.

1. Commercial General Liability Insurance (Primary) shall be provided on ISO-CGL Form No. CG 00 01 10 93. Policy limits shall be no less than $1,000,000 per occurrence for all coverages and $2,000,000 general aggregate. The District and its officials, employees and agents shall be added as additional insureds using ISO Form CG 20 10 10 93. Coverage shall apply on a primary non-contributing basis in relation to any other insurance or self-insurance, primary or excess, available to the District or any employee or agent of the District. Coverage shall not be limited to the vicarious liability or supervisory role of any additional insured. Coverage shall contain no contractors' limitation endorsement. There shall be no endorsement or modification limiting the scope of coverage for liability arising from explosion, collapse, or underground property damage.

2. Umbrella Liability Insurance (over Primary) shall apply to bodily injury/property damage, personal injury/advertising injury, at a minimum, and shall include a "drop down" provision providing primary coverage above a maximum $25,000 self-insured retention for liability not covered by primary policies but covered by the umbrella policy. Coverage shall be following form to any underlying coverage. Coverage shall be provided on a "pay on behalf" basis, with defense costs payable in addition to policy limits. There shall be no cross-liability exclusion and no contractor's limitation endorsement. Policy limits shall be not less than $1,000,000 per occurrence and $1,000,000 in the aggregate, above any limits required in the underlying policies. The policy shall have starting and ending dates concurrent with the underlying coverages.

3. Workers' Compensation/Employer's Liability shall provide workers' compensation statutory benefits as required by law. Employer's liability limits shall be no less than $1,000,000 per accident or disease. Employer's liability coverage shall be scheduled under any umbrella policy described above. Unless otherwise agreed, this policy shall be endorsed to waive any right of subrogation as respects the District, its employees or agents.

4. The Developer and the District further agree as follows:

   a. All insurance coverage provided pursuant to this Agreement shall not prohibit the Developer, and the Developer's employees or agents, from waiving the right of subrogation prior to a loss. The Developer waives its right of subrogation against the District.

b. Unless otherwise approved by the District in writing, the Developer's insurance shall be written by insurers authorized to do business in the State of California and with a minimum "Best's" Insurance Guide rating of "A:VII". Self-insurance will not be considered to comply with these insurance specifications.

c. The Developer agrees to provide evidence of the insurance required herein, satisfactory to the District, consisting of certificate(s) of insurance evidencing all of the coverages required and an additional insured endorsement to the Developer's general liability and umbrella liability policies. Certificate(s) are to reflect that the insurer will provide 30 days' notice of any cancellation of coverage. The Developer agrees to require its insurer to modify such certificate(s) to delete any exculpatory wording stating that failure of the insurer to mail written notice of cancellation imposes no obligation, and to delete the word "endeavor" with regard to any notice provisions. The Developer agrees to provide complete certified copies of policies to the District within 10 days of the District's request for such copies.

d. In the event of any loss that is not insured due to the failure of the Developer to comply with these requirements, the Developer agrees to be responsible for any all losses, claims, suits, damages, defense obligations and liability of any kind attributed to the District, or the District's officials, employees and agents as a result of such failure.

e. The Developer agrees not to attempt to avoid its defense and indemnity obligations to the District and its employees, agents and officials by using as defense the Developer's statutory immunity under workers' compensation and similar statutes.

MISCELLANEOUS PROVISIONS

X. Status of the Parties. This Agreement is not intended to create, and nothing herein contained shall be construed to create, an association, a trust, a joint venture, a partnership or other entity of any kind, or to constitute either party as the agent, employee or partner of the other.

Y. Force Majeure. If either the District or the Developer is delayed, hindered or prevented from performing any term of this Agreement by any cause beyond either party's control including, without limitation, any strike, walkout, prohibitions imposed by law, rules or regulations, riot, war, act of God or the default of the other party, then such performance may be excused or the time of performance tolled during the period of delay.

Z. Incorporation of Prior Agreements. This Agreement contains all of the agreements of the parties with respect to any matter covered or mentioned in this Agreement, and no prior agreement or understanding pertaining to any such matter shall be effective for any purpose.

AA. Waiver. No waiver by either Party of any provisions of this Agreement shall be deemed to be a waiver of any other provision hereof or of any subsequent breach by either Party of the same or any other provisions.

BB. Severance. If any provision of this Agreement is determined to be void by any court of competent jurisdiction then such determination shall not affect any other provision of this Agreement provided that the purpose of this Agreement is not frustrated.

CC. Disclaimer. Utilizing fees and Facilities provided to the District by the Developer, the District will supply sewer collection and treatment services to the Developer's Property and Project, however, the District shall not be obligated to utilize public funds to subsidize the Project.

DD. Water Supply Availability. The District does not guarantee water supply availability and shall not be required to authorize the issuance of grading, building, or occupancy permits during the period of time that the State of California and/or the Board of Directors have declared a water supply reduction of 20% or greater for a specific portion or all of the District's service area.

EE. Preparation of This Agreement. This Agreement shall not be construed against the Party preparing it, but shall be construed as if both Parties prepared it.

FF. Alternative Dispute Resolution. Any dispute as to the construction, interpretation or implementation of this Agreement, or any rights or obligations hereunder, shall be submitted to mediation. Unless the Parties enter into a written stipulation to the contrary, prior to the filing of any complaint to initiate legal action, all disputes shall first be submitted to non-binding mediation, conducted by the Judicial Arbitration and Mediation Services, Inc./Endispute, or its successor, or any other neutral, impartial mediation service that the Parties mutually agree upon in accordance with its rules for such mediation. Mediation fees shall be shared equally by the DEVELOPER and the DISTRICT.

END OF SECTION

Administrative Issues

Yucaipa Valley Water District

Yucaipa Valley Water District

Workshop Memorandum 18-077

Date: February 27, 2018

From: Joseph Zoba, General Manager

Subject: Overview of the Draft 2017 Consolidated Annual Report and Engineering Report of the Beaumont Basin Watermaster

---

The attached document provides a summary of the activities of the Beaumont Basin Watermaster during 2017. The attached report might be modified before it is formally adopted by the Watermaster Committee.

The final document will be posted online at http://www.beaumontbasinwatermaster.org/

Beaumont Basin Watermaster

2017 Consolidated Annual Report and Engineering Report

DRAFT

2017 Watermaster Board

Art Vela, City of Banning
George Jorritsma, South Mesa Water Company, **Vice Chairman**
Eric Fraser, Beaumont Cherry Valley Water District, **Secretary**
Joseph Zoba, Yucaipa Valley Water District, **Treasurer**
Kyle Warsinski, City of Beaumont

Alvarado Smith, **Legal Counsel**
ALDA Inc. in Association with Thomas Harder & Company, **Engineering**
Rogers, Anderson, Malody, and Scott. LLP, **Financial Auditors**

February 2018

ALDA Inc.
5928 Vineyard Avenue
Alta Loma, CA 91701
Tel: (909) 587-9916
Fax: (909) 498-0423

February 7, 2018

Art Vela, Chairman
Beaumont Basin Watermaster
560 Magnolia Avenue
Beaumont, CA 92223

Subject: **Beaumont Basin Watermaster**
Draft Consolidated Annual Report and Engineering Report for Calendar Year 2017

Dear Mr. Vela:

ALDA Inc., in association with Thomas Harder & Co. is pleased to submit to you, as Chairman of the Beaumont Basin Watermaster, the Beaumont Basin Watermaster Consolidated Annual Report and Engineering Report for Calendar Year 2017. This draft report expands on the earlier format of the annual report by incorporating information previously presented in the biannual Engineering Report. As such, this report summarizes all production, spreading, storage activities, and water transfers between parties to the Judgment that took place during calendar year 2017. Further, it documents changes in water levels and storage conditions, as well as, an estimate of the Basin Operating Safe Yield for 2017.

The report also documents an evaluation of water quality conditions for the 2013-2017 five-year period for drinking water wells based on information obtained from the California Department of Public Health database. Water quality information for other non-potable and/or monitoring wells, collected as part of the Beaumont Management Zone Maximum Benefit Monitoring Program was not available for CY 2017 at the time of this writing. We have included water quality for these wells for the 2012-16 monitoring period. The final report, to be presented at the March 28th, 2018 meeting, will incorporate the 2017 water quality information for these wells.

We will make a formal presentation to the Watermaster Committee during the upcoming Board meeting on February 7th, 2018. We welcome your review and comments on this report and look forward to answering any questions you may have.

Should you have any questions on this matter, please contact us at 909-587-9916 during normal business hours.

Table of Contents

List of Figures

List of Tables

Appendices

Abbreviations

ac-ft	acre-feet
ac-ft/yr	acre-feet per year
Banning	City of Banning
Basin	Beaumont Basin
BCVWD	Beaumont-Cherry Valley Water District
BMZ	Beaumont Management Zone
Beaumont	City of Beaumont
CDPH	California Department of Public Health
CVCOI	Cherry Valley Community of Interest
CY	calendar year
du	dwelling unit
FY	fiscal year
IRWMP	Integrated Regional Water Management Program
MCL	Maximum Contaminant Level
NL	Notification Level
NTU	Nephelometric Turbidity Units
OSWDS	On-Site Waste Disposal Systems
Pass Agency	San Gorgonio Pass Water Agency
PPCPs	Pharmaceutical and Personal Care Products
SGPWA	San Gorgonio Pass Water Agency
SMWC	South Mesa Water Company
STWMA	San Timoteo Watershed Management Authority
STWMP	San Timoteo Watershed Management Program
SWP	State Water Project
TDS	Total Dissolved Solids
UCR	University of California, Riverside
USEPA	United States Environmental Protection Agency
Watermaster	Beaumont Basin Watermaster Committee
YVWD	Yucaipa Valley Water District

Section 1
Background

The Fourteenth Annual Report of the Beaumont Basin Watermaster Committee (Watermaster) consolidates the information about the basin previously presented in Annual Reports with the information presented in the bi-annual Engineer's Report. This report documents activities in the Beaumont Basin for Calendar Year 2017. Section 3 of the original annual report has been expanded and retitled as "Status of the Basin" to document the Administration of the Judgment as well as to provide a status of conditions in the basin addressing water production, water levels, and storage activities. In addition, a Water Quality section, Section 4, has been added to document water quality of selected compounds at selected wells, as well as, basin wide concentrations for the 2013-17 period.

1.1 History of the Beaumont Basin Stipulated Judgment

In January 2001, the City of Beaumont (Beaumont), the Beaumont-Cherry Valley Water District (BCVWD), the South Mesa Water Company (SMWC), and the Yucaipa Valley Water District (YVWD) formed the San Timoteo Watershed Management Authority (STWMA). One of the initial tasks of STWMA was to develop a watershed-wide program to develop and implement a comprehensive management program for the San Timoteo watershed.

Phase I of the management program, documented in the San Timoteo Watershed Management Program, Phase I Report (WEI, 2002), included the following goals:

- Enhancing water supplies
- Protecting and enhancing water quality
- Optimizing the management of STWMA area groundwater basins
- Protecting riparian habitat in San Timoteo Creek and protecting/enhancing habitat in the STWMA area
- Equitably distributing the benefits and costs of developing the Integrated Regional Watershed Management Program for the San Timoteo watershed

One of the elements identified in the management plan to achieve the listed goals consisted in the establishment of a groundwater management entity for the Beaumont Basin. As a result of this initiative, two groups representing overlying users and water agencies with interest in this basin began negotiations in May 2002.

Over the next 18 months of negotiations, a Stipulated Agreement was developed and submitted to the Court. Honorable Judge Gary Tranbarger of the Superior Court of the State of California for the County of Riverside signed the Agreement, titled "San Timoteo Watershed Management Authority, vs. City of Banning, et al." (Case No. RIC 389197), on February 4, 2004, (the Judgment).

Pursuant to the Judgment, the Court appointed a five-member Watermaster Committee, consisting of representatives from each of the Appropriator parties: City of Banning, City of

Beaumont, Beaumont Cherry Valley Water District (BCVWD), South Mesa Water Company (SMWC), and Yucaipa Valley Water District (YVWD). The effective date of the Judgment for accounting purposes was retroactively established to July 1, 2003.

The Court gave the responsibility of managing the Basin to the Watermaster by approving the Stipulated Agreement but retained continuing jurisdiction should there be any future need to resolve difficult questions among the Parties.

1.2 Essential Elements of the Judgment

Elements of the 2004 Judgment are as follows:

- All producers shall be allowed to pump sufficient water from the Basin to meet their respective requirements.
- The Safe Yield of the Basin was established at 8,650 ac-ft/yr to be distributed among the Overlying Producers. The Safe Yield of the Basin is to be re-evaluated every 10 years, at a minimum.
- The Overlying Parties can extract a combined total of 8,650 ac-ft/yr. with individual rights set for each Overlying Producer. If an Overlying Party pumps more than five times its share of the operating Safe Yield in any five consecutive years, the overlying producer shall provide Watermaster with sufficient funds to replace the overproduction.
- A controlled overdraft of the basin is allowed to create enough additional storage capacity to prevent the waste of water. This controlled overdraft, also known as Temporary Surplus, allows Appropriators to extract up to 160,000 ac-ft of water from the basin over the 10-year period immediately following the Judgment inception. The Temporary Surplus will cease after the initial 10 years of operations.
- During the first ten years after adoption of the Judgment, the Appropriators have the right to extract, as a whole, a maximum of 16,000 ac-ft/yr not including storage credits from spreading supplemental water or transfers from Overlying Parties. The Temporary Surplus has been divided among the Appropriators as follows:

  - ✓ Beaumont Cherry Valley WD — 42.51 percent or 6,802 ac-ft/yr
  - ✓ City of Banning — 31.43 percent or 5,029 ac-ft/yr
  - ✓ South Mesa Water Company — 12.48 percent or 1.997 ac-ft/yr
  - ✓ Yucaipa Valley Water District — 13.58 percent or 2,173 ac-ft/yr

- After the first 10 years of operation, Appropriators can extract only the amount each has in storage or credited to them. An Appropriator shall provide Watermaster with sufficient funds to replace any amount of overproduction that may have occurred over a five-year consecutive period.
- The Watermaster has the authority to enter into Groundwater Storage Agreements with producers for the storage of supplemental water, wellhead protection and recharge, well

abandonment, well construction, monitoring, replenishment, mitigation of overdraft, and collection of assessments.

- Supplemental replenishment water can be in the form of recycled water, imported State Project Water, or other imported water. Replenishment can be accomplished by spreading and percolation, injection, or in-lieu use of surface water or imported water.
- A minimum of 200,000 ac-ft of groundwater storage capacity shall be reserved for conjunctive use. Any person, party to the Judgment can make reasonable beneficial use of the groundwater storage capacity for storage of supplemental water provided that it is in accordance with a storage agreement with Watermaster.
- Minimal producers, those producing less than 10 ac-ft/yr from the basin, and not listed in the Judgment, are exempt from the provisions of the Judgment.

1.3 Watermaster Responsibilities

Under the Judgment, the Watermaster is granted discretionary powers to develop and implement a groundwater management plan for the Beaumont Basin, including water quality and quantity considerations and being reflective of the provisions of the Judgment.

In carrying out its duties, Watermaster is responsible for providing the legal and practical means of ensuring that the waters of the Basin are put to maximum beneficial use. Specific responsibilities are summarized below.

1.- Administer the Beaumont Basin Judgment. Watermaster operates under the Judgment and the Rules and Regulations, which were originally adopted June 8, 2004, and subsequently amended in 2006 and 2008. The Judgment and the Rules and Regulations establish the procedures by which Watermaster accounts for the water resources of the Basin. Watermaster has the power to collect administrative assessments from all Appropriators and replenishment assessments from those parties (Appropriative and Overlying) pumping in excess of their pumping right to fund its operations. Each year, Watermaster publishes an Annual Report, which documents production and recharge activities in the Beaumont Basin.

2.- Approve Producer Activities. All producers must notify and obtain approval, as necessary, from Watermaster for activities, such as recharging water, transferring or exchanging water, storing local water, and storing or recovering supplemental water.

3.- Maintain and Improve Water Supply. On an annual basis, Watermaster determines the amount of groundwater that each producer is entitled to pump from the Basin without incurring a replenishment obligation. Further, Watermaster is responsible for facilitating and coordinating the acquisition, recharge, and storage of imported water or other local supplemental water to replenish and/or conjunctively manage the Basin to increase local supplies.

4.- Monitor and Understand the Basin. Watermaster is responsible for collecting information from producers, and other cooperating agencies, in order to enhance its knowledge of how the Basin works and manage it more effectively. Information collected by the Watermaster includes:

- Water production, water level, and water quality information from the Appropriator Parties.
- Water production and water level information from the Overlying Parties.
- Water level and water quality data collected by local agencies as part of their Maximum Benefit and Monitoring Program for the Beaumont Management Zone.
- Ground surface elevations from periodic surveys conducted to determine whether ground subsidence may be occurring as a result of over pumping from the basin.

5.- Maintain and Improve Water Quality. Watermaster coordinates and participates in local efforts to preserve and/or enhance the quality of groundwater in the Basin. It assists and encourages regulatory agencies to enforce water quality regulations that may have an effect on the Basin groundwater sources and its surrounding resources. One of these programs is the Maximum Benefit Monitoring Program of the Beaumont Management Zone.

6.- Develop and Administer a Well Policy. Watermaster is responsible for developing a policy on the proper construction and abandonment of wells in the Basin. Through the adoption of Resolution 2004-04, the Watermaster adopted minimum standards for the construction, repair, abandonment and destruction of groundwater extraction wells in the Beaumont Basin. As part of this resolution, Watermaster adopted Riverside County Ordinance No. 682.3 and expanded it to require the installation of a sounding tube in order to facilitate the measurement of water levels on all future wells.

7.- Develop Contracts for Beneficial Programs and Services. Watermaster is responsible for developing and entering into contracts for programs and services that are beneficial to the Basin on behalf of the Parties to the Judgment. This includes programs for conjunctively utilizing the Basin for the storage of supplemental water with other agencies and programs to implement and expand the direct or indirect use of recycled water.

8.- Provide Cooperative Leadership. Watermaster may act jointly or cooperate with other local, state, and/or federal agencies to develop and implement regional scale programs for the management of the Basin and its surrounding resources.

1.4 Watermaster Address

For the purposes of conducting Watermaster business and maintaining records, Watermaster's official address remains as follows:

Office of the Watermaster Secretary
C/O Beaumont-Cherry Valley Water District
560 Magnolia Avenue
Beaumont, CA 92223

1.5 Watermaster Website

Watermaster website address is www.beaumontbasinwatermaster.org. This website is maintained by the YVWD and it is used by the Watermaster to communicate its activities to the Parties and the public. The website contains copies of the Judgment, the Rules and

Regulations, Annual Reports, and Engineer's Reports. In addition, it contains meeting minutes, meeting agendas, and other documents of interest.

1.6 Mission Statement

Watermaster adopted the following mission statement in October 2004:

> *"Watermaster's mission is to manage the yield of and storage within the Beaumont Basin to provide maximum benefit to the people dependent on it."*

Section 2
Watermaster Activities

2.1 Makeup of the Board

During the February 1, 2017 regular meeting of the Beaumont Basin Watermaster, elections were held; the officers to the Watermaster Committee during 2016 were reaffirmed for calendar year 2017 as follows.

- Mr. Art Vela – Chairman
- Mr. George Jorritsma – Vice Chairman
- Mr. Eric Fraser – Secretary
- Mr. Joseph Zoba – Treasurer

The Committee Representatives serving each Appropriative Party during CY 2017 were as follows:

Agency	Representative	Alternate
City of Banning	Art Vela	Vacant
City of Beaumont	Vacant	Kyle Warsinski
Beaumont Cherry Valley Water District	Eric Fraser	Tony Lara
South Mesa Water Company	George Jorritsma	Dave Armstrong
Yucaipa Valley Water District	Joseph Zoba	Jennifer Ares

Legal counsel during CY 2017 was provided by Alvarado Smith APC, represented by Keith McCullough and Thierry Montoya, while Engineering Services were provided by ALDA Inc., represented by Hannibal Blandon, in association with Thomas Harder & Company, represented by Thomas Harder.

2.2 Watermaster Accomplishments and Activities During 2017

2.2.1 Watermaster Meetings

A total of six regular meetings were held during CY 2016 on the following dates:

- February 1, 2017
- April 5, 2017
- June 7, 2017
- August 2, 2017
- October 4, 2017
- December 6, 2017

In addition, there was a Special Meeting conducted on August 30, 2017.

Agendas and approved minutes from each of the above regular and special meetings can be viewed at and/or downloaded from Watermaster's website or by making a request to the Watermaster Secretary. Pursuant to Resolution 2009-001, all of Watermaster's public records are open for inspection during office hours, provided that a written request to inspect said records has been submitted.

2.2.2 Watermaster Committee Resolutions

During CY 2017, two resolutions were adopted.

Resolution 17-01, a Resolution of the Beaumont Basin Watermaster to Confirm and Adopt San Gorgonio Pass Water Agency's Application for Groundwater Storage, Subject to Stated Conditions, was approved at the June 7, 2017 regular meeting. Under this resolution, SGPWA has the right to store up to 10,000 ac-ft of water in the Basin under certain conditions. A copy of the resolution is included under Appendix A.

Resolution 17-02, a Resolution of the Beaumont Basin Watermaster to transfer Oak Valley Partners overlying production rights associated with specific parcels to the Yucaipa Valley Water District was adopted at a special meeting on August 30, 2017. Under this resolution Oak Valley Partners transfers all of their overlying rights, initially set in the 2003 Judgment at 1,806 ac-ft/yr to the YVWD. OVP's rights have since been adjusted down to 1,398.86 ac-ft based on the recalculation of the Basin Safe Yield of 6,700 ac-ft/yr. A copy of Resolution 17-02 is included under Appendix A.

2.2.3 Items Discussed in 2017

This section is simply an unofficial summary of topics addressed at Watermaster meetings. The Beaumont Basin Watermaster maintains official meeting minutes that report the items discussed and actions taken during normal and special meetings. Official meeting minutes may be accessed at: www.beaumontbasinwatermaster.org

The following items were discussed during the six regular meetings and one special meeting held in CY 2017 along with their resulting outcome.

Items Discussed During the February 1, 2016 Regular Watermaster Committee Meeting

- Reorganization of the Beaumont Basin Watermaster Committee [Memorandum 17-01]. All members of the Board serving in CY 2016 were reaffirmed for CY 2017.
- Independent Accountant's Financial Report for the Beaumont Basin Watermaster for CY 2016 [Memorandum 17-02]. Member Zoba provided a brief explanation of the report and answered several questions. Report was received and filed.
- Review and Discussion of Conditions Related to the Groundwater Storage Agreement in the Beaumont Basin for the San Gorgonio Pass Water Agency [Memorandum 17-03]. Member Zoba provided an update on the progress being made on this issue; after some

insight provided by Legal Counsel Montoya as well as SGPWA General Manager Jeff Davis, the item was continued to the next meeting for additional discussion.

- Review and Discussion of the Conceptual Framework for the Formation of a Groundwater Sustainability Agency (GSA) for the San Timoteo Basin [Memorandum 17-04]. Member Zoba provided an overview of the agenda item and of the discussions that have occurred with other stakeholder agencies regarding the formation of a GSA. No action was taken.

- Approval of a Contract Amendment for Engineering Services with ALDA Inc. [Memorandum 17-05]. Member Zoba indicated that the initial contract expired on June 30, 2016 and needed to be renewed based on the positive track record of ALDA Inc. After some discussion, Legal Counsel was instructed to prepare a contract amendment extending the contract with ALDA Inc. through December 31, 2021.

- Discussion Regarding Task Order No. 12 with ALDA Inc. for the Preparation of the 2016 Consolidated Annual Report, Estimate of the Safe Yield, Update of the Groundwater Model, and Associated Consulting Services [Memorandum 17-06]. After Engineer Blandon provided an overview of the consulting services provided by ALDA Inc. on a year to year basis, the Committee approved Task Order No. 12 for a sum not to exceed $95,970.00.

- Discussion Regarding Task Order No. 13 with ALDA Inc. for the Installation, Maintenance, and Data Collection of Water Level Monitoring Equipment in CY 2017 [Memorandum 17-07]. After Engineer Blandon provided an overview of the consulting services provided under this task, the Committee approved Task Order No. 13 for a sum not to exceed $21,520.00.

- Discussion Regarding Task Order No. 14 with ALDA Inc. for the Analysis of Return Flows by Appropriators to the Beaumont Groundwater Basin and Incorporation of Findings into the 2016 Beaumont Basin Watermaster Annual Report [Memorandum 17-08]. Hydrogeologist Harder explained the steps that will be involved in this assessment and indicated that the majority of the cost will result with issues associated with the City of Banning. A motion was approved to exclude the cost related to the City of Banning in order to reduce the cost shared by the Watermaster member agencies.

- Preparation of Methodology for Estimating Groundwater Storage Losses Associated with Supplemental Water Recharage [Memorandum 17-09]. Mr. Harder requested the Committee's input regarding this issue and indicated that he would summarize methodologies used to account for groundwater storage losses by other agencies and that he would have a proposal for the Committee at the April meeting.

- Discussion Regarding the Methodology for Calculating New Yield [Memoramndum 17-10]. Mr. Harder gave an overview of the issues that would be faced in calculating new yield. After much discussion, the Committee members supported the notion that additional discussion needed to take place at future meetings.

- Discussion Regarding the Water Level Monitoring Equipment [Memorandum 17-11]. After Engineer Blandon noted the concerns that have been raised in prior Watermaster discussions about poor customer service received from Solinst, the manufacturer of the equipment being used. Engineer Blandon presented a comparison matrix of four providers of water level monitoring equipment and discussed aspects related to features, cost, and reliability. He also recommended that the Watermaster continue with Solinst.

Items Discussed During the April 5, 2017 Regular Watermaster Committee Meeting

- Overview of the Issues Associated with the Estimation of Storage Losses due to Supplemental Water Recharge [Memorandum 17-12]. Mr. Harder presented a synopsis of the methodology, or lack thereof, of twelve groundwater management basins in California in estimating groundwater storage losses. He indicated that with the exception of a couple of basins, groundwater storage losses are not addressed as technically or in as much detail as he had expected. After much discussion, several Committee Members indicated their support of a technically defensible model to estimate groundwater storage losses from the basin and requested a proposal to conduct this analysis by the next Committee meeting.

Items Discussed During the June 7, 2017 Regular Watermaster Committee Meeting

- Status Report on Water Level Monitoring throughout the Beaumont Basin through May 31, 2017 [Memorandum 17-13]. Engineer Blandon gave a status report of the water level monitoring throughout the basin and indicated that in general water levels were beginning to come up at various locations.

- 2016 Consolidated Annual Report and Engineering Report – Draft Report [Memorandum 17-14]. Engineer Blandon apologized for not being able to present the Draft Consolidated Annual Report and Engineering Report at this meeting and stated that the draft report will be submitted at the regular August 2, 2018 meeting.

- 2014 Sustainable Groundwater Management Act Reporting Requirements and its impact on the 2017 Consolidated Annual Report and Engineering Report [Memorandum 17-15]. Engineer Blandon indicated that as an adjudicated basin, the Beaumont Basin must comply with the reporting requirements to the state under this act. One of the requirements is the delivery of a Final Annual Report to the state for the preceding year by April 1st. He indicated that the completion of the Consolidated Annual Report by the reporting date will require an adjustment in the presentation of the Draft report and in the adoption of the Final report. After a brief discussion, the Committee members agreed that the Draft report be presented at the regular February meeting while presentation of the Final report will require moving the April meeting to the last Wednesday in March.

- Approval of the Groundwater Storage Application and Groundwater Storage Agreement in the Beaumont Basin for the San Gorgonio Pass Water Agency in the Amount of 10,000 ac-ft. [Memoranum 17-16]. Member Zoba gave an overview of the agenda item highlighting the four conditions under which the Watermaster Committee would approve the storage account requested by SGPWA. Member Frazer motion to approve the

Resolution as drafted before several representatives of SGPWA including their legal counsel indicated that they could not agree to the conditions set forth in the Draft Resolution. After much discussion between members of the Board, legal counsel, and representatives of the SGPWA, the original motion was approved on a 3-2 vote. A copy of the approved Resolution 17-01 is included under Appendix A of this report.

Items Discussed During the August 2, 2017 Regular Watermaster Committee Meeting

- Approval of Watermaster Budget for Fiscal Year 2017-18 [Memorandum 17-17]. Member Zoba gave a presentation of the proposed budget prior to the Committee approving it as presented.

- Consideration of Resolution 17-02 Approving the Transfer of Overlying Water Rights to Specific Parcels – Oak Valley Partners [Memorandum 17-18]. Legal Counsel McCullough provided background information on the agenda item. A discussion ensued on this issue with some members in favor a deferring any action until some issues be addressed while other members supported the approval of the resolution as presented. Additional input was provided by representatives from Oak Valley Partners and Summerwind Ranch, the developing company. After much discussion, the Watermaster Committee voted to further consider this matter at as special meeting to be held on August 30, 2017.

- 2016 Consolidated Annual Report and Engineering Report – Presentation of Draft Report [Memorandum 17-19]. Engineer Blandon presented the draft 2016 Annual Report which included discussions on groundwater conditions, groundwater production and recharge, transfer and adjustment of rights, and accounting of storage. Mr. Harder presented the operating Safe Yield for the basin for 2016. Engineer Blandon concluded the presentation with a discussion of water quality in the basin and provided recommendations to be considered by the Watermaster in the future.

- Status Report on Water Level Monitoring throughout the Beaumont Basin through July 24, 2017 [Memorandum No. 17-20]. Engineer Blandon gave a status report of the water level monitoring program being done at 13 locations throughout the basin.

- Consideration of Task Order No. 14 with ALDA Inc. for the preparation of a Methodology to Estimate Storage Losses from the Beaumont Groundwater Basin at Selected Locations [Memorandum 17-21]. Mr. Harder provided an overview of the scope of services included in the proposed task order. After questions and discussions regarding the project timeline, Member Warsinski indicated that this should be a special project and the City of Beaumont should not be required to share on the cost of the study. In response, Member Zoba motioned that the report be funded by four of the five members; task order was approved.

Items Discussed During the August 30, 2017 Special Watermaster Committee Meeting

- Consideration of Resolution 17-02 Approving the Transfer of Overlying Water Rights to Specific Parcels – Oak Valley Partners [Memorandum 17-22]. Engineer Blandon presented a map of the parcels owned by Oak Valley Partners and identified those listed in the Resolution. Legal Counsel McCullough provided his firm's opinion on the transfer of rights. After much discussion the original resolution was adopted. Under this resolution Oak Valley Partners transfers their overlying right to produce 77.4566 percent of 1,806 ac-ft of groundwater from the Beaumont Basin to the Yucaipa Valley Water District. A copy of the approved Resolution 17-02 is included under Appendix A.

Items Discussed During the October 5, 2016 Regular Watermaster Committee Meeting

- Nomination of the Beaumont Basin Watermaster Committee Secretary [Memorandum 17-23]. Member Zoba nominated Mr. Tony Lara of the Beaumont Cherry Valley Water District as Secretary of the Watermaster Committee. Motion was approved.

- Status Report on Water Level Monitoring throughout the Beaumont Basin through September 25, 2017 [Memorandum 17-24]. Engineer Blandon presented a map of potential additional monitoring sites and discussed sites currently being considered. He continued with a status of the water level monitoring program being done.

- Potential Scenarios to be Evaluated Using the Groundwater Model for Analyzing Basin Losses [Memorandum 17-25]. Mr. Harder presented three scenarios and alternatives to determine water losses and requested written comments from members of the Watermaster Committee.

- Independent Accountant's Financial Report of Agreed-Upon Procedures for the Beaumont Basin Watermaster [Memorandum 17-26]. Member Lara moved to receive and file the Independent Financial Report for the Period ending June 30, 2017. The motion was carried.

Items Discussed During the December 6, 2017 Regular Watermaster Committee Meeting

- Status Report on Water Level Monitoring throughout the Beaumont Basin through November 27, 2017 [Memorandum 17-27]. Engineer Blandon indicated that BCVWD's Well No. 25 has been added as a monitoring well; he further mentioned that this was an active pumping well that was selected because of the absence of dedicated monitoring wells in that portion of the basin. He continued with a status of the water level monitoring program being done and indicated that water levels in the upper aquifer in the vicinity of the Noble Creek spreading grounds have risen by close to 80 feet in the last 18 months.

- Progress Report to the Storage Losses Evaluation [Memorandum 17-28]. Mr. Harder indicated that the model is anticipated to be completed within the next two weeks to then begin running scenarios. He indicated that the scenarios to be run will be as realistic as possible and that anticipated to provide preliminary results at the February meeting.

2.2.4 Redetermination of Safe Yield

Under the Judgment (2003) the Safe Yield of the Beaumont Basin was established at 8,650 ac-ft/yr. to be distributed among the Overlying Producers. The Judgment indicates that the Safe Yield of the Beaumont Basin shall be redetermined at least every 10 years beginning 10 years after the date of entry of the Judgment (February 4, 2004).

At the February 2013 Watermaster meeting, the Watermaster Committee authorized a study to develop a hydrologic model of the groundwater basin to be used as a tool in the re-evaluation of the Safe Yield of the basin. At the February 2015 Watermaster meeting a formal presentation of the final-draft document was made to provide members of the Committee with an opportunity to ask questions and addressed any unresolved issues. The final document was presented for approval and adoption at the April 2015 Watermaster meeting.

Resolution No. 2015-01 was adopted at the April 1st, 2015 Regular Watermaster Committee meeting. Through this resolution, the Final 2013 Reevaluation of the Beaumont Basin Safe Yield Report and Redetermination of the Safe Yield of the Beaumont Basin were adopted.

The Beaumont Basin Watermaster re-determined the Safe Yield of the Beaumont Basin to be 6,700 ac-ft per year.

2.3 Storage Applications and Agreements

The first applications to use the Basin for storage purposes were approved in FY 2005-06 when Watermaster approved applications by Banning, BCVWD, SMWC, and YVWD to store up to 135,000 ac-ft of water in the Basin. The City of Beaumont's application to store water was approved by Watermaster in FY 2007-08 bringing the total storage allocation to 157,000 ac-ft. In FY 2009-10, Watermaster approved additional applications by Banning, BCVWD, Beaumont, and YVWD to increase the total storage allowed to 260,000 ac-ft. It is our understanding that the Watermaster Committee has not yet amended the respective Storage Agreements to reflect the current storage limits.

An application for a storage agreement was received by the Watermaster from the San Gorgonio Pass Water Agency (SGPWA) in mid 2010 and brought for discussion at the summer of 2012. The initial application was rejected because it was determined to be incomplete.

An application for a storage agreement was also received from the Morongo Band of Mission Indians at the December 2012 meeting. Watermaster deemed the application incomplete and requested further information from the applicant to address questions posed by members of the Watermaster Committee. This application was subsequently approved at the June 5, 2013 meeting allowing the Morongo Band of Mission Indians to store up to 20,000 ac-ft of imported water in the basin.

A new application for Groundwater Storage Agreement was developed in early 2013; the application was presented and discussed at several Watermaster Committee meetings where

input was received and questions were addressed. The new application was approved by the Watermaster Committee in August 2013 and will be used for future applicants.

After development of new forms and procedures, a new application by SGPWA was received in early 2016 to develop a Groundwater Storage Agreement. This application was discussed over several Watermaster Committee meetings and was finally approved at the June 7, 2017 regular meeting under Resolution 17-01. The approval of this application allows the SGPWA to store up to 10,000 ac-ft of water in the Beaumont Groundwater Basin.

As of December 31, 2017, the total storage allowed stands at 290,000 ac-ft; storage limits by participant are presented below. Amounts of water in storage by participant are discussed under Section 3.

- City of Banning 80,000 ac-ft
- City of Beaumont 30,000 ac-ft
- Beaumont Cherry Valley WD 80,000 ac-ft
- South Mesa Water Company 20,000 ac-ft
- Yucaipa Valley Water District 50,000 ac-ft
- Morongo Band of Mission Indians 20,000 ac-ft
- San Gorgonio Pass Water Agency 10,000 ac-ft

2.4 Rules and Regulations

The original Rules and Regulations of the Watermaster were adopted on June 8, 2004. The Judgment provides for their periodic update as deemed necessary by the Watermaster. On September 9, 2008, the Watermaster adopted Rule and Regulation 7.8, entitled "Availability of Unused Overlying Production and Allocation to the Appropriator Parties". The objective of this rule is to define the process through which unused production by Overlying Parties is allocated to the Appropriator Parties. The unused water will be allocated based on each Appropriator's percent share of the operating Safe Yield, as described in Exhibit C of the Judgment. This allocation will have no impact on the legal water rights owned by the Overlying Parties in subsequent years. The initial allocation to take place on or after February 4, 2009.

No changes to the Rules and Regulations were made during Calendar Year 2017.

2.5 Active Party List

Part VII, Paragraph 1 of the Judgment, indicates that Watermaster shall maintain an updated list of parties to whom notices are to be sent for service. Said list should include names, addresses for the Parties or their successors. A copy of the list has been included with this annual report as Appendix B.

2.6 Financial Management

The Watermaster must develop and administer a budget for all administrative, operational, and capital costs it incurs. The following discussion summarizes the budget established for the Fiscal Year 2017 operations.

2.6.1 Budget

The budget for Fiscal Year 2017-18 was initially approved at the August 2, 2017 Watermaster Committee meeting under Memorandum 17-17. The approved budget provided funding for Administrative expenses in the amount of $197,800.00, an increase of $14,750.00 or 8.05 percent from the prior year of $183,050.00. Funding for administrative expenses was covered from a carryover of $189,260.00 from FY 2016-17 and water agencies contributions of $1,375.00 each. The approved budget did not include any funds for Special Projects.

The following table presents a comparison between the final budgets for FY 2015-16, final budget for FY 2016-17, and approved budget for FY 2017-18.

Operating Expense	*FY 2015-16 Final Budget*	*FY 2016-17 Final Budget*	*FY 2017-18 Approved Budget*
Administrative Expenses			
Bank Fees and Interest	$ 50.00	$ 50.00	$ 100.00
Miscellaneous and Meetings	$ 500.00	$ 500.00	$ 200.00
Acquisition/computation & Annual Report	$ 85,000.00	$ 90,000.00	$ 100,000.00
Annual Audit	$ 2,500.00	$ 2,500.00	$ 2,500.00
Engineering Services	$ 10,000.00	$ 20,000.00	$ 15,000.00
Monitoring and Data Acquisition		$ 25,000.00	$ 25,000.00
Meter Installation and Repair		$ 10,000.00	$ 10,000.00
Legal Expenses	$ 20,000.00	$ 20,000.00	$ 20,000.00
Reserve Funding	$ 10,000.00	$ 15,000.00	$ 25,000.00
	$ 128,050.00	**$ 183,050.00**	**$ 197,800.00**
Special Project Expenses			
Engineering	$ 0.00	$ 0.00	$ 0.00
Litigation	$ 0.00	$ 0.00	$ 0.00
	$ 0.00	**$ 0.00**	**$ 0.00**
Total Operating Expense	**$ 128,050.00**	**$ 183,050.00**	**$ 197,800.00**

2.6.2 Financial Audit

The Beaumont Basin Watermaster has a financial audit performed on annually on a fiscal year basis. The audit assists in properly accounting for the revenues and expenses of the Watermaster and tracking the financial resources of the agency. The detailed audit report for FY 2017, prepared by Rogers, Anderson, Malody, and Scott, LLP, was presented, received and filed as Watermaster under Memorandum No. 17-26 on October 5, 2017. This report is included under Appendix C.

Section 3
Status of the Basin and Administration of the Judgment

The Beaumont Basin Watermaster is responsible for the accounting of groundwater production, recharge of supplemental water, groundwater transfers and storage activities in the Beaumont Basin. Since the inception of the Judgment accounting has been conducted on a fiscal year basis starting on July 1, 2003.

Through the adoption of Resolution No. 2011-01, on September 21, 2011, Watermaster changed the accounting from a fiscal year basis to a calendar year basis starting in CY 2011. The conversion of Fiscal Year basis to Calendar Year basis was documented in the Annual Report for CY 2011 adopted by the Board in early 2013. The annual report for CY 2017 builds on the information presented in previous annual reports.

3.1 Climate, Hydrology and Hydrogeology

3.1.1 Climate

The Beaumont Basin is located in a semi-arid region characterized by warm summers and mild winters with average summer high temperatures in the mid to upper 90s (Fahrenheit) and average winter low temperatures in the mid to low 40s. Precipitation in the region occurs as snowfall in the upper elevations of the San Bernardino Mountains to the north and rainfall in the Basin. Annual precipitation in the Beaumont Basin, as recorded at the County of Riverside's Beaumont Station 013 averaged 17.16 inches over the 100-year period between 1918 and 2017. On the average during this 100 year period, 11.96 inches of precipitation, or 69.8 percent of total, fell during the winter between December and March.

Figure 3-1 illustrates annual precipitation at this station for the reporting period including a plot of the cumulative departure from the mean (CDFM) precipitation. This parameter is used to assess the occurrence, duration, and extent of wet and dry precipitation cycles. Upper trending periods in the graph represent periods with above average precipitation such as the 1913-46 period; average precipitation during this period was 20.53 inches or close to 20 percent above the long-term average. Other above average precipitation periods include the 1977-83 and 1990-98 periods. Conversely, down trending periods indicate periods of below average precipitation as in the 1947-77 period when average precipitation was only 15.2 inches. The 1984-90 period with seven consecutive years of below average precipitation was also characterized as a dry period.

Currently, the Basin is in a dry period that began in 1999. During this 18-year period three of the five years with the lowest precipitation ever recorded at Station 13 have occurred; 6.3 inches (lowest ever) in 1999, 7.40 inches in 2013, and 8.07 inches in 2009. It should be noted that the average precipitation during the base period (1997-2001) used to determine

the Safe Yield of the Basin was 13.43 inches, close to 25 percent below the long-term average for the Basin.

3.1.2 Surface Water Hydrology

There are three significant drainage systems that overlie the Beaumont Basin: the San Timoteo Creek drainage system which is tributary to the Santa Ana River; the Potrero Creek drainage system in the San Jacinto watershed; and the Smith Creek drainage system tributary to the White Water River which is part of the Salton Sea drainage basin.

Surface water flows originate in the San Bernardino Mountains to the north of the Basin. The streams and creeks that flow into the Beaumont Basin are dry for most of the year with occasional runoff during rainfall events. There are no stream gages in the Basin that can be used to estimate surface water recharge to the Basin or discharge from the Basin.

3.1.3 Hydrogeology

3.1.3.1 Regional Geologic Context

The Beaumont Basin is located in the San Gorgonio Pass, a low-relief highland that is bordered on the north by the San Bernardino Mountains, on the southeast by the San Jacinto Mountains, and on the west by the San Timoteo Badlands. Surface sediments in the Beaumont Basin and nearby lowlands consist of unconsolidated to semiconsolidated Quaternary alluvium. Surrounding the alluvial sediments are semiconsolidated rocks of the San Timoteo Formation and igneous and metamorphic rocks that make up the San Jacinto and San Bernardino Mountains (see Figure 3-2). The San Timoteo Formation is composed primarily of sandstone, conglomerate, siltstone, and mudstone (Rewis, et al., 2007). The igneous and metamorphic rocks form the crystalline basement rocks in the area (Bloyd, 1971). The unconsolidated Quaternary alluvium and the upper portion of the underlying San Timoteo Formation constitute the water-bearing aquifer of the Beaumont Basin (Rewis, et al., 2007).

3.1.3.2 Faults

The boundaries of the Beaumont Basin are based on faults that often form barriers to groundwater flow (Bloyd, 1971). Major faults in the area include the Banning and Cherry Valley faults, which form the northern boundary of the basin (see Figure 3-2). Groundwater levels within the Beaumont Basin are generally lower than groundwater levels in the surrounding areas. Along the Banning Fault, groundwater levels on the north side of the fault and outside the basin are as much as 400 ft higher than groundwater levels on the south side of the fault and inside the basin. The same condition has been observed along the southern Beaumont Basin boundary.

3.1.3.3 Groundwater Occurrence and Flow

Groundwater in the Beaumont Basin occurs at depth in the Quaternary alluvium and the underlying San Timoteo Formation. Groundwater flow within the Beaumont Basin generally depends on location with respect to a groundwater flow divide which occurs in the center of

the basin, approximately coincident with the Noble Creek drainage (see Figure 3-2). West of the Noble Creek drainage, groundwater generally flows to the northwest and ultimately as underflow beneath San Timoteo Wash. East of the Noble Creek drainage, groundwater flows to the southeast towards the City of Banning.

The groundwater system in the Beaumont Basin is replenished from multiple sources. These include:

- Infiltration of precipitation within the unlined portions of natural streams
- Subsurface seepage across fault boundaries
- Return flow from irrigation and individual septic systems
- Artificial recharge in man-made basins (e.g. Noble Creek Recharge Facility).

Groundwater discharges from the Beaumont Basin primarily occur from:

- Groundwater production
- Underflow out of the basin at the downgradient margins
- Rising water in San Timoteo Creek
- Evapotranspiration

3.2 Production

The Beaumont Basin Watermaster is responsible for the tracking and accounting of groundwater production by all producers named in the Judgment regardless of the amount of groundwater produced. Other producers, not listed in the Judgment, and pumping less than 10 ac-ft /yr., also known as minimal producers, are exempt from the provisions of the Judgment. Figure 3-3 illustrates the location of all production wells that belong to the Appropriators and Overlying parties of the Judgment.

3.2.1 Appropriative Party Production

There are five Appropriative Producers; namely, City of Banning, City of Beaumont, the BCVWD, the SMWC, and the YVWD. The amount that each Appropriator produces in any given year, without incurring a replenishment obligation, varies from year to year and results from a combination of:

- Their share of the Operating Yield, based on the Temporary Surplus of 16,000 ac-ft/yr for all Appropriators,
- Transfers from other Appropriators,
- Transfers of unused production from Overlying Producers,
- Water withdrawn from their storage account, and
- New yield created by the Appropriator.

It should be noted that beginning in 2014, the Temporary Surplus is no longer available to the Appropriators as it officially ended after 10 years during Fiscal Year 2013.

Annual production by well for each of the five Appropriative Parties for the CY 2003-2012 period is summarized in Table 3-1A; this table also includes the Temporary Surplus Allocation and the amount of unused production that is eligible for storage for each Appropriator. Monthly production for the last five years of operation (CY 2013-17) are presented in a series of tables starting with Table 3-1B for CY 2013 and continuing on an annual basis through Table 3-1F for CY 2017. Table 3-1B for CY 2013 also includes the Temporary Surplus Allocation for each of the Appropriators based on half of the 16,000 ac-ft/yr since this temporary allocation ended at the end of Fiscal Year 2013 in June of that year. It should be noted that all production by Appropriators is currently being metered; however, no information is available as to the accuracy of existing meters.

During CY 2017, Appropriators pumped a combined amount of 13,462.40 ac-ft of groundwater from the Beaumont Basin. Production for the year was approximately 12 percent higher than in CY 2016 and 20 percent higher than in CY 2015; however, it was less than two percent higher than the 5-year average of 13,228 ac-ft.

Compared to groundwater production totals for CY 2016, production for individual agencies in CY 2017 was mixed. The City of Banning production dropped by two percent; however, production by BCVWD and SMWC increased by 15 percent and four percent respectively. Production by YVWD was rather minimal as less than one ac-ft was pumped during the year. A comparison of production against a five-yr running average, the City of Banning underproduced by over 22 percent while the BCVWD pumped 11 percent higher. Production by SMWC was only one percent higher than the average while no comparison could be established for the YVWD due to minimal production.

3.2.2 Overlying Party Production

Overlying Parties are defined in the Judgment as persons, or their assignees, that are part of the Judgment and who are owners of land which overlies the Beaumont Basin and have exercised Overlying Water Rights to pump therefrom. Overlying Parties include successors in interest and assignees. Overlying Producers were assigned a share of the Basin's Safe Yield, estimated in 2003 at 8,650 ac-ft/yr. Individual Overlying Producers may not pump more than five times their assigned share of the Basin's Safe Yield in any five-year consecutive period without incurring a replenishment obligation.

Currently, there are 17 Overlying Producers in the Basin pumping from 20 groundwater wells. All active wells operated by the larger producers are metered. Meters were installed by individual owners or as part of an effort initiated by Watermaster in 2013 to obtain a closer production accounting from Overlying Parties. Production from metered wells represented close to 99 percent of the total production by Overlying Parties in CY 2017.

The remaining wells, operated by smaller producers, did not have meters for some or most of 2017 and their production is estimated using the water duty method. This method was initially

proposed by Wildermuth Environmental Inc. (WEI), during the preparation of the 2005-06 Annual Report. After being accepted by the Watermaster, an updated water duty method was developed by WEI and it has been used since. The estimate of unmetered production for the CY 2017 Annual Report uses the updated method developed by WEI as detailed in Appendix D.

Similar to the production reported for the Appropriators, a series of tables was developed to report monthly and annual production from the Overlying Parties on a calendar year basis. Starting with Table 3-2A, annual production is documented for CY 2003-12; Table 3-2B through 3-2F summarize monthly production by Overlying well for CY 2013 through CY 2017 respectively. In addition, these tables show their share of the Safe Yield and the amount of unused water for each Overlying Party is shown. It should be noted that these tables have been revised to reflect updated production records from Sharondale Mesa Owner Association since 2011 and Plantation by the Lake since 2013.

Production by Plantation by the Lake has been corrected for the 2013 to 2016 period. During those years, monthly production records were provided by this Overlying Producer in million gallons; however, research conducted early in the year indicated that the number should have been reported in million cubic feet instead. This result in a documented under production by a factor of 7.48 since there are 7.48 gallons of water in a cubic foot. Production by this Overlying user continues to be refined and shall be properly documented by the time the final report for CY 2017 is produced. Close production estimates for the 2013-16 period are used in this draft report.

During CY 2017, Overlying Producers produced an estimated 2,404.7 ac-ft; this level of production is approximately 24 percent higher than in CY 2016 and 15 percent higher than in CY 2015. Compared to the five-year average of 2,186.1 ac-ft, Overlying Producers pumped 10 percent more water than the average. Production tables 3-2B (2013) through 3-2F (2017) have been corrected based on the Plantation by the Lake revisions.

3.2.3 2003-2017 Annual Production Summary

Annual production for all Appropriators and Overlying Parties since 2003 is summarized in Table 3-3a on a calendar year basis for the 2003 to 2010 calendar years while Table 3-3b documents annual production for CY 2011 through CY 2017. It should be noted that production from 2003 only includes production for the second half of the year. Since July 2003, a total of 229,014 ac-ft have been pumped from the Beaumont Basin; an estimated 83 percent of this total has been pumped by Appropriators. The percentage of groundwater production from Appropriators has steadily increased since the Judgment inception from a low of 74.3 percent registered in CY 2003 to a high of 87.2 percent recorded in CY 2014 and has averaged 85.7 percent over the last five calendar years.

Groundwater production peaked in CY 2007 when close to 20,000 ac-ft were pumped from the basin; since, it declined steadily through 2010 to approximately 13,600 ac-ft; however, production during the 2011-14 period increased by 23.6 percent. Total groundwater production from the basin in CY 2017 was 15,867 ac-ft; approximately three percent higher than the five-year

average of 15,414 ac-ft/yr. Annual production for each of the Appropriators and for the Overlying Producers combined is depicted in Figure 3-4.

3.3 Groundwater Recharge

The Watermaster is responsible for maintaining an annual account of all water artificially recharged in the Beaumont Basin and any losses of water supplies or Safe Yield resulting from such recharge water. Sources of groundwater recharge include imported water from the State Water Project (SWP), recycled water, and new yield sources developed in the basin since the Judgment inception in July 2003. The Watermaster has maintained the accounting of groundwater recharge; however, losses from the basin, if any, have not been estimated. Table 3-4 presents a summary of the annual groundwater recharge in the Beaumont Basin since 2003 on a calendar year basis.

3.3.1 State Water Project Water Recharge

BCVWD's Noble Creek spreading facility, located in the vicinity of Beaumont Avenue and Cherry Valley Boulevard, is the only facility in the Beaumont Basin where deliveries of imported water can be used to recharge the groundwater basin. The location of this spreading facility is depicted in Figure 3-3. Deliveries of imported water are conducted through the San Gorgonio Pass Water Agency, which is the State Water Contractor for this area.

The BCVWD began taking deliveries of imported water for groundwater recharge in the Fall of 2006 when 3,501 ac-ft were spread pursuant to the storage and recharge agreement on file with Watermaster. Deliveries of imported water for BCVWD increased over the next five years peaking in CY 2011 at 7,979 ac-ft and declining through 2015 to an all-time low of 2,773 ac-ft. BCVWD augmented spreading of imported water significantly in CY 2016 at 9,319 ac-ft and even more in CY 2017 to an all-time high of 13,590 ac-ft. A total of 72,121 ac-ft of imported water have been spread by BCVWD since CY 2006 as documented in Table 3-4.

The City of Banning began purchasing imported water for recharge at the BCVWD's Noble Creek facility in July 2008 and has since recharged 12,942 ac-ft. in accordance with their storage agreement on file with Watermaster. During CY 2012 and 2013, the City of Banning spread an average of 100 ac-ft per month; spreading in CY 2014 and 2015 was reduced to approximately half of that amount. However, spreading in CY 2016 and 2017 increased significantly to 1,477 ac-ft and 1,350 ac-ft respectively.

In addition to imported water deliveries to BCVWD and the City of Banning at BCVWD's Noble Creek facility, SGPWA has also delivered significant quantities of imported water at the Little San Gorgonio Creek Spreading Ponds. These spreading ponds are located outside the adjudicated boundary of the Beaumont Basin and to the north of the Banning Fault, as shown in Figure 3-3. Spreading of imported water at these spreading ponds is likely to be a source of subsurface recharge to the Beaumont Basin; however, Watermaster has not adopted this finding. Subsurface recharge across the Banning Fault was investigated as part of the Safe Yield of the Basin determination study, completed in early 2015.

Deliveries of imported water by the SGPWA to the Little San Gorgonio Creek Spreading Ponds began in August 2003; the agency has since recharged a total of 10,508 ac-ft averaging 808 ac-ft/yr. Deliveries in CY 2013, at 881 ac-ft, were less than half of the amount spread in CY 2011 and CY 2012. Deliveries in CY 2014 through CY 2017 were basically non-existent as less than 44 ac-ft were spread in those four years combined. Under Resolution 17-01, adopted on June 7, 2017, the SGPWA entered into a storage agreement with the Beaumont Basin Watermaster to spread up to 10,000 ac-ft of imported water in the Beaumont Basin subject to certain conditions. As part of their application, the SGPWA plans to construct their own spreading facilities in the southwest corner of Brookside Avenue and Beaumont Avenue.

3.3.2 Recycled Water Recharge

Prior to March 2010, Beaumont's recycled water from Wastewater Treatment Plant No. 1 was discharged at Discharge Point No. 1 (DP-001) in Cooper's Creek where it infiltrates into the San Timoteo Management Zone and outside the Beaumont Basin. Starting in March 2010, Beaumont began deliveries of recycled water to Discharge Point No. 7 (DP-007), located along an unnamed tributary of Marshall Creek, as shown in Figure 3-3. It is believed that a portion of the recycled water discharged at this location reaches and recharges the Beaumont Basin. It should be noted that deliveries to DP-007 ceased in the Fall of 2015 due to mechanical failure of a pump station.

In CY 2017, the City of Beaumont discharged an estimated 3,663 ac-ft of recycled water at DP-001 in Cooper's Creek; no discharges were made at DP-007. Recycled water discharges were approximately four percent higher than in CY 2016. Monthly discharges at DP-001 varied slightly from a low 3.17 mgd in March to a high of 3.36 mgd in January; the average for the year was 3.27 mgd. Monthly recycled water discharges by the City of Beaumont since 2007 are summarized in Table 3-5.

3.3.3 New Yield Stormwater Recharge

Before accounting for any new yield resulting from the recharge of local surface water, not initially considered as part of the Basin Safe Yield, Watermaster needs to develop a methodology to quantify and credit the New Yield to the party that creates the new recharge. According to Part VI Paragraph 5.V of the Judgment, Watermaster shall make an independent scientific assessment of the estimated new yield created by each proposed project. It is our understanding that the City of Beaumont has been recharging local waters at various locations in the Basin and would like to receive credit for the New Yield developed. For Beaumont to receive credit however, Watermaster will need to develop the methodology to compute and credit the New Yield dating back to the Judgment inception in February 2003 or since delivery of flows began, whichever is latest.

3.4 Water Transfers and Adjustments of Rights

Section 7 of the Watermaster Rules and Regulations, as amended in September 2008, provides for the adjustment of rights by and between Appropriators and Overlying Parties. This section indicates that Watermaster shall maintain an accounting for all transfers and

include said transfers in the Annual Report or other relevant document. There are three types of transfers that Watermaster accounts for: a) transfer of water rights and/or water in storage between Appropriator Producers, b) transfer of water rights from Overlying Producers to an Appropriator Producer in exchange for water service, and c) the allocation of unused Overlying Water to the Appropriator Parties based on their share of the Operating Safe Yield.

According to Part VI, Administration, Paragraph 5Y of the Judgment, the Safe Yield of the Beaumont Basin shall be re-determined at least every 10 years after the date of entry of the Judgment, February 4, 2004. In 2015 the Safe Yield of the Beaumont Basin was re-determined and estimated at 6,700 ac-ft/yr. This amount represents a 22.54 percent reduction from the previous estimate of 8,650 ac-ft/yr. Table 3-6 presents the initial and revised production rights from individual Overlying Producers and compares them against actual groundwater production during the 2013-17 five-year period for each user. Annual average groundwater production during this period for all Overlying Producers combined was estimated at 2,161.5 ac-ft/yr; representing approximately 32.3 percent of the revised Safe Yield. Individually, none of the Overlying Producers produced more than their allowable production rights during this five-year period; California Oak Valley Golf and Resort LLC averaged the highest percentage of their respective allocation at 86.6 percent followed by Plantation by the Lake at 78.7 percent and Sharondale Mesa Owner Association at 70.1 percent. Tukwet Canyon Golf Club followed at an average of 59.8 percent of their Overlying right.

3.4.1 Transfers between Appropriators

According to Section 7.3 of the Rules and Regulations, an Appropriator may transfer all or a portion of its production right or water in storage that exceeds its supply needs to another Appropriator.

In January 2008, the SMWC and the BCVWD entered into a transfer agreement that allows BCVWD the option to purchase all water that SMWC determines to be available for transfer from their storage account. As part of the agreement, each year the SMWC estimates the amount of water available for transfer and offers it to the BCVWD for purchase prior to offering it to other Appropriators. Since the beginning of the agreement, SMWC has transferred 9,500 ac-ft of water to BCVWD with 3,500 ac-ft transferred in CY 2011. SMWC also transferred 1,500 ac-ft of water to Banning in CY 2007. The purchase agreements and transfers between these agencies are on file with Watermaster.

Water transfers between Appropriators were not reported during CY 2017.

3.4.2 Transfers of Overlying Rights for Service by an Appropriator

The Judgment, under Part III, Paragraph 3, provides that to the extent an Overlying Party request water service from an Appropriator Party, and uses its adjudicated water rights to obtain said service; an equivalent volume of groundwater shall be reserved for the Appropriator Party providing the service to the Overlying Party. Further, Section 7 of the Rules and Regulations indicates that both the Overlying and Appropriator will file a Notice of Adjustments of Rights with Watermaster within 30 days after entering a service agreement.

Under Resolution 17-02, adopted on August 30, 2017, the Oak Valley Partners LP transferred all of its Overlying rights to the YVWD to serve a number of parcels in the Beaumont Basin. The Stipulated Judgment allocated OVP an overlying production right of 1,806 ac-ft based on the initial Safe Yield of 8,650 ac-ft/yr. OVPs rights have been adjusted to 1,398.86 ac-ft based on the recalculated Safe Yield of 6,700 ac-ft/yr as approved by the Watermaster on April 1, 2015. Overlying rights and Overlying-Appropriative rights will be adjusted every 10 years based on the recalculation of the Safe Yield of the Beaumont Basin.

The following table summarizes the transfer and conversion of Overlying Water Rights from an Overlier Party to an Appropriative User. This table will be used to track the conversion of rights as lands develop and begin being served by the Appropriators.

Description	Resolution 17-02
✓ Resolution Effective Date	August 30, 2017
✓ Overlyier water rights were transferred from	Oak Valley Partners LP
✓ Appropriator water rights were transferred to	Yucaipa Valley Water District
✓ Date that Overlier notifies Watermaster of assignment of a quantity of Overlying water rights to a project area	To be determined
✓ Date that Appropriators begins to provide water service to the project area	To be determined
✓ Calculated quantity of water rights transferred	To be determined
✓ Remaining quantity of Overlying Water Rights not converted to an Overlying-Appropriative Right	1,398.86 ac-ft/yr

3.4.3 Allocation of Unused Overlying Water

Section 7.8 of the Rules and Regulations, adopted on September 9, 2008, by Watermaster, outlines the process for distributing the volume of adjudicated water not produced by the Overlying Parties to the Appropriators. Under this section, if an Overlying Party produces less than five times of their share of the Safe Yield in any five-year period, the quantity of groundwater not produced by that Overlying Party shall be made available for allocation to the Appropriators. Transferring of unused production from Overlying Users does not diminish their legal right to produce in subsequent years.

Since the inception of the Judgment, transfers of unused production by Overlying Users has been made on a fiscal year basis coinciding with the preparation of the annual report. Preparing the annual report on a calendar year basis required that the transfers of unused production also be made on the same basis. Based on the five-year format used in the Rules

and Regulations, transfers to the Appropriator Parties for CY 2017 were based on unused production from Overlying Users in CY 2012. This required the recalculation of Overlying Users production, back to July 2003, on a calendar year basis. Under this format, unused production from the second half of 2003, with adjusted water rights for half of the year, was allocated to Appropriators for CY 2008. Table 3-7 summarizes the volume of unused Overlying water for CY 2003 through CY 2017. While groundwater production by Overlying Users has decreased by over 40 percent since 2004, the volume of unused overlying water has correspondingly increased from 5,053 ac-ft/yr in CY 2006 to a maximum of 6,679 ac-ft during CY 2011. The amount of unused production decreased starting in CY 2014 to slightly over 4,600 ac-ft/yr as a result of reduced Overlying allocations resulting from the new basin Safe Yield of 6,700 ac-ft/yr.

Table 3-7 presents the allocation of unused Overlying water to each Appropriator based on their shares of the Safe Yield and the schedule set forth under Section 7.8 of the Rules and Regulations. It should be noted that this schedule has been modified to reflect a calendar year basis for allocation. Under the modified schedule, unused Overlying production in CY 2012, estimated at 6,565 ac-ft, is allocated to Appropriators during CY 2017. Unused Overlying production during CY 2017, estimated at 4,295 ac-ft and subject to revision, would be allocated to Appropriators during CY 2022.

It should be noted that if the Overlying Right of Oak Valley Partners LP is converted to an Overlying-Appropriative Right in favor of YVWD prior to CY 2022, then the quantity of water available to Appropriators in 2022 will be adjusted accordingly.

3.5 Storage Accounting

Section 6.7 of the Watermaster Rules and Regulations indicates that Watermaster shall calculate additions, extractions, and losses of all water stored and any losses of water supplies or Safe Yield resulting from such water stored. This section further indicates that Watermaster shall keep and maintain for public record an annual accounting thereof. While additions (spreading) and extractions (pumping) are easily quantifiable, losses from storage are more difficult to estimate. A methodology for estimating groundwater losses from the Basin is currently being developed and is anticipated to be completed in FY 2018.

3.5.1 Annual Storage Consolidation

Consistent with the new reporting format to document extractions, spreading and other groundwater activities on a calendar year basis, Table 3-8 represents the consolidation of each Appropriator's storage account from CY 2003 through CY 2017. This table includes annual production by Appropriator, their share of Temporary Surplus, supplemental water recharge in its various forms, transfers between Appropriators, potable deliveries to parcels previously owned by Overlying Users, and transfers of unused water from Overlying Users. At the end of 2016, an overall total of 101,118.8 ac-ft of water were stored in the Basin for future use; this total increased in CY 2017 by 8,046.2 ac-ft to a cumulative total of 109,165.0 ac-ft. Increased spreading of imported water by BCVWD and the City of Banning along with low production totals by YVWD were the primary reasons for the increase in storage. Despite of the expiration of the Temporary Surplus allocation at the end of CY 2013, the

amount of water in storage at the end of CY 2017 was 8,352.3 ac-ft higher. The amount of water in storage by party at the beginning and end of CY 2017 is as follows:

Agency / Party to the Judgment	Calendar Year 2017 (ac-ft)		
	Beginning	Ending	Change
City of Banning	49,990.8	51,960.6	1,969.8
BCVWD	27,565.9	32,295.7	4,729.9
City of Beaumont	0.0	0.0	0.0
South Mesa Water Company	8,681.3	9,132.5	451.2
Yucaipa Valley Water District	14,880.8	15,776.2	895.3
Morongo Band of Mission Indians	0.0	0.0	0.0
San Gorgonio Pass Water Agency	0.0	0.0	0.0
TOTAL in storage	**101,118.8**	**109,165.0**	**8,046.2**

3.6 Changes in Groundwater Levels in the Beaumont Basin

3.6.1 Analysis of Groundwater Level Changes

Changes in groundwater flow and groundwater levels between 2016 and 2017 were evaluated using a calibrated groundwater flow model that was previously developed to reevaluate the Safe Yield of the Beaumont Basin (TH&Co, 2015). For this analysis, the existing calibrated model was updated with groundwater pumping, recharge, and groundwater levels through the end of 2017. A model-generated groundwater contour map was created for Fall 2017 and compared to the model-generated Fall 2016 groundwater contour map in order to evaluate changes in groundwater flow patterns and basin-wide changes in groundwater levels. The model-generated groundwater contour maps for 2016 and 2017 are shown on Figures 3-6 and 3-7, respectively.

Groundwater flow direction and gradient within the Beaumont Basin varies depending on location with respect to a groundwater flow divide which occurs in the center of the basin approximately coincident with the Noble Creek drainage. West of the Noble Creek drainage, groundwater generally flows to the northwest and ultimately towards San Timoteo Wash. East of the Noble Creek drainage, groundwater flows to the southeast towards the City of Banning. The groundwater flow directions did not change significantly between 2016 and 2017 except near the Noble Creek Recharge Facility where a localized mount can be seen in 2017.

Basin-wide groundwater level trends in the Beaumont Basin were evaluated based on hydrographs from eights key wells and the groundwater level change map developed by

subtracting the 2016 groundwater surface from the 2017 groundwater surface (See Figures 3-6 and 3-7). The total change in storage between the Fall 2016 and the Fall 2017 is shown in Figure 3-8. In the northwest portion of the basin (YVWD 34 and Singleton Ranch 7), groundwater levels remained stable in CY 2017. At Tukwet Canyon Golf Club C, groundwater levels continued a steady decline in 2017 that has been observed since 2003. When evaluated on a long-term basis, groundwater levels in wells in the western portion of the basin have shown a general long-term decline since approximately 2005.

As shown on Figure 3-9, groundwater levels in the north central portion of the basin rose as much as 15 ft in 2017 as a result of increased recharge at the Noble Creek Artificial Recharge facility. Conversely, groundwater levels in TW-1, located on the northeast corner of the recharge facility began to recover slightly in early 2017 before starting to decline again. This well is perforated in the lower aquifer and typically shows a delayed response to groundwater recharge relative to wells perforated in the upper aquifer.

In the south-central portion of the basin, groundwater levels at Oak Valley No. 1 declined by over 10 feet since 2016. At BCVWD Well No. 2, groundwater levels rose in February 2016 but have generally been declining since. At Banning Well C-4 (southeast Beaumont Basin), groundwater levels were rising in April, declined in the summer, and began increasing in October.

The variability of groundwater levels at BCVWD Well No. 2 and Banning Well C4 are likely due to seasonal pumping patterns in these areas. Groundwater levels in the northeast portion of the basin (335714116565002) have been trending upward since 2010 and have remained mostly stable in 2017.

3.6.2 Analysis of Change in Groundwater Storage

Basin-wide change in groundwater storage between Fall 2016 and Fall 2017 was analyzed as a function of the difference in groundwater levels across the basin and the specific yield of the aquifer sediments. Groundwater level change across the basin was analyzed using the following procedure:

1. The Fall 2016 and Fall 2017 model-generated groundwater contour maps were each converted into three-dimensional raster surfaces.
2. The basin was discretized into 100-ft by 100-ft grid cells.
3. Attributes were assigned to each grid cell including groundwater level change and specific yield.
4. The resulting attribute table was processed in a Geographic Information System (GIS) for calculating the change in storage.

The specific yield distribution used for the analysis was obtained from the calibrated groundwater flow model used to evaluate the Safe Yield of the Beaumont Basin, as summarized in TH&Co (2015).

Results of the analysis show an increase in groundwater storage within the adjudicated basin of approximately 1,362 acre-ft between Fall 2016 and Fall 2017. The net storage increase is attributable to artificial recharge of imported water at the Noble Creek Artificial Recharge facility. Most of the western and southern areas showed decreases in groundwater in storage

3.7 Operating Safe Yield

For purposes of this annual report, the annual operating Safe Yield (OSY) describes the net infiltration to the adjudicated groundwater basin (not including artificial recharge) for any given year. It is noted that the OSY is different than the Operating Yield, which is a function of the unused overlyer production (Appropriative Water) and Temporary Surplus, as described in the Beaumont Basin Judgment (San Timoteo Management Authority v. Banning et al., 2004).

Operating Safe Yield is estimated based on the following equation:

$$OSY = \frac{\Sigma P + \Delta S - \Sigma AR}{\Delta T}$$

where:

ΣP	=	The sum of groundwater production (ac-ft)
ΔS	=	The change in groundwater storage (ac-ft)
ΣAR	=	The sum of groundwater recharge (ac-ft)
ΔT	=	The time over which the OSY is estimated (years)

Total Beaumont Basin groundwater production in calendar year 2017 was 15,867 ac-ft (see Table 3-3). Total artificial recharge in calendar year 2017 was 14,940 ac-ft (see Table 3-4). It is noted that only the Noble Creek Recharge Facility recharge was used in the analysis of OSY (recharge at the Little San Gorgonio Creek facility is not included because it is outside the adjudicated area). The change in groundwater storage estimate is based on the analysis of groundwater levels described earlier in this TM. The period of time over which the OSY is evaluated is one year. The resulting OSY is estimated as:

$$OSY = \frac{15{,}867 + 1{,}362 - 14{,}940}{1} = 2{,}289 \text{ ac-ft}$$

It is emphasized that the OSY, as presented herein, is based on one year of data. When evaluated on a long-term basis, this methodology can be used to estimate the long-term Safe Yield of the basin, as defined in the Beaumont Basin Judgment. As required by the Judgment, the Safe Yield of the basin was reevaluated in 2013. The Safe Yield will be reevaluated again in 2023.

It is noted that the change in groundwater storage used to estimate the annualized Safe Yield is based on a calibrated model, as described herein. As additional hydrogeological data are collected and incorporated into the model, it can be refined to produce more representative groundwater storage change estimates.

It is also noted that there are a number of data limitations that could impact the OSY estimate. These limitations include:

- Accuracy of Overlyer Production Data – Production data from many of the Overlying Parties is not metered but is estimated based on a water duty method (Wildermuth Environmental, 2012). In addition to inherent limitations in this methodology, there are, in some cases, discrepancies between groundwater production estimated using the water duty method and production reported by individual parties to the California State Water Resources Control Board. Resolution of Overlyer Production is anticipated to affect the OSY (plus or minus) on the order of hundreds of ac-ft (not thousands).

- Change in Storage Calculation – Although groundwater storage change estimates will always have inherent uncertainty, it is possible to develop more representative results through collection and analysis of additional data. These data include:

    - ✓ Static groundwater levels from dedicated non-pumping wells. There is evidence that groundwater levels measured in some wells had not recovered fully between pumping cycles in the w ell and were not, therefore, representative of true static conditions. This can be addressed by waiting longer after pumping to collect groundwater levels or constructing/designating non-pumping groundwater monitoring wells in strategic areas.
    - ✓ Measurement of surface water flow in selected drainages, hydrogeological data near Noble Creek and San Timoteo Creek, and hydrogeological analysis of faults in the basin to help achieve a better calibrated model, resulting in more accurate groundwater head distributions. Bettering our understanding of the hydrogeology of this area will help improve the accuracy of the model and its output.

3.8 Recommendations

The Rules and Regulations, initially adopted in June 2004, were developed with the understanding that they should be revisited and/or revised from time to time to make sure they were consistent with the provisions of the Judgment. Revisions to the Rules and Regulations have been made over the years with the latest revision changing the reporting of Watermaster activities from a fiscal year basis to a calendar year basis.

Currently, Watermaster is conducting a study to estimate groundwater losses from the basin resulting from spreading of imported or outside water at selected locations in the basin. The report is anticipated to be completed in eary 2018.

Watermaster may conduct additional studies in the future in support of:

- ✓ Developing a methodology to account for new yield from capturing local stormwater in the basin, and
- ✓ Developing a methodology to account for recycled water recharge in the basin.

In preparing this annual report and through the review of previous annual reports, we have identified a number of issues/activities that should be considered by the Watermaster to ensure accurate accounting of production, transfers, recharge, and storage. It should be noted that many of the recommendations provided in this section have been previously documented in prior annual reports. Our recommendations are as follows:

- Develop a protocol to increase the accuracy and consistency of data reported to the Watermaster. Watermaster should identify a person and/or entity to be the central repository for data collection, transfer, and exchange. This person/entity shall be responsible for the collection and distribution of all groundwater production, water level, groundwater recharge, and water quality information. Quality control of the data in its various forms including checks for errors, omissions, and inconsistencies between the reporting agencies and/or parties should be part of this process.
- Develop a policy to account for transfers of water that may result when an Appropriator provides water service to an Overlying Party. Section 7 of the Rules and Regulations, Adjustments for Rights, provides initial guidelines to execute this transfer; however, it needs to be enhanced in the following areas: a) data requirements to complete the transfer, b) review process by Watermaster, c) schedule for completion so that proper accounting of transfers can be given and documented in the annual report.

As indicated earlier, Watermaster should revisit the Rules and Regulations to ensure that its activities are consistent with the requirements of the Judgment. The following inc onsistencies between guidelines provided in this document and current Watermaster activities were identified:

- Watermaster has not conducted a meter maintenance program, as required under Section 3.1 of the Rules and Regulations, to make sure groundwater production is reported accurately. Individual parties may or may not maintain and calibrate their production meters at acceptable intervals.
- Under Section 3.2 of the Rules and Regulations, producers producing in an excess of 10 ac-ft/yr. should report on a monthly basis by the 15th day of the ensuing month while those producing less should file on an annual basis by the 15th of July. This provision should be revised as it was written for fiscal year accounting. Overlying Parties producing less than 10 ac-ft/yr should report by the 15th of January now that calendar year accounting is used. Proper supporting information should be provided.
- Watermaster has not enforced the submittal of notices of transfers prior to accounting for said transfers as defined in Sections 7.1 through 7.5 of the Rules and Regulations.

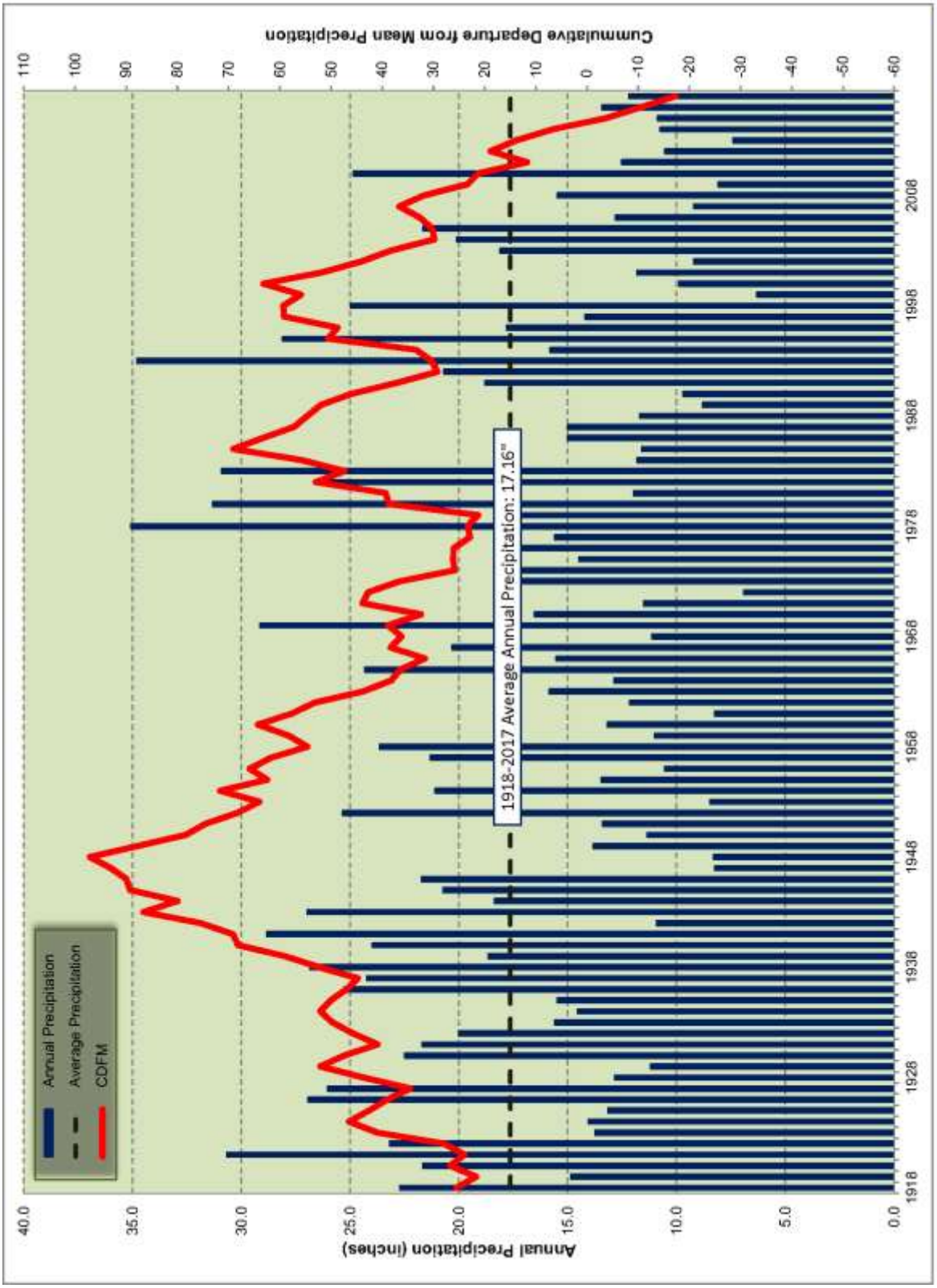
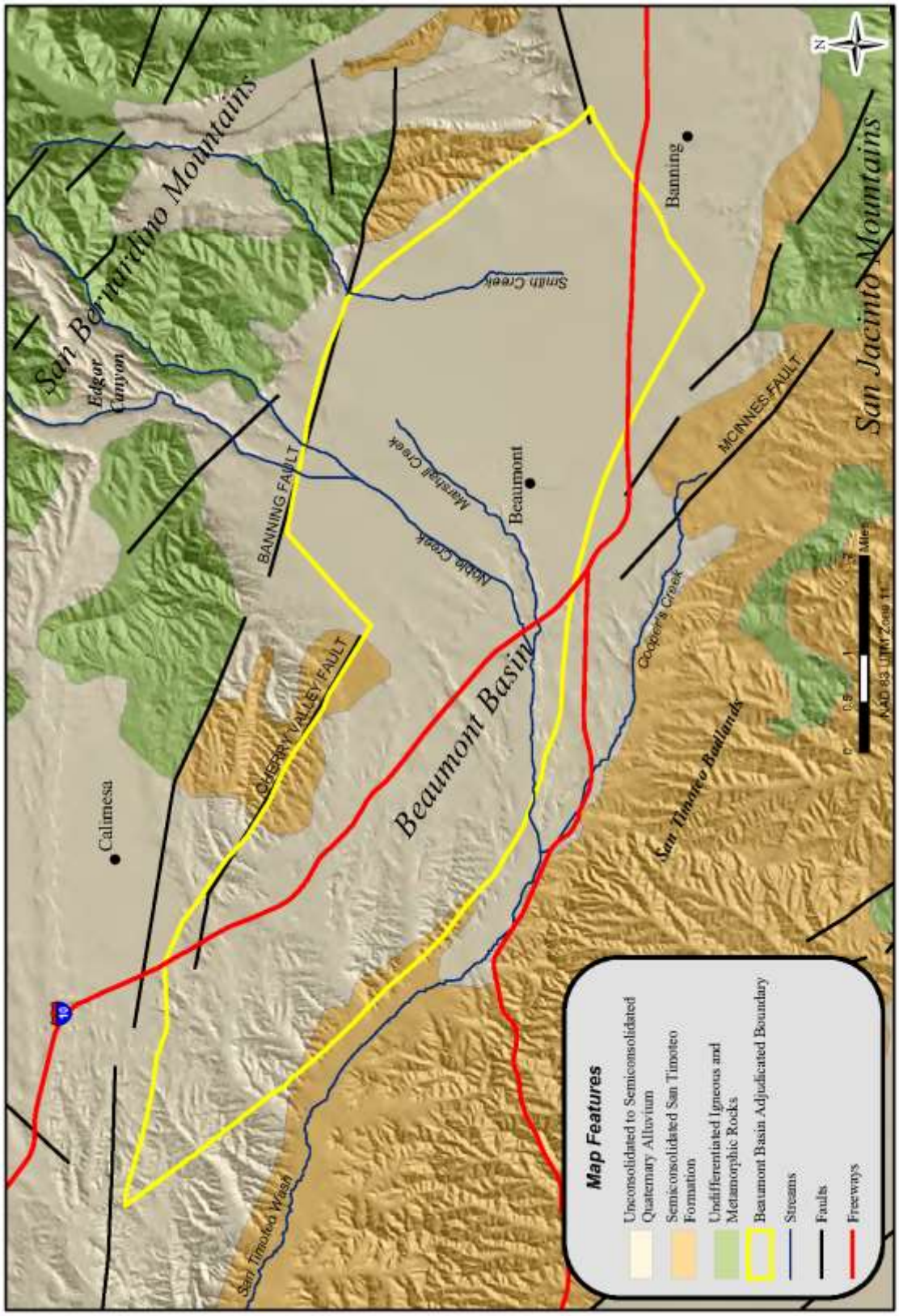
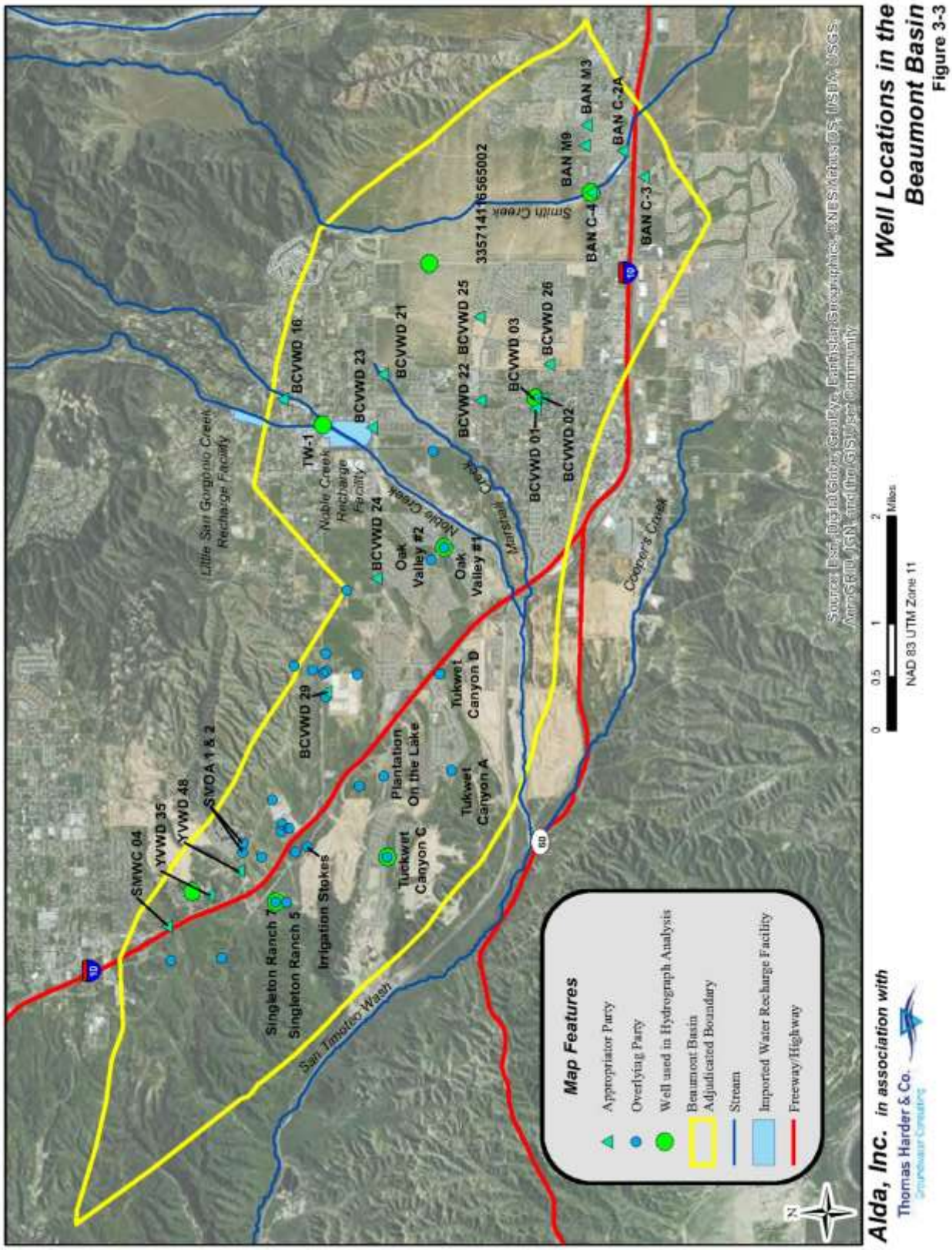


Figure 3-1
Annual Precipitation with Cummulative Departure from the Mean (1918-2017)



Geology of the Beaumont Basin
Figure 3-2

Alda, Inc. *in association with* Thomas Harder & Co.


Map Features
Appropriator Party
Overlying Party
Well used in Hydrograph Analysis
Beaumont Basin Adjudicated Boundary
Stream
Imported Water Recharge Facility
Freeway/Highway
Little San Gorgonio Creek Recharge Facility
Noble Creek Recharge Facility
Noble Creek
Smith Creek
Marshall Creek
Cooper's Creek
San Timoteo Wash
TW-1
BCVWD 16
BCVWD 21
BCVWD 23
BCVWD 24
BCVWD 25
BCVWD 22
BCVWD 03
BCVWD 26
BCVWD 01
BCVWD 02
BCVWD 29
Oak Valley #2
Oak Valley #1
Plantation On the Lake
Tukwet Canyon D
Tukwet Canyon A
Tukwet Canyon C
Irrigation Stokes
Singleton Ranch 5
Singleton Ranch 7
SMWC 04
YVWD 35
YVWD 48
SWOA 1 & 2
BAN C-4
BAN C-3
BAN C-2A
BAN M9
BAN M3
3357141165650 02
60
10
0 0.5 1 2 Miles
NAD 83 UTM Zone 11
N
Alda, Inc. in association with
Thomas Harder & Co.
Groundwater Consulting
Well Locations in the Beaumont Basin
Figure 3-3

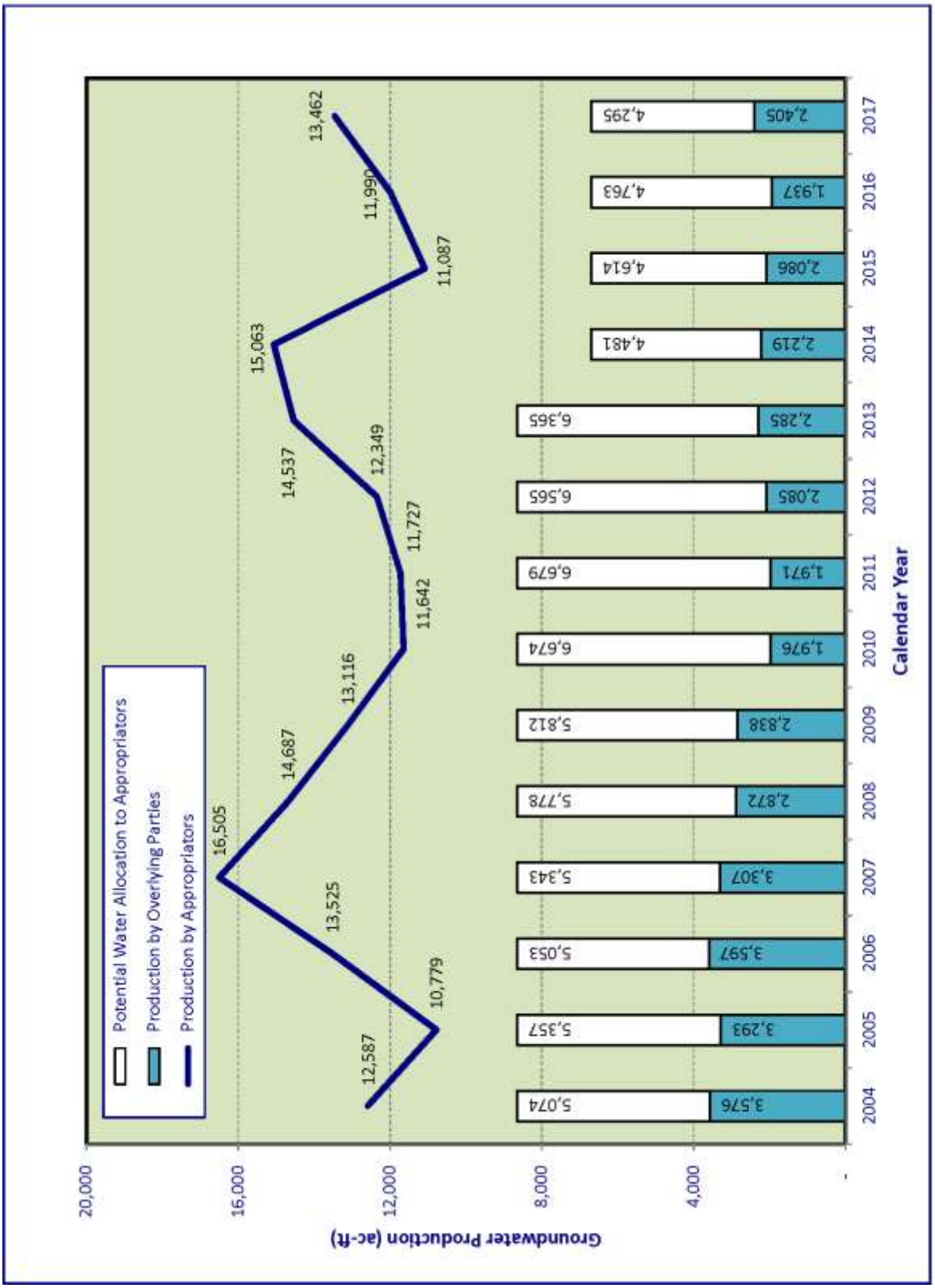


Figure 3-4
Annual Production by Appropriators and Overalying Users (2004-17)

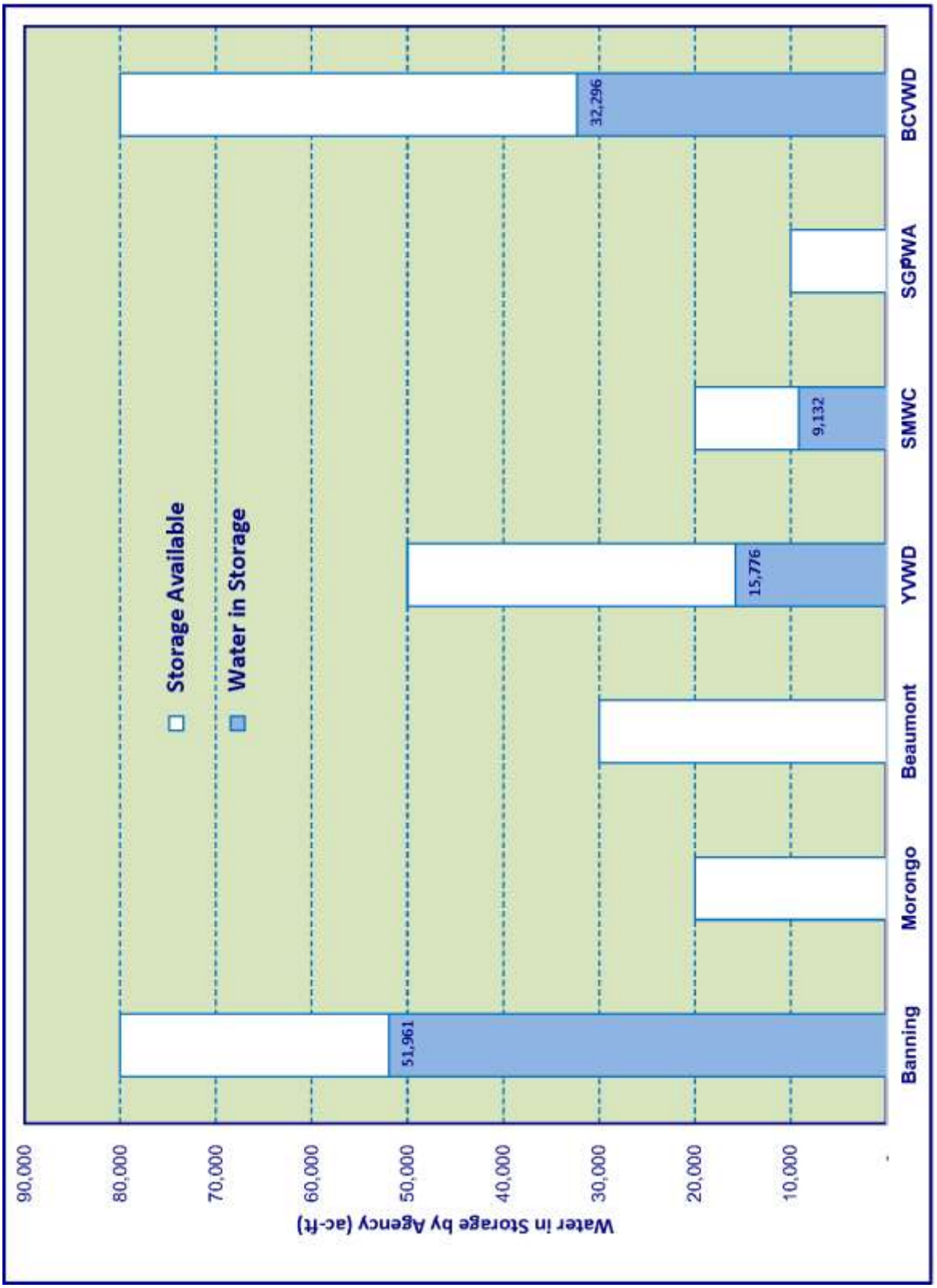
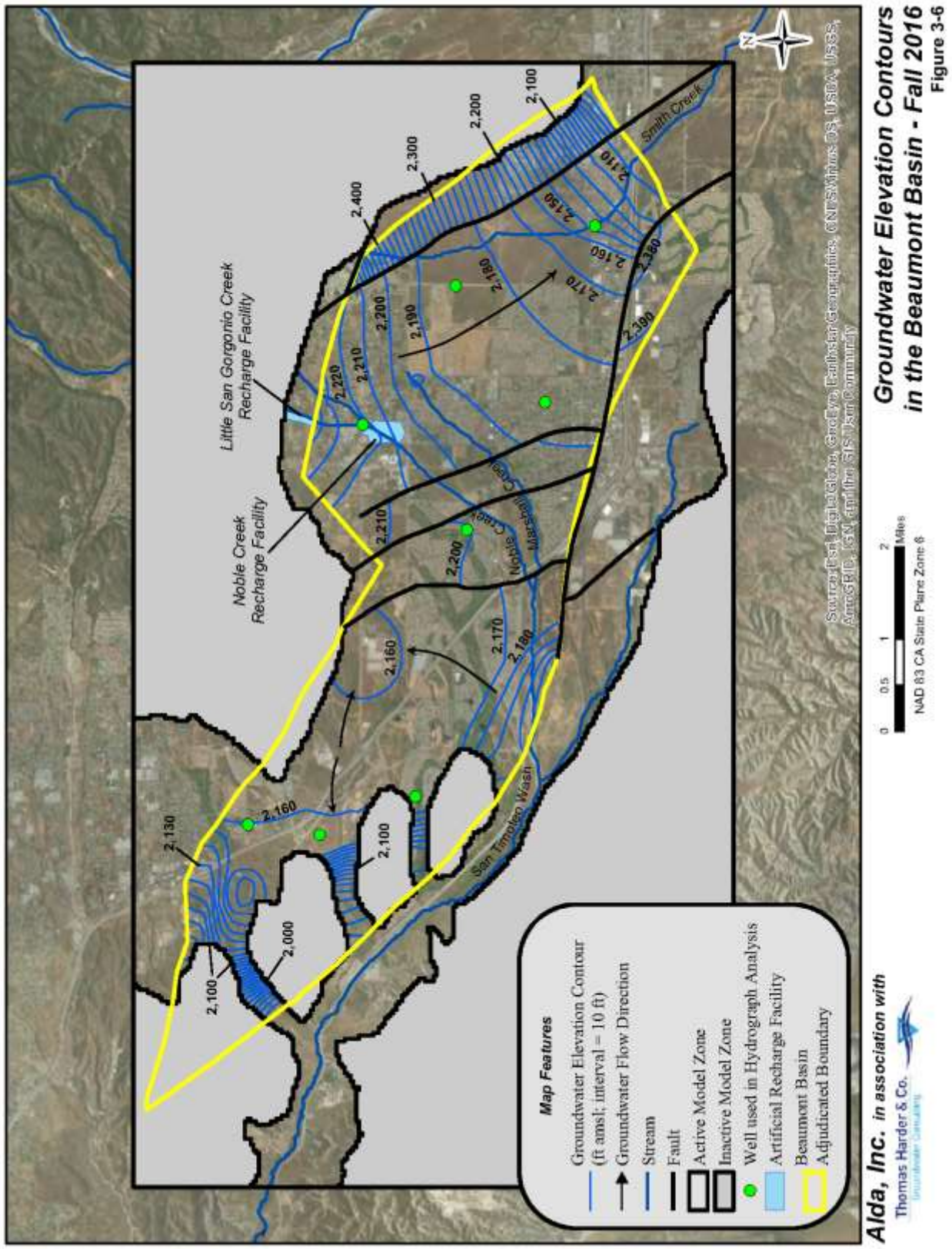
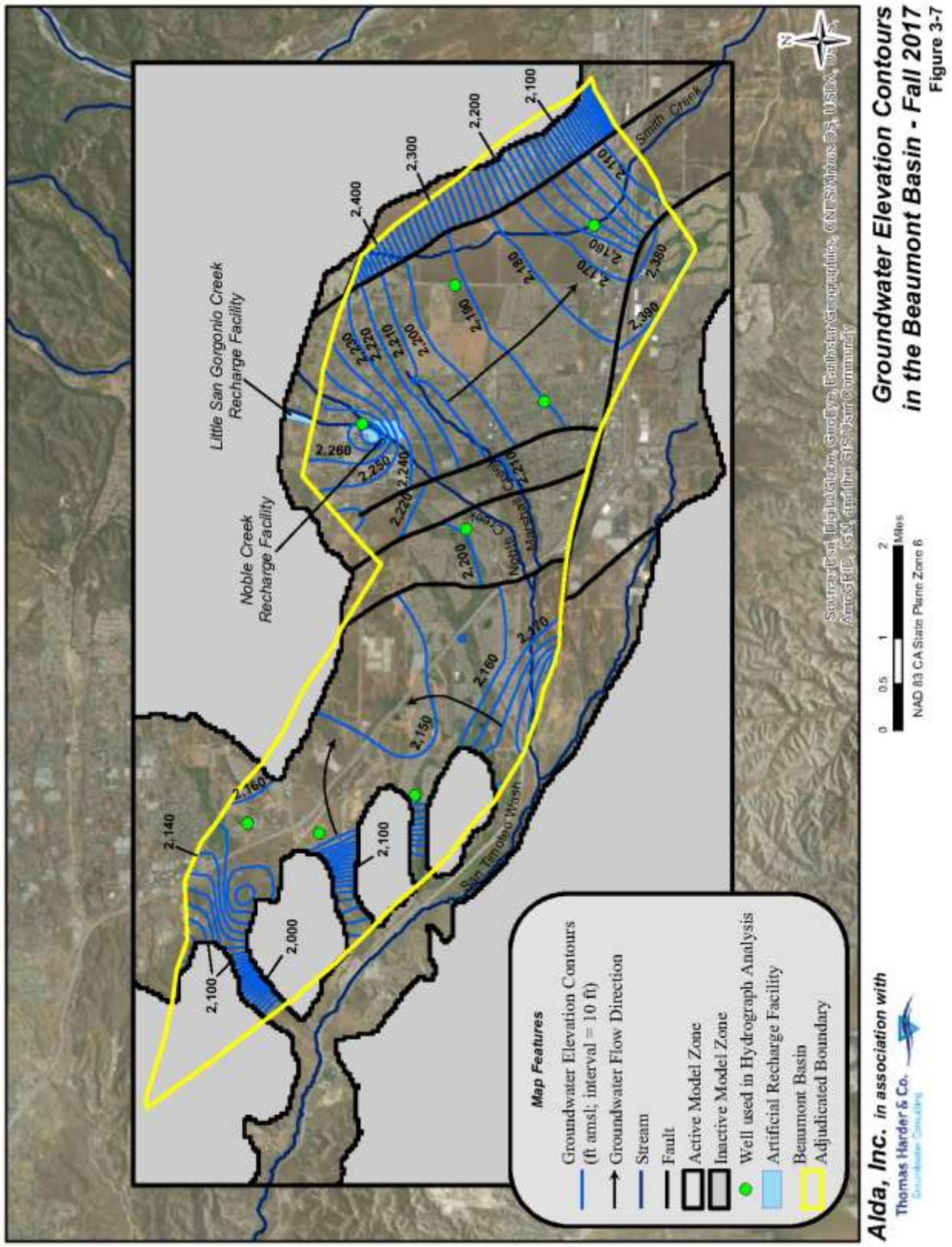


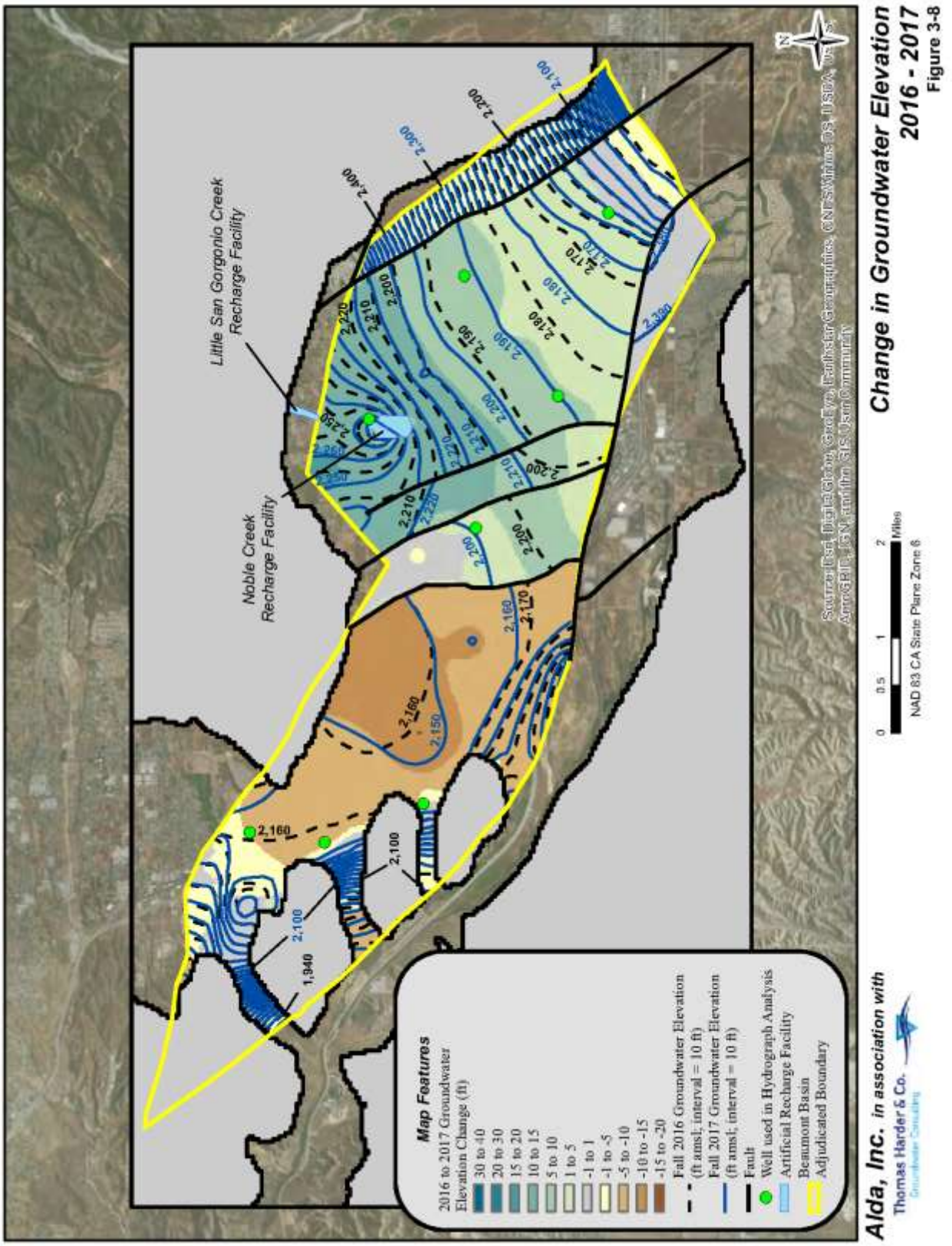
Figure 3-5
Groundwater Storage by Agency/User as of 2017

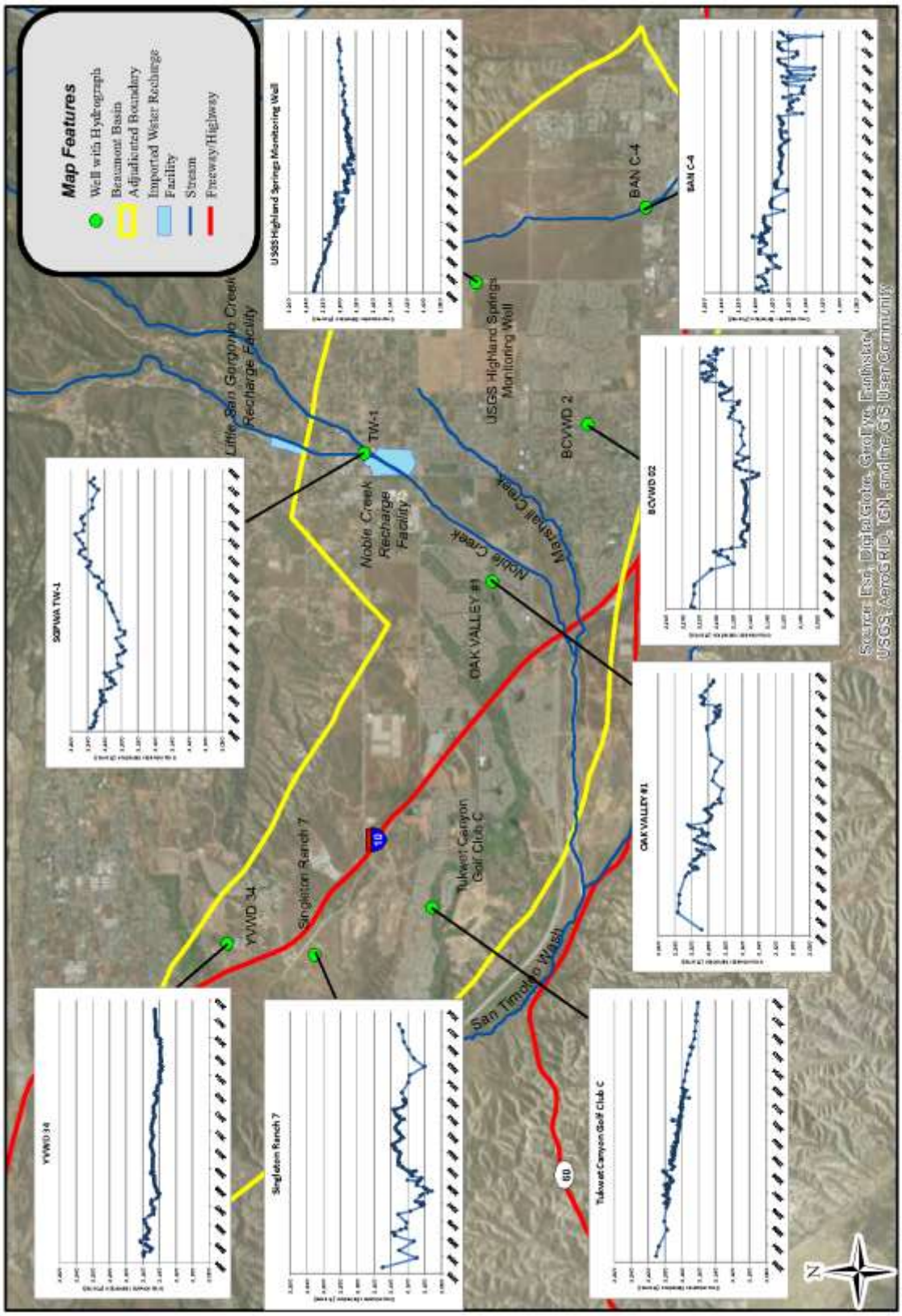


Groundwater Elevation Contours in the Beaumont Basin - Fall 2016

Figure 3-6


Little San Gorgonio Creek Recharge Facility
Noble Creek Recharge Facility
Smith Creek
San Timoteo Wash
Noble Creek
Marshall Creek
2,100
2,200
2,300
2,400
2,260
2,250
2,240
2,220
2,210
2,200
2,190
2,180
2,170
2,160
2,150
2,140
2,000
2,380
2,390
Map Features
Groundwater Elevation Contours (ft amsl; interval = 10 ft)
Groundwater Flow Direction
Stream
Fault
Active Model Zone
Inactive Model Zone
Well used in Hydrograph Analysis
Artificial Recharge Facility
Beaumont Basin
Adjudicated Boundary
N
0 0.5 1 2 Miles
NAD 83 CA State Plane Zone 6
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Alda, Inc. in association with Thomas Harder & Co. Groundwater Consulting
Groundwater Elevation Contours in the Beaumont Basin - Fall 2017
Figure 3-7


Little San Gorgonio Creek
Recharge Facility
Noble Creek
Recharge Facility
Map Features
2016 to 2017 Groundwater
Elevation Change (ft)
30 to 40
20 to 30
15 to 20
10 to 15
5 to 10
1 to 5
-1 to 1
-1 to -5
-5 to -10
-10 to -15
-15 to -20
Fall 2016 Groundwater Elevation
(ft amsl; interval = 10 ft)
Fall 2017 Groundwater Elevation
(ft amsl; interval = 10 ft)
Fault
Well used in Hydrograph Analysis
Artificial Recharge Facility
Beaumont Basin
Adjudicated Boundary
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
0 0.5 1 2 Miles
NAD 83 CA State Plane Zone 6
Alda, Inc. in association with
Thomas Harder & Co.
Groundwater Consulting
Change in Groundwater Elevation
2016 - 2017
Figure 3-8



Groundwater Level Trends at Key Wells

Figure 3-9

Table 3-1A
Appropriator Producer - Summary of Annual Production (2003 to 2012)

Owner & Well Name	Water Production by Well (ac-ft/yr) [1]									
	2003 [2]	2004	2005	2006	2007	2008	2009	2010	2011	2012
Banning, City of										
Well C2-A	619.2	710.7	0.4	6.8	288.1	382.3	119.8	26.8	32.5	13.1
Well C3	517.7	1,026.6	521.2	235.3	511.6	552.5	733.0	843.0	776.6	607.9
Well C4	446.3	1,135.7	387.6	276.8	673.9	664.3	472.6	51.4	197.5	73.0
Well M3	525.7	169.8	532.8	671.9	726.0	583.3	294.8	80.0	335.1	344.2
Well M9	63.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
From BCVWD [3]	0.0	354.5	366.4	636.7	572.9	751.3	474.8	142.5	0.0	0.0
Annual Production	**2,174.2**	**3,397.3**	**1,808.6**	**1,827.5**	**2,772.6**	**2,933.6**	**2,095.0**	**1,143.6**	**1,341.7**	**1,038.3**
Eligible for Storage [4]	340.3	1,631.7	3,220.4	3,201.5	2,256.4	2,095.4	2,934.0	3,885.4	3,687.3	3,990.7
Beaumont Cherry Valley Water District										
Well 1	5.9	978.3	1,244.2	1,149.1	1,283.8	976.9	894.1	809.1	461.7	93.8
Well 2	960.2	1,628.2	117.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 3	575.1	936.0	841.6	749.7	1,357.3	1,310.2	1,139.5	775.6	535.6	716.6
Well 16	554.6	1,103.7	735.6	537.7	348.3	414.9	452.0	11.9	153.8	255.0
Well 21	832.8	1,252.5	2,299.5	1,996.3	2,424.7	2,446.1	1,784.1	9.7	1,473.3	2,035.0
Well 22	483.3	1,125.3	405.7	1,062.6	1,056.8	1,105.3	265.1	381.7	95.1	514.7
Well 23	0.0	204.3	1,747.9	1,963.9	3,018.3	2,491.7	982.7	1,930.4	982.1	854.6
Well 24				2,231.7	2,467.1	2,093.1	2,045.4	2,199.6	2,045.7	1,764.1
Well 25						127.6	1,060.7	1,300.4	1,188.6	1,680.9
Well 28						495.9	1,187.9	1,312.2	1,435.3	1,260.9
Well 29							787.1	834.4	1,060.3	966.1
To Banning [3]	0.0	-354.5	-366.4	-636.7	-572.9	-751.3	-474.8	-142.5	0.0	0.0
Annual Production	**3,511.9**	**6,873.9**	**7,025.6**	**9,054.1**	**11,383.3**	**10,710.5**	**10,133.9**	**9,421.3**	**9,431.3**	**10,162.0**
Eligible for Storage [4]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
South Mesa Water Company										
3rd No. 4 Well	223.2	482.5	663.2	616.0	665.8	470.9	382.2	405.0	419.9	448.5
Annual Production	**223.2**	**482.5**	**663.2**	**616.0**	**665.8**	**470.9**	**382.2**	**405.0**	**419.9**	**448.5**
Eligible for Storage [4]	774.8	1,513.5	1,332.8	1,380.0	1,330.2	1,525.2	1,613.8	1,591.0	1,576.1	1,547.5
Yucaipa Valley Water District										
Well 35	58.9	226.3	117.5	220.0	163.8	3.2	0.0	0.0	0.0	0.0
Well 48	1,103.5	1,607.4	1,163.7	1,807.2	1,519.1	568.8	504.4	672.4	534.1	700.1
Annual Production	**1,162.4**	**1,833.7**	**1,281.3**	**2,027.3**	**1,682.9**	**572.0**	**504.4**	**672.4**	**534.1**	**700.1**
Eligible for Storage [4]	0.0	339.3	891.7	145.7	490.1	1,601.0	1,668.6	1,500.6	1,638.9	1,472.9
Annual Production	**7,071.7**	**12,587.4**	**10,778.6**	**13,524.9**	**16,504.6**	**14,687.0**	**13,115.6**	**11,642.3**	**11,727.1**	**12,348.9**
Eligible for Storage	**1,115.1**	**3,484.5**	**5,445.0**	**4,727.2**	**4,076.7**	**5,221.5**	**6,216.4**	**6,977.0**	**6,902.3**	**7,011.1**

1.- Calendar Year Production. All values rounded and subject to revision based on receipt of more accurate information.

2.- 2003 Production only includes from July to December to account for first half of Fiscal Year 2004 Production.

3.- Pursuant to Part I, Paragraph 3.B of the Judgment, and a separate Agreement (a copy of which is on file with the Watermaster).

4.- Volume of water available for storage is equal to the positive difference between the temporary surplus allocation and the volume of groundwater produced by each agency. Temporary surplus based on 16,000 ac-ft/yr allocated from Fiscal Year 2004 to Fiscal Year 2013. Annual allocation is as follows: a) City of Banning, 5,029 ac-ft/yr, b) Beaumont Cherry Valley Water District, 6,802 ac-ft/yr, c) South Mesa Water Company, 1,996 ac-ft/yr, and d) Yucaipa Valley Water District, 2,173 ac-ft/yr. Allocations for 2003 are based on 50 percent of the annual allocation to account for the second half of the year only.

Table 3-1B

Appropriator Producer - Summary of Production for Calendar Year 2013 (ac-ft)

Owner & Well Name	Water Production by Appropriator (ac-ft) [1]												Total Production
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Banning, City of				*Eligible for Storage based on the Temporary Surplus Allocation:*						*413.8 ac-ft*			
Well C2-A	0.3	0.3	0.2	0.7	0.3	0.4	35.5	52.8	7.2	10.7	4.0	3.2	115.5
Well C3	3.0	0.1	2.2	56.6	76.2	92.1	78.7	82.0	79.5	70.9	47.1	38.3	626.7
Well C4	0.5	2.8	126.0	140.6	97.6	100.5	116.2	87.3	56.0	48.1	23.8	59.0	858.5
Well M3	0.1	66.4	0.1	0.0	0.0	0.0	12.6	69.9	84.6	99.8	79.3	87.1	499.9
Well M9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
From BCVWD [2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	**4.0**	**69.7**	**128.5**	**197.9**	**174.1**	**193.0**	**243.0**	**292.1**	**227.3**	**229.4**	**154.1**	**187.6**	**2,100.7**
Beaumont Cherry Valley Water District				*Eligible for Storage based on the Temporary Surplus Allocation:*						*0.0 ac-ft*			
Well 1	0.6	0.0	0.0	0.3	74.0	95.9	121.9	2.2	0.0	0.0	0.0	0.0	294.9
Well 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 3	0.5	0.0	0.0	0.0	79.2	113.9	154.4	160.8	139.9	104.0	26.5	9.9	789.2
Well 16	0.2	0.0	35.7	52.4	43.2	53.3	0.0	45.2	53.6	41.6	9.2	26.5	360.8
Well 21	47.1	50.6	170.6	188.9	226.7	215.4	189.1	225.5	226.6	211.0	199.5	190.2	2,141.1
Well 22	0.0	0.0	0.0	0.0	48.0	94.0	43.1	76.5	72.7	4.5	9.7	10.3	358.9
Well 23	0.7	0.0	54.0	36.2	168.0	198.6	240.1	89.7	0.0	0.0	0.0	0.0	787.3
Well 24	157.5	123.4	128.7	159.7	109.3	122.6	100.2	118.8	123.4	120.1	118.1	144.6	1,526.5
Well 25	78.6	77.8	80.8	165.8	112.5	144.0	204.6	292.8	287.0	253.9	203.3	132.5	2,033.4
Well 26	70.2	75.7	80.7	125.0	115.4	144.8	148.6	155.9	146.2	126.8	68.6	0.0	1,257.9
Well 29	64.0	65.9	93.1	123.2	144.0	144.6	192.4	89.0	273.7	144.6	118.5	94.3	1,547.3
To Banning [2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	**419.3**	**393.4**	**643.7**	**851.4**	**1,120.4**	**1,327.2**	**1,394.4**	**1,256.4**	**1,323.2**	**1,006.5**	**753.4**	**608.4**	**11,097.4**
South Mesa Water Company				*Eligible for Storage based on the Temporary Surplus Allocation:*						*689.7 ac-ft*			
3rd No. 4 Well	18.09	14.48	22.02	26.88	31.13	42.36	47.77	45.59	34.45	25.58	-	-	308.4
Subtotal	**18.1**	**14.5**	**22.0**	**26.9**	**31.1**	**42.4**	**47.8**	**45.6**	**34.5**	**25.6**	**0.0**	**0.0**	**308.4**
Yucaipa Valley Water District				*Eligible for Storage based on the Temporary Surplus Allocation:*						*55.7 ac-ft*			
Well 35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 48	0.0	17.0	72.8	106.0	95.6	135.6	188.2	198.0	99.5	106.5	11.6	0.0	1,030.8
Subtotal	**0.0**	**17.0**	**72.8**	**106.0**	**95.6**	**135.6**	**188.2**	**198.0**	**99.5**	**106.5**	**11.6**	**0.0**	**1,030.8**
Total	**441.3**	**494.5**	**867.0**	**1,182.1**	**1,421.2**	**1,698.1**	**1,873.4**	**1,792.1**	**1,684.5**	**1,368.0**	**919.1**	**796.0**	**14,537.2**

(1) - All values rounded and subject to revision based on receipt of more accurate information

(2) - Pursuant to Part I, Paragraph 3 B of the Judgment, and a separate Agreement (a copy of which is on file with the Watermaster).

Table 3-1C

Appropriator Producer - Summary of Production for Calendar Year 2014 (ac-ft)

Owner & Well Name	Water Production by Appropriator (ac-ft) [1]												Total Production
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Banning, City of													
Well C2-A	0.9	26.3	93.5	87.4	73.1	71.3	71.2	52.3	9.2	15.6	29.4	0.3	530.5
Well C3	68.2	26.7	2.4	26.9	58.6	66.8	73.0	61.9	46.7	49.2	41.3	5.2	526.8
Well C4	64.1	1.5	21.2	39.4	124.4	112.9	110.1	103.3	118.1	114.5	47.7	0.2	857.7
Well M3	98.4	71.4	96.7	80.2	26.2	68.4	29.3	37.7	92.0	69.4	0.0	0.4	670.0
Well M9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
From BCVWD [2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	**231.7**	**125.9**	**213.9**	**233.9**	**282.2**	**319.4**	**283.6**	**255.2**	**265.9**	**248.7**	**118.4**	**6.0**	**2,585.1**
Beaumont Cherry Valley Water District													
Well 1	0.0	0.0	0.0	6.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9
Well 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 3	7.4	81.4	72.5	140.9	143.4	161.8	192.3	124.1	135.0	122.2	85.1	15.6	1,281.8
Well 16	21.7	0.0	0.0	0.0	0.0	0.0	0.0	35.1	45.5	51.3	20.7	7.8	182.2
Well 21	229.5	181.2	184.3	170.1	231.5	242.0	283.3	262.8	211.4	212.5	177.6	174.4	2,560.7
Well 22	0.1	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Well 23	0.0	0.0	0.0	0.0	76.2	208.3	211.0	133.9	92.7	90.6	165.2	103.3	1,081.0
Well 24	198.6	80.7	128.0	104.6	110.0	94.1	2.4	0.0	86.1	147.6	108.7	5.9	1,066.7
Well 25	227.3	164.1	175.4	234.7	259.9	279.0	372.6	285.9	188.3	170.9	26.3	2.4	2,386.8
Well 26	0.0	0.0	8.2	9.1	0.3	0.0	0.0	55.6	142.3	123.2	89.8	93.3	521.9
Well 29	119.0	88.7	102.0	128.1	172.9	198.3	210.9	180.6	172.3	158.4	120.1	65.2	1,716.5
To Banning [2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	**803.6**	**596.1**	**671.3**	**794.4**	**994.3**	**1,183.5**	**1,272.5**	**1,078.1**	**1,073.7**	**1,076.7**	**793.6**	**467.8**	**10,805.5**
South Mesa Water Company													
3rd No. 4 Well	17.43	24.26	56.87	30.32	38.34	50.25	56.87	46.55	54.69	45.88	33.22	19.04	473.7
Subtotal	**17.4**	**24.3**	**56.9**	**30.3**	**38.3**	**50.3**	**56.9**	**46.6**	**54.7**	**45.9**	**33.2**	**19.0**	**473.7**
Yucaipa Valley Water District													
Well 35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 48	5.1	57.0	81.7	143.3	96.6	127.1	136.5	108.9	127.9	156.6	117.9	39.9	1,198.5
Subtotal	**5.1**	**57.0**	**81.7**	**143.3**	**96.6**	**127.1**	**136.5**	**108.9**	**127.9**	**156.6**	**117.9**	**39.9**	**1,198.5**
Total	**1,057.8**	**803.4**	**1,023.8**	**1,201.9**	**1,411.5**	**1,680.2**	**1,749.4**	**1,488.8**	**1,522.2**	**1,527.9**	**1,063.1**	**532.8**	**15,062.8**

(1) - All values rounded and subject to revision based on receipt of more accurate information

(2) - Pursuant to Part I, Paragraph 3 B of the Judgment, and a separate Agreement (a copy of which is on file with the Watermaster).

Table 3-1D

Appropriator Producer - Summary of Production for Calendar Year 2015 (ac-ft)

Owner & Well Name	Water Production by Appropriator (ac-ft) [1]												Total Production
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Banning, City of													
Well C2-A	3.8	13.0	55.3	3.3	2.0	1.7	3.2	2.6	28.2	4.6	0.4	0.5	118.6
Well C3	1.7	-1.4	35.3	41.0	22.9	59.5	43.9	60.0	38.3	26.5	50.9	11.6	390.2
Well C4	3.2	2.7	7.5	1.4	5.1	94.0	100.4	89.4	55.1	103.0	69.9	39.9	571.8
Well M3	0.1	10.1	58.3	88.6	91.9	84.8	94.2	83.6	53.8	1.2	18.1	13.1	597.7
Well M9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
From BCVWD [2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	**8.8**	**24.5**	**156.5**	**134.2**	**122.0**	**240.0**	**241.7**	**235.6**	**175.3**	**135.2**	**139.3**	**65.1**	**1,678.3**
Beaumont Cherry Valley Water District													
Well 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 16	5.6	24.4	49.7	75.3	81.7	83.1	72.5	60.3	51.4	73.6	57.0	41.8	0.0
Well 21	166.9	184.6	230.4	218.9	185.3	218.2	216.1	224.9	200.5	204.2	192.8	191.9	0.0
Well 22	40.0	108.3	30.6	86.1	7.5	74.6	128.2	116.1	121.1	55.5	13.4	3.0	0.0
Well 23	184.7	121.3	199.1	246.6	232.9	267.5	261.9	241.3	216.7	226.2	167.1	143.9	0.0
Well 24	54.6	5.7	97.1	69.0	64.7	179.4	124.6	106.8	60.1	24.5	49.4	27.3	0.0
Well 25	0.0	61.1	10.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 26	16.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 29	80.4	95.7	102.6	113.2	112.0	156.7	155.7	163.3	151.3	138.4	114.5	93.0	0.0
Egg Ranch Well	10.5	8.1	7.1	15.1	0.0	34.0	6.8	14.9	25.3	0.0	17.3	0.5	0.0
To Banning [2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	**559.6**	**609.2**	**727.4**	**824.2**	**684.2**	**1,013.4**	**965.6**	**927.5**	**826.4**	**722.4**	**611.4**	**501.5**	**8,972.8**
South Mesa Water Company													
3rd No. 4 Well	20.10	19.95	21.55	27.08	21.72	36.95	34.27	37.80	28.89	27.91	21.03	19.90	317.2
Subtotal	**20.1**	**20.0**	**21.6**	**27.1**	**21.7**	**37.0**	**34.3**	**37.8**	**28.9**	**27.9**	**21.0**	**19.9**	**317.2**
Yucaipa Valley Water District													
Well 35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 48	7.5	10.0	43.0	12.8	4.3	5.8	6.1	20.4	3.4	0.0	0.1	5.8	119.2
Subtotal	**7.5**	**10.0**	**43.0**	**12.8**	**4.3**	**5.8**	**6.1**	**20.4**	**3.4**	**0.0**	**0.1**	**5.8**	**119.2**
Total	**596.0**	**663.6**	**948.6**	**998.3**	**832.2**	**1,296.2**	**1,247.7**	**1,221.3**	**1,034.0**	**885.5**	**771.9**	**592.3**	**11,087.4**

(1) - All values rounded and subject to revision based on receipt of more accurate information

(2) - Pursuant to Part I, Paragraph 3 B of the Judgment, and a separate Agreement (a copy of which is on file with the Watermaster).

Table 3-1E

Appropriator Producer - Summary of Production for Calendar Year 2016 (ac-ft)

Owner & Well Name	Water Production by Appropriator (ac-ft) [1]												Total Production
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Banning, City of													
Well C2-A	4.1	0.7	0.2	0.2	1.9	17.4	32.9	30.1	1.1	2.0	0.0	3.5	94.2
Well C3	15.5	21.9	0.2	5.8	20.1	50.0	50.9	70.6	55.5	23.0	3.0	1.5	317.8
Well C4	25.5	0.9	12.0	8.3	11.8	92.8	121.5	121.2	101.9	91.9	14.2	0.5	602.3
Well M3	0.4	0.4	0.0	0.4	22.3	92.9	95.7	95.8	90.3	58.4	1.7	0.1	458.5
Well M9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
From BCVWD [2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	**45.4**	**23.9**	**12.5**	**14.8**	**56.0**	**253.0**	**301.0**	**317.7**	**248.8**	**175.3**	**18.8**	**5.5**	**1,472.7**
Beaumont Cherry Valley Water District													
Well 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 16	68.6	67.5	61.8	66.6	80.2	75.0	91.4	74.0	37.7	70.1	47.9	20.8	761.5
Well 21	221.1	196.3	223.2	201.2	234.2	246.1	245.0	295.8	258.9	225.3	193.1	153.3	2,693.3
Well 22	0.0	2.6	0.0	0.0	40.5	111.8	144.7	177.7	164.2	155.8	67.5	7.0	871.8
Well 23	19.9	85.8	113.9	152.0	213.6	250.9	273.2	257.9	228.1	228.1	160.6	153.7	2,137.8
Well 24	30.4	48.9	19.1	1.5	0.0	188.0	241.6	216.5	145.8	38.6	104.9	62.2	1,097.3
Well 25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 26	23.3	65.8	54.6	74.6	101.9	123.3	151.8	293.5	25.1	99.6	82.8	31.7	1,127.9
Well 29	77.3	101.7	98.7	104.3	91.7	141.6	198.7	36.8	181.8	89.9	183.7	84.2	1,390.4
Egg Ranch Well	11.6	8.4	2.6	7.0	3.1	11.1	7.4	11.2	11.4	0.2	2.7	3.0	79.8
To Banning [2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	**452.1**	**577.0**	**573.9**	**607.2**	**765.2**	**1,147.9**	**1,353.7**	**1,363.4**	**1,052.9**	**907.6**	**843.2**	**515.9**	**10,159.8**
South Mesa Water Company													
3rd No. 4 Well	16.9	21.9	23.3	24.7	28.1	38.4	47.1	45.6	37.6	27.9	23.6	17.6	352.6
Subtotal	**16.9**	**21.9**	**23.3**	**24.7**	**28.1**	**38.4**	**47.1**	**45.6**	**37.6**	**27.9**	**23.6**	**17.6**	**352.6**
Yucaipa Valley Water District													
Well 35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 48	0.7	0.7	1.0	0.0	0.0	1.4	0.0	0.0	0.9	0.0	0.0	0.0	4.6
Subtotal	**0.7**	**0.7**	**1.0**	**0.0**	**0.0**	**1.4**	**0.0**	**0.0**	**0.9**	**0.0**	**0.0**	**0.0**	**4.6**
Total	**515.0**	**623.5**	**610.6**	**646.6**	**849.3**	**1,440.7**	**1,701.9**	**1,726.7**	**1,340.2**	**1,110.8**	**885.6**	**539.0**	**11,989.7**

(1) - All values rounded and subject to revision based on receipt of more accurate information

(2) - Pursuant to Part I, Paragraph 3 B of the Judgment, and a separate Agreement (a copy of which is on file with the Watermaster).

Table 3-1F

Appropriator Producer - Summary of Production for Calendar Year 2017 (ac-ft)

Owner & Well Name	Water Production by Appropriator (ac-ft) [1]												Total Production
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Banning, City of													
Well C2-A	0.8	0.3	0.8	0.3	0.0	4.6	3.8	2.0	0.7	3.7	1.4	0.2	18.6
Well C3	0.9	0.3	1.5	69.3	113.5	87.0	92.5	76.4	49.9	4.6	16.0	0.1	512.1
Well C4	1.2	0.5	48.5	20.8	7.6	73.5	91.4	76.8	73.3	64.2	26.6	14.2	498.4
Well M3	0.0	0.3	0.4	1.5	14.3	76.4	94.3	92.1	87.5	47.2	0.2	0.2	414.4
Well M9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
From BCVWD [2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	**3.0**	**1.4**	**51.2**	**91.9**	**135.4**	**241.5**	**282.0**	**247.2**	**211.4**	**119.7**	**44.1**	**14.7**	**1,443.5**
Beaumont Cherry Valley Water District													
Well 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 16	9.0	10.3	3.6	2.3	50.3	89.4	112.4	113.8	84.6	68.2	78.8	58.0	680.6
Well 21	141.5	87.6	144.2	196.3	39.5	394.9	290.1	294.4	240.9	210.7	196.2	169.5	2,405.7
Well 22	0.0	0.0	2.1	1.6	37.3	111.1	172.9	167.2	140.1	102.8	1.0	2.6	738.6
Well 23	147.7	169.0	113.3	209.2	264.7	265.3	268.8	263.6	178.5	0.0	107.1	256.8	2,244.0
Well 24	0.0	6.9	152.6	227.0	194.4	171.2	129.7	121.1	187.7	212.5	149.0	159.0	1,711.1
Well 25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	232.4	120.2	0.0	352.6
Well 26	9.0	10.4	57.8	133.6	154.5	163.9	174.9	170.0	152.5	161.1	127.4	130.1	1,445.1
Well 29	54.7	54.3	95.7	161.8	174.9	221.8	324.2	255.6	231.5	189.2	144.2	142.7	2,050.5
Egg Ranch Well	0.0	1.9	11.6	8.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.4
To Banning [2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	**361.8**	**340.4**	**580.9**	**940.7**	**915.5**	**1,417.6**	**1,472.8**	**1,385.7**	**1,215.8**	**1,176.9**	**923.8**	**918.7**	**11,650.7**
South Mesa Water Company													
3rd No. 4 Well	15.7	12.9	17.7	25.0	36.7	41.9	45.6	51.0	37.1	34.7	27.6	22.2	368.1
Subtotal	**15.7**	**12.9**	**17.7**	**25.0**	**36.7**	**41.9**	**45.6**	**51.0**	**37.1**	**34.7**	**27.6**	**22.2**	**368.1**
Yucaipa Valley Water District													
Well 35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Well 48	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Subtotal	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**	**0.0**	**0.0**	**0.1**
Total	**380.5**	**354.8**	**649.8**	**1,057.6**	**1,087.7**	**1,700.9**	**1,800.4**	**1,684.0**	**1,464.2**	**1,331.4**	**995.5**	**955.6**	**13,462.4**

(1) - All values rounded and subject to revision based on receipt of more accurate information

(2) - Pursuant to Part I, Paragraph 3 B of the Judgment, and a separate Agreement (a copy of which is on file with the Watermaster).

Table 3-2A
Overlying Producer - Summary of Production for Calendar Year 2003 through 2012 (ac-ft)

Owner and Well Name	Metered	Annual Water Production by Overlying Producer [1] [2]										Overlying Water Right (ac-ft/yr)
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
Beckman, Walter M.	No	**16.2**	**27.0**	**22.4**	**11.5**	**8.3**	**12.7**	**12.9**	**6.4**	**9.0**	**9.0**	**75.0**
California Oak Valley Golf and Resort LLC [3]												
Oak Valley #1	Yes			523.2	453.6	181.7	596.9	135.7	304.2	0.0	0.0	
Oak Valley #2	Yes			180.7	377.9	597.3	183.5	631.0	280.9	0.0	0.0	
Subtotal		**736.2**	**728.6**	**703.9**	**831.5**	**779.0**	**780.4**	**766.7**	**585.1**	**517.3**	**517.3**	**950.0**
Martin Properties	No	**3.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.5**	**1.6**	**1.6**	**550.0**
Oak Valley Partners, LP [4]												
Haskell Ranch-Main	N/A	29.4	19.6	300.0	300.0	300.0	0.0	0.0	0.0	0.0	0.0	
Singleton Ranch #5	No	180.0	300.0	40.2	2.1	2.1	2.5	2.5	2.5	2.5	2.5	
Singleton Ranch #7	Yes	85.8	111.1	10.0	10.0	10.0	0.0	0.0	0.0	0.0	0.0	
Irrigation Stokes	No	6.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Subtotal		**301.2**	**440.7**	**350.2**	**312.1**	**312.1**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**1,806.0**
Plantation on the Lake LLC	Yes	**178.6**	**340.9**	**310.2**	**350.1**	**344.2**	**354.0**	**352.3**	**337.2**	**344.7**	**344.7**	**581.0**
Rancho Calimesa Mobile Home Park	No	**35.4**	**68.3**	**68.3**	**68.3**	**69.3**	**69.3**	**69.3**	**69.3**	**69.3**	**69.3**	**150.0**
Roman Catholic Bishop of San Bernardino	No	**46.8**	**59.1**	**55.6**	**59.0**	**0.7**	**0.7**	**0.7**	**0.0**	**0.0**	**0.0**	**154.0**
Sharondale Mesa Owners Association												
Well No.1	Yes	96.6	111.0	98.4	97.0	130.1	102.9	80.3	67.7	81.0	79.2	
Well No.2	Yes	5.7	47.0	82.6	91.6	52.3	90.4	74.0	64.6	52.0	66.0	
Subtotal		**104.3**	**158.0**	**181.0**	**188.6**	**182.3**	**193.3**	**154.3**	**132.3**	**133.0**	**145.3**	**200.0**
Tukwet Canyon Golf Club [5]												
Well A	Yes	130.8	268.0	217.2	341.7	329.1	11.2	204.4	118.6	118.4	217.5	
Well C	Yes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Well D	Yes	660.6	1,078.6	995.9	1,411.6	1,269.9	1,126.4	954.2	733.2	764.5	766.8	
Subtotal		**791.4**	**1,346.7**	**1,213.1**	**1,753.4**	**1,599.1**	**1,137.6**	**1,158.6**	**851.8**	**882.9**	**984.3**	**2,200.0**
Stearns, Leonard M. and Dorothy D.	No	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**0.7**	**0.7**	**0.7**	**200.0**
Sunny-Cal Egg and Poultry Company	N/A	**226.0**	**404.4**	**385.4**	**2.6**	**2.7**	**4.2**	**4.2**	**3.8**	**4.2**	**4.3**	**1,439.5**
Sunny-Cal North - Manheim, M & Berman	No				**13.2**	**2.3**	**2.3**	**2.3**	**2.1**	**2.3**	**2.4**	**300.0**
Nikodinov, Nick	No				**0.7**	**0.8**	**0.8**	**0.7**	**0.7**	**0.8**	**0.8**	**20.0**
McAmis, Ronald L.	No				**0.5**	**0.6**	**0.6**	**0.5**	**0.5**	**0.6**	**0.6**	**5.0**
Aldama, Nicolas and Amalia	No				**0.8**	**0.8**	**0.9**	**0.8**	**0.8**	**0.9**	**0.9**	**7.0**
Gutierrez, Hector, et al.	No				**1.4**	**1.4**	**1.4**	**1.4**	**1.3**	**1.4**	**1.4**	**10.0**
Darmont, Boris and Miriam	No				**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**2.5**
TOTAL		**2,440.8**	**3,576.3**	**3,292.6**	**3,596.7**	**3,306.5**	**2,563.6**	**2,530.1**	**1,976.5**	**1,971.4**	**2,085.4**	**8,650.0**

1.- All values rounded and subject to revision based on receipt of more accurate information.

2.- Annual production is estimated for Overlying parties with un-metered wells.

3.- Metering began in late 2004 and was not reported monthly. One total production value for each well was reported to Watermaster for FY 2003/04 . For the conversion to CY accounting, it was assumed that CY 2004 production for this entity was equal to FY 2003/04 production.

4.- Provided copies of state filing with annual calendar year totals for each well. Production values for Singleton Ranch #5 and Irrigation Stokes are estimated by Oak Valley Partners through 2007. Starting in 2008, production was reduced to an estimated 2.5 ac-ft/y as agricultural use of the land ended. Estimate based on water use by a single farm house and a small cattle population.

5.- The Southern California Section of the PGA of America changed to East Valley Golf Club in 2007 and to Tukwet Canyon Golf Course in 2010. Monthly production provided by the Morongo Band of Mission Indians - 03/14.

Table 3-2B
Overlying Producer - Summary of Production for Calendar Year 2013 (ac-ft)

Owner and Well Name	Metered	Monthly Water Production by Overlying Producer[1]												Total [2] Production	Overlying Water Right	Unused Overlying Allocation in 2013
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Beckman, Walter M. [3]	Yes	0.0	0.0	0.0	0.3	0.3	0.4	0.6	0.0	0.4	0.1	0.0	0.0	**2.1**	**75.0**	**72.9**
California Oak Valley Golf and Resort LLC [3]																
Oak Valley #1	Yes	11.5	12.4	12.5	11.4	55.2	66.1	97.7	0.0	0.0	0.0	0.0	0.0	266.8		
Oak Valley #2	Yes	1.3	0.7	1.1	0.8	0.0	0.0	2.5	68.9	49.7	70.4	53.3	110.4	359.0		
Subtotal		**12.8**	**13.1**	**13.6**	**12.1**	**55.2**	**66.1**	**100.1**	**68.9**	**49.7**	**70.4**	**53.3**	**110.4**	**625.8**	**950.0**	**324.2**
Merlin Properties	No	Water Duty Method Used to Estimate Annual Production												1.6	550.0	548.4
Oak Valley Partners, LP [4]																
Singleton Ranch #5	No													0.00		
Singleton Ranch #7	No													2.50		
Irrigation Stokes	No													0.00		
Subtotal		Annual consumption estimated based on water use by a single farm house and a small bovine population												**2.5**	**1,806.0**	**1,803.5**
Plantation on the Lake LLC [3]	Yes	13.3	16.1	17.0	29.8	20.4	35.1	36.7	41.1	35.4	37.0	24.6	20.2	326.7	581.0	254.3
Rancho Calimesa Mobile Home Park [3]	No	Water Duty Method Used to Estimate Annual Production												69.3	150.0	80.7
Roman Catholic Bishop of San Bernardino		Water Duty Method Used to Estimate Annual Production												0.0	154.0	154.0
Sharondale Mesa Owners Association [3]																
Well No.1	Yes	2.7	3.1	4.8	7.3	7.6	9.7	10.8	10.9	3.8	1.6	5.8	4.0	72.0		133.4
Well No.2	Yes	2.5	2.8	4.1	5.9	5.8	6.6	7.6	7.8	13.3	12.2	3.0	3.7	75.0		
Subtotal		**5.2**	**6.0**	**8.8**	**13.2**	**13.4**	**16.3**	**18.3**	**18.7**	**16.9**	**13.8**	**8.8**	**7.7**	**147.0**	**200.0**	**53.0**
Tukwet Canyon Golf Club [5]																
Well A	Yes	6.6	6.2	15.6	29.9	33.8	39.6	0.0	0.0	5.2	25.4	15.7	20.0	198.1		
Well C	Yes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Well D	Yes	20.2	13.3	35.3	70.2	86.0	111.1	152.8	143.9	117.1	77.7	41.6	31.2	900.3		
Subtotal		**26.9**	**19.4**	**50.9**	**100.0**	**119.8**	**150.6**	**152.8**	**143.9**	**122.3**	**103.1**	**57.3**	**51.2**	**1,098.4**	**2,200.0**	**1,101.6**
Stearns, Leonard M. and Dorothy D.	No	Water Duty Method Used to Estimate Annual Production												**0.7**	**200.0**	**199.3**
Sunny-Cal Egg and Poultry Company	No	Water Duty Method Used to Estimate Annual Production												**4.3**	**1,439.5**	**1,435.2**
Albor Properties III, LP	No	Water Duty Method Used to Estimate Annual Production												**2.4**	**300.0**	**297.6**
Nikodinov, Nick	No	Water Duty Method Used to Estimate Annual Production												**0.8**	**20.0**	**19.2**
McAmis, Ronald L.	No	Water Duty Method Used to Estimate Annual Production												**0.6**	**5.0**	**4.4**
Aldama, Nicolas and Amalia	No	Water Duty Method Used to Estimate Annual Production												**0.9**	**7.0**	**6.1**
Gutierrez, Hector, et al.	No	Water Duty Method Used to Estimate Annual Production												**1.4**	**10.0**	**8.6**
Darmont, Boris and Miriam	No	Water Duty Method Used to Estimate Annual Production												**0.4**	**2.5**	**2.2**
TOTAL														**2,284.8**	**8,650.0**	**6,365.2**

1.- All values rounded and subject to revision based on receipt of more accurate information in the future.

2.- Total production is estimated for Overlying parties with un-metered wells.

3.- Monthly production provided by BCVWD - Feb 2014

4.- Starting in 2009, the parcels owned by Oak Valley Partners were no longer used for agricultural purposes. Groundwater production was estimated at 2.5 ac-ft/yr based on water use by a single farm house and a small cattle population.

5.- Monthly production since 2011 provided by Clearwater Solutions, a company in charge of operating the water system.

6.- Actual monthly production provided by the Morongo Band of Mission Indians - March 2014.

Table 3-2C
Overlying Producer - Summary of Production for Calendar Year 2014 (ac-ft)

Owner and Well Name	Metered	Monthly Water Production by Overlying Producer[2]												Total[2] Production	Overlying Water Right	Unused Overlying Allocation in 2014
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Beckman, Walter M. [3]	Yes	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.9**	**58.1**	**57.2**
California Oak Valley Golf and Resort LLC [3]																
Oak Valley #1	Yes	0.0	2.0	3.3	4.7	6.4	5.5	4.0	5.9	0.0	0.0	4.9	18.7	55.4		
Oak Valley #2	Yes	28.7	16.9	0.0	0.0	0.0	42.8	69.0	24.7	54.9	98.7	25.9	0.0	361.6		
Subtotal		**28.7**	**18.9**	**3.3**	**4.7**	**6.4**	**48.3**	**73.0**	**30.5**	**54.9**	**98.7**	**30.8**	**18.7**	**417.0**	**735.8**	**318.8**
Merlin Properties	No	Water Duty Method Used to Estimate Annual Production												1.6	426.0	424.4
Oak Valley Partners, LP [4]																
Singleton Ranch #5	No													0.00		
Singleton Ranch #7	No													2.50		
Irrigation Stokes	No													0.00		
Subtotal		Annual consumption estimated based on water use by a single farm house and a small bovine population												**2.5**	**1,398.9**	**1,396.4**
Plantation on the Lake LLC	Yes	20.2	23.6	25.7	44.3	31.7	32.4	37.6	42.7	39.0	32.8	34.0	39.7	403.8	450.0	46.2
Rancho Calimesa Mobile Home Park [5]	Yes	0.9	0.9	0.9	1.0	1.0	1.1	2.6	1.1	0.6	2.0	1.7	2.3	16.2	116.2	100.0
Roman Catholic Bishop of San Bernardino		Water Duty Method Used to Estimate Annual Production												0.0	119.3	119.3
Sharondale Mesa Owners Association [3]																
Well No.1	Yes	5.1	4.0	4.9	7.0	9.0	8.7	10.1	7.0	6.5	8.8	4.9	1.8	78.0		
Well No.2	Yes	4.8	3.7	4.3	5.4	6.3	6.4	6.9	4.4	5.4	5.5	4.6	1.7	59.3		
Subtotal		**9.9**	**7.7**	**9.2**	**12.4**	**15.3**	**15.1**	**17.0**	**11.4**	**12.0**	**14.3**	**9.5**	**3.5**	**137.3**	**154.9**	**17.6**
Tukwet Canyon Golf Club [6]																
Well A	Yes	24.0	15.9	20.1	29.3	34.3	43.4	41.1	29.6	12.1	23.5	3.5	0.8	277.6		
Well C	Yes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Well D	Yes	55.4	30.0	34.6	63.1	114.4	127.5	119.3	111.5	134.5	85.8	58.4	16.0	950.3		
Subtotal		**79.4**	**45.8**	**54.7**	**92.4**	**148.7**	**170.9**	**160.3**	**141.1**	**146.6**	**109.3**	**61.9**	**16.7**	**1,227.9**	**1,704.0**	**476.1**
Stearns, Leonard M. and Dorothy D.	No	Water Duty Method Used to Estimate Annual Production												**0.7**	**154.9**	**154.2**
Sunny-Cal Egg and Poultry Company	No	Water Duty Method Used to Estimate Annual Production												**4.3**	**1,115.0**	**1,110.6**
Albor Properties III, LP	No	Water Duty Method Used to Estimate Annual Production												**2.4**	**232.4**	**229.9**
Nikodinov, Nick	No	Water Duty Method Used to Estimate Annual Production												**0.8**	**15.5**	**14.7**
McAmis, Ronald L.	No	Water Duty Method Used to Estimate Annual Production												**0.6**	**3.9**	**3.3**
Aldama, Nicolas and Amalia	No	Water Duty Method Used to Estimate Annual Production												**0.9**	**5.4**	**4.6**
Gutierrez, Hector, et al.	No	Water Duty Method Used to Estimate Annual Production												**1.4**	**7.7**	**6.3**
Darmont, Boris and Miriam	No	Water Duty Method Used to Estimate Annual Production												**0.4**	**1.9**	**1.6**
TOTAL														**2,218.7**	**6,700.0**	**4,481.3**

1.- All values rounded and subject to revision based on receipt of more accurate information in the future.

2.- Total production is estimated for Overlying parties with un-metered wells.

3.- Monthly production provided by BCVWD - Feb 2015

4.- Starting in 2008, the parcels owned by Oak Valley Partners were no longer used for agricultural purposes. Groundwater production was estimated at 2.5 ac-ft/yr based on water use by a single farm house and a small cattle population.

5.- Monthly production since 2011 provided by Clearwater Solutions, a company in charge of operating the water system.

6.- Actual monthly production provided by the Morongo Band of Mission Indians - March 2014.

Table 3-2D
Overlying Producer - Summary of Production for Calendar Year 2015 (ac-ft)

Owner and Well Name	Metered	Monthly Water Production by Overlying Producer[1]												Total[2] Production	Overlying Water Right	Unused Overlying Allocation in 2015
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Beckman, Walter M. [3]	Yes	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.9**	**58.1**	**57.2**
California Oak Valley Golf and Resort LLC [3]																
Oak Valley #1	Yes	22.2	0.0	34.5	56.4	40.1	66.6	35.1	59.9	111.6	31.3	25.3	2.8	485.6		
Oak Valley #2	Yes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	193.8	11.7	60.0	0.0	265.5		
Subtotal		**22.2**	**0.0**	**34.5**	**56.4**	**40.1**	**66.6**	**35.1**	**59.9**	**305.4**	**43.0**	**85.3**	**2.8**	**751.1**	**735.8**	**0.0**
Merlin Properties	No	Water Duty Method Used to Estimate Annual Production												**1.6**	**426.0**	**424.4**
Oak Valley Partners, LP [4]																
Singleton Ranch #6	No													0.00		
Singleton Ranch #7	No													2.50		
Irrigation Stokes	No													0.00		
Subtotal		Annual consumption estimated based on water use by a single farm house and a small bovine population												**2.5**	**1,398.9**	**1,396.4**
Plantation on the Lake LLC [5]	Yes	39.7	19.3	17.4	24.3	26.2	32.1	20.9	24.8	28.2	27.3	21.6	20.2	**302.1**	**450.0**	**147.9**
Rancho Calimesa Mobile Home Park [6]																
Well No.1	Yes	1.2	1.1	1.1	1.5	0.8	0.8	1.2	1.2	0.9	1.2	1.1	1.0	13.2		
Well No.2	No	0.8	1.0	0.9	0.9	0.8	0.8	1.0	1.0	0.8	0.8	0.8	0.8	10.2		
Subtotal		**1.9**	**2.1**	**2.0**	**2.4**	**1.7**	**1.7**	**2.2**	**2.2**	**1.7**	**1.9**	**1.9**	**1.8**	**23.4**	**116.2**	**92.7**
Roman Catholic Bishop of San Bernardino		Water Duty Method Used to Estimate Annual Production												**0.0**	**119.3**	**119.3**
Sharondale Mesa Owners Association [6]																
Well No.1	Yes	2.5	3.9	0.5	0.2	1.9	5.1	6.3	9.6	8.4	8.9	7.9	1.8	57.1		
Well No.2	Yes	2.4	3.2	6.6	9.3	5.3	3.9	1.9	0.0	0.0	0.0	0.0	4.5	37.0		
Subtotal		**4.9**	**7.2**	**7.1**	**9.5**	**7.2**	**9.0**	**8.2**	**9.6**	**8.4**	**8.9**	**7.9**	**6.3**	**94.1**	**154.9**	**60.8**
Tukwet Canyon Golf Club [7]																
Well A	Yes	6.0	1.6	3.3	4.3	1.5	12.4	6.4	5.1	1.8	1.9	0.7	3.2	48.1		
Well C	Yes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Well D	Yes	42.1	53.7	51.7	89.2	55.4	120.3	93.3	104.8	95.5	59.3	50.9	34.1	850.5		
Subtotal		**48.1**	**55.4**	**55.0**	**93.5**	**56.9**	**132.7**	**99.7**	**109.8**	**97.3**	**61.2**	**51.6**	**37.3**	**898.6**	**1,704.0**	**805.4**
Stearns, Leonard M. and Dorothy D.	No	Water Duty Method Used to Estimate Annual Production												**0.7**	**154.9**	**154.2**
Sunny-Cal Egg and Poultry Company	No	Water Duty Method Used to Estimate Annual Production												**4.3**	**1,115.0**	**1,110.6**
Albor Properties III, LP	No	Water Duty Method Used to Estimate Annual Production												**2.4**	**232.4**	**229.9**
Nikodinov, Nick	No	Water Duty Method Used to Estimate Annual Production												**0.8**	**15.5**	**14.7**
McAmis, Ronald L.	No	Water Duty Method Used to Estimate Annual Production												**0.6**	**3.9**	**3.3**
Aldama, Nicolas and Amalia	No	Water Duty Method Used to Estimate Annual Production												**0.9**	**5.4**	**4.6**
Gutierrez, Hector, et al.	No	Water Duty Method Used to Estimate Annual Production												**1.4**	**7.7**	**6.3**
Darmont, Boris and Miriam	No	Water Duty Method Used to Estimate Annual Production												**0.4**	**1.9**	**1.6**
TOTAL														**2,085.8**	**6,700.0**	**4,629.5**

1.- All values rounded and subject to revision based on receipt of more accurate information in the future.

2.- Total production is estimated for Overlying parties with un-metered wells.

3.- Monthly production provided by Overlying User

4.- Starting in 2008, the parcels owned by Oak Valley Partners were no longer used for agricultural purposes. Groundwater production was estimated at 2.5 ac-ft/yr based on water use by a single farm house and a small cattle population.

5.- Production for Plantation by the Lake provided by producer.

6.- Monthly production since 2011 provided by Clearwater Solutions, a company in charge of operating the water system

7.- Actual monthly production provided by the Morongo Band of Mission Indians - May 2016

Table 3-2E
Overlying Producer - Summary of Production for Calendar Year 2016 (ac-ft)

Owner and Well Name	Metered	Monthly Water Production by Overlying Producer[3]												Total[2] Production	Overlying Water Right	Unused Overlying Allocation in 2016
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Beckman, Walter M. [3]	Yes	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.9**	**58.1**	**57.2**
California Oak Valley Golf and Resort LLC [3]																
Oak Valley #1	Yes	23.7	12.6	4.3	18.7	20.9	75.0	113.5	106.2	31.7	5.6	4.1	2.2	418.5		
Oak Valley #2	Yes	44.6	43.9	5.5	11.1	26.9	0.0	0.0	0.0	1.8	0.1	0.0	0.0	133.9		
Subtotal		**68.2**	**56.5**	**9.8**	**29.8**	**47.8**	**75.0**	**113.5**	**106.2**	**33.4**	**5.7**	**4.1**	**2.2**	**552.3**	**735.8**	**183.5**
Merlin Properties	No	Water Duty Method Used to Estimate Annual Production												**1.6**	**426.0**	**424.4**
Oak Valley Partners, LP [4]																
Singleton Ranch #5	No													0.00		
Singleton Ranch #7	No													2.50		
Irrigation Stokes	No													0.00		
Subtotal		Annual consumption estimated based on water use by a single farm house and a small cattle population												**2.5**	**1,398.9**	**1,396.4**
Plantation on the Lake LLC [3]	Yes	14.5	15.6	17.9	19.5	18.8	28.7	34.4	35.1	38.3	33.7	20.9	17.9	**293.4**	**450.0**	**156.6**
Rancho Calimesa Mobile Home Park [3]																
Well No.1	Yes	1.0	1.0	0.6	1.7	2.5	3.3	3.0	3.4	3.7	2.8	2.7	1.1	26.9		
Well No.2	No	0.7	0.6	0.4	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.9	4.2		
Subtotal		**1.7**	**1.6**	**1.1**	**2.9**	**2.5**	**3.3**	**3.0**	**3.4**	**3.7**	**2.8**	**3.1**	**2.0**	**31.2**	**116.2**	**85.0**
Roman Catholic Bishop of San Bernardino		Water Duty Method Used to Estimate Annual Production												**0.0**	**119.3**	**119.3**
Sharondale Mesa Owners Association [5]																
Well No.1	Yes	2.7	3.7	4.7	2.7	5.1	6.6	3.5	0.3	7.2	5.3	5.8	2.9	50.5		
Well No.2	Yes	2.3	2.7	1.4	4.0	3.3	4.0	5.5	4.3	1.6	0.0	2.8	2.5	34.3		
Subtotal		**5.0**	**6.4**	**6.1**	**6.7**	**8.4**	**10.6**	**9.0**	**4.5**	**8.9**	**5.3**	**8.6**	**5.4**	**84.8**	**154.9**	**70.1**
Tukwet Canyon Golf Club [5]																
Well A	Yes	0.8	0.7	14.1	0.7	1.7	4.7	7.9	11.7	5.7	1.4	0.6	0.5	50.6		
Well C	Yes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Well D	Yes	18.2	39.1	17.1	43.8	78.6	138.6	134.9	162.8	124.8	85.7	58.4	6.0	908.1		
Subtotal		**19.1**	**39.8**	**31.2**	**44.5**	**80.2**	**143.2**	**142.8**	**174.5**	**130.5**	**87.2**	**59.1**	**6.5**	**958.6**	**1,704.0**	**745.4**
Stearns, Leonard M. and Dorothy D.	No	Water Duty Method Used to Estimate Annual Production												**0.7**	**154.9**	**154.2**
Sunny-Cal Egg and Poultry Company	No	Water Duty Method Used to Estimate Annual Production												**4.3**	**1,115.0**	**1,110.6**
Albor Properties III, LP	No	Water Duty Method Used to Estimate Annual Production												**2.4**	**232.4**	**229.9**
Nikodinov, Nick	No	Water Duty Method Used to Estimate Annual Production												**0.8**	**15.5**	**14.7**
McAmis, Ronald L.	No	Water Duty Method Used to Estimate Annual Production												**0.6**	**3.9**	**3.3**
Aldama, Nicolas and Amalia	No	Water Duty Method Used to Estimate Annual Production												**0.9**	**5.4**	**4.6**
Gutierrez, Hector, et al.	No	Water Duty Method Used to Estimate Annual Production												**1.4**	**7.7**	**6.3**
Darmont, Boris and Miriam	No	Water Duty Method Used to Estimate Annual Production												**0.4**	**1.9**	**1.6**
TOTAL														**1,936.7**	**6,700.0**	**4,763.3**

1.- All values rounded and subject to revision based on receipt of more accurate information in the future.

2.- Total production is estimated for Overlying parties with un-metered wells.

3.- Monthly production provided by Overlying User

4.- Starting in 2008, the parcels owned by Oak Valley Partners were no longer used for agricultural purposes. Groundwater production was estimated at 2.5 ac-ft/yr based on water use by a single farm house and a small cattle population.

5.- Monthly production since 2011 provided by Clearwater Solutions, a company in charge of operating the water system.

6.- Actual monthly production provided by the Morongo Band of Mission Indians - May 2017.

Table 3-2F
Overlying Producer - Summary of Production for Calendar Year 2017 (ac-ft)

Owner and Well Name	Metered	Monthly Water Production by Overlying Producer[1]												Total[2] Production	Overlying Water Right	Unused Overlying Allocation in 2017
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Beckman, Walter M. [3]	Yes	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.9**	**58.1**	**57.2**
California Oak Valley Golf and Resort LLC [3]																
Oak Valley #1	Yes	0.0	0.0	0.0	0.0	0.0	0.0	38.9	88.3	40.8	0.0	0.0	0.0	168.1		
Oak Valley #2	Yes	6.3	6.5	125.4	54.7	61.6	75.0	129.4	0.0	52.7	10.1	80.1	60.1	661.9		
Subtotal		**6.3**	**6.5**	**125.4**	**54.7**	**61.6**	**75.0**	**168.3**	**88.3**	**93.5**	**10.1**	**80.1**	**60.1**	**830.0**	**735.8**	**0.0**
Merlin Properties	No	Water Duty Method Used to Estimate Annual Production												**1.6**	**426.0**	**424.4**
Oak Valley Partners, LP [4]																
Singleton Ranch #5	No													0.00		
Singleton Ranch #7	No													2.50		
Irrigation Stokes	No													0.00		
Subtotal		Annual consumption estimated based on water use by a single farm house and a small cattle population												**2.5**	**1,398.9**	**1,396.4**
Plantation on the Lake LLC [3]	Yes	11.6	9.0	9.7	20.1	28.8	29.0	35.7	38.6	73.4	55.7	61.1	47.1	**417.8**	**450.0**	**32.2**
Rancho Calimesa Mobile Home Park [5]																
Well No.1	Yes	1.0	1.0	0.6	1.7	2.5	3.3	3.0	3.4	3.7	2.8	2.7	1.1	26.9		
Well No.2	No	0.7	0.6	0.4	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.9	4.2		
Subtotal		**1.7**	**1.6**	**1.1**	**2.9**	**2.5**	**3.3**	**3.0**	**3.4**	**3.7**	**2.8**	**3.1**	**2.0**	**31.2**	**116.2**	**85.0**
Roman Catholic Bishop of San Bernardino		Water Duty Method Used to Estimate Annual Production												**0.0**	**119.3**	**119.3**
Sharondale Mesa Owners Association [5]																
Well No.1	Yes	1.4	1.3	4.2	5.4	5.2	8.4	10.5	9.2	9.1	8.7	6.0	5.4	74.7		
Well No.2	Yes	1.4	1.2	3.3	4.0	3.8	4.1	4.0	3.7	3.9	4.3	5.1	4.4	43.2		
Subtotal		**2.7**	**2.5**	**7.4**	**9.3**	**9.0**	**12.5**	**14.5**	**13.0**	**13.0**	**13.0**	**11.2**	**9.8**	**117.9**	**154.9**	**37.0**
Tukwet Canyon Golf Club [5]																
Well A	Yes	0.4	0.8	0.6	7.9	6.2	15.4	12.3	6.1	2.9	12.4	0.7	0.5	66.3		
Well C	Yes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Well D	Yes	0.0	4.7	48.3	94.9	111.7	130.5	58.2	137.6	112.1	101.8	58.4	67.1	925.1		
Subtotal		**0.4**	**5.5**	**48.8**	**102.8**	**117.9**	**145.9**	**70.5**	**143.7**	**115.0**	**114.1**	**59.1**	**67.6**	**991.4**	**1,704.0**	**712.7**
Stearns, Leonard M. and Dorothy D.	No	Water Duty Method Used to Estimate Annual Production												**0.7**	**154.9**	**154.2**
Sunny-Cal Egg and Poultry Company	No	Water Duty Method Used to Estimate Annual Production												**4.3**	**1,115.0**	**1,110.6**
Albor Properties III, LP	No	Water Duty Method Used to Estimate Annual Production												**2.4**	**232.4**	**229.9**
Nikodinov, Nick	No	Water Duty Method Used to Estimate Annual Production												**0.8**	**15.5**	**14.7**
McAmis, Ronald L.	No	Water Duty Method Used to Estimate Annual Production												**0.6**	**3.9**	**3.3**
Aldama, Nicolas and Amalia	No	Water Duty Method Used to Estimate Annual Production												**0.9**	**5.4**	**4.6**
Gutierrez, Hector, et al.	No	Water Duty Method Used to Estimate Annual Production												**1.4**	**7.7**	**6.3**
Darmont, Boris and Miriam	No	Water Duty Method Used to Estimate Annual Production												**0.4**	**1.9**	**1.6**
TOTAL														**2,404.7**	**6,700.0**	**4,389.4**

1.- All values rounded and subject to revision based on receipt of more accurate information in the future.

2.- Total production is estimated for Overlying parties with un-metered wells.

3.- Monthly production provided by BCVWD - Feb 2015 - Production for Plantation by the Lake for 2015 was used for 2016 until producer provides final numbers.

4.- Starting in 2008, the parcels owned by Oak Valley Partners were no longer used for agricultural purposes. Groundwater production was estimated at 2.5 ac-ft/yr based on water use by a single farm house and a small cattle population.

5.- Monthly production since 2011 provided by Clearwater Solutions, a company in charge of operating the water system.

6.- Actual monthly production provided by the Morongo Band of Mission Indians - May 2017.

Table 3-3a

Production Summary for Appropriator and Overlying Producers in the Beaumont Basin

2003 through 2010 - Calendar Year Accounting (ac-ft)

	Annual Production (ac-ft)							
	2003[1]	2004	2005	2006	2007	2008	2009	2010
Appropriator Parties								
Banning, City of	2,174.2	3,397.3	1,808.6	1,827.5	2,772.6	2,933.6	2,095.0	1,143.6
Beaumont-Cherry Valley Water District	3,511.9	6,873.9	7,025.6	9,054.1	11,383.3	10,710.5	10,133.9	9,421.3
South Mesa Water Company	223.2	482.5	663.2	616.0	665.8	470.9	382.2	405.0
Yucaipa Valley Water District	1,162.4	1,833.7	1,281.3	2,027.3	1,682.9	572.0	504.4	672.4
Subtotal	**7,071.7**	**12,587.4**	**10,778.6**	**13,524.9**	**16,504.6**	**14,687.0**	**13,115.6**	**11,642.3**
Overlying Parties								
Beckman, Walter M	16.2	27.0	22.4	11.5	8.3	12.7	12.9	6.4
California Oak Valley Golf and Resort LLC	736.2	728.6	703.9	831.5	779.0	780.4	766.7	565.1
Merlin Properties	3.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5
Oak Valley Partners, LP	301.2	440.7	350.2	312.1	312.1	310.5	310.5	2.5
Plantation on the Lake LLC	178.6	340.9	310.2	350.1	344.2	354.0	352.3	337.2
Rancho Calimesa Mobile Home Park	35.4	68.3	68.3	68.3	69.3	69.3	69.3	69.3
Roman Catholic Bishop of San Bernardino	46.8	59.1	55.6	59.0	0.7	0.7	0.7	0.0
Sharondale Mesa Owners Association	104.3	158.0	181.0	188.6	182.3	193.3	154.3	132.3
Tukwet Canyon Golf Club[2]	791.4	1,346.7	1,213.1	1,753.4	1,599.1	1,137.6	1,158.6	851.8
Stearns, Leonard M. and Dorothy D.	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.7
Sunny-Cal Egg and Poultry Company	226.0	404.4	385.4	2.6	2.7	4.2	4.2	3.8
Albor Properties III, LP[3]				13.2	2.3	2.3	2.3	2.1
Nikodinov, Nick				0.7	0.8	0.8	0.7	0.7
McAmis, Ronald L.				0.5	0.6	0.6	0.5	0.5
Aldama, Nicolas and Amalia				0.8	0.8	0.9	0.8	0.8
Gutierrez, Hector, et. al.				1.4	1.4	1.4	1.4	1.3
Darmont, Boris and Miriam				0.4	0.4	0.4	0.4	0.4
Subtotal	**2,440.8**	**3,576.3**	**3,292.6**	**3,596.7**	**3,306.5**	**2,871.6**	**2,838.2**	**1,976.5**
Total	**9,512.5**	**16,163.6**	**14,071.3**	**17,121.6**	**19,811.1**	**17,558.6**	**15,953.7**	**13,618.8**

1.- 2003 groundwater production only includes Jul-Dec time period.

2.- Formerly known as the East Valley Golf Course and the Southern California Section of the PGA of America.

3.- Formerly Known as Sunny Cal North - Manheim, Manheim & Berman.

Table 3-3b

Production Summary for Appropriator and Overlying Producers in the Beaumont Basin

2011 through 2017 - Calendar Year Accounting (ac-ft)

	Annual Production (ac-ft)						
	2011	2012	2013	2014	2015	2016	2017
Appropriator Parties							
Banning, City of	1,341.7	1,038.3	2,100.7	2,585.1	1,678.3	1,472.7	1,443.5
Beaumont-Cherry Valley Water District	9,431.3	10,162.0	11,097.4	10,805.5	8,972.8	10,159.8	11,650.7
South Mesa Water Company	419.9	448.5	308.4	473.7	317.2	352.6	368.1
Yucaipa Valley Water District	534.1	700.1	1,030.8	1,198.5	119.2	4.6	0.1
Subtotal	**11,727.1**	**12,348.9**	**14,537.2**	**15,062.8**	**11,087.4**	**11,989.7**	**13,462.4**
Overlying Parties							
Beckman, Walter M	9.0	9.0	2.1	0.9	0.9	0.9	0.9
California Oak Valley Golf and Resort LLC	517.3	517.3	625.8	417.0	751.1	552.3	830.0
Merlin Properties	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Oak Valley Partners, LP	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Plantation on the Lake LLC	344.7	344.7	326.7	403.8	302.1	293.4	417.8
Rancho Calimesa Mobile Home Park	69.3	69.3	69.3	16.2	23.4	31.2	31.2
Roman Catholic Bishop of San Bernardino	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sharondale Mesa Owners Association	133.0	145.3	147.0	137.3	94.1	84.8	117.9
Tukwet Canyon Golf Club[2]	882.9	984.3	1,098.4	1,227.9	898.6	958.6	991.4
Stearns, Leonard M. and Dorothy D.	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Sunny-Cal Egg and Poultry Company	4.2	4.3	4.3	4.3	4.3	4.3	4.3
Albor Properties III, LP[3]	2.3	2.4	2.4	2.4	2.4	2.4	2.4
Nikodinov, Nick	0.8	0.8	0.8	0.8	0.8	0.8	0.8
McAmis, Ronald L.	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Aldama, Nicolas and Amalia	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Gutierrez, Hector, et. al.	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Darmont, Boris and Miriam	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subtotal	**1,971.4**	**2,085.4**	**2,284.8**	**2,218.7**	**2,085.7**	**1,936.7**	**2,404.7**
Total	**13,698.4**	**14,434.3**	**16,821.9**	**17,281.5**	**13,173.1**	**13,926.4**	**15,867.1**

1.- 2003 groundwater production only includes Jul-Dec time period.

2.- Formerly known as the East Valley Golf Course and the Southern California Section of the PGA of America.

3.- Formerly Known as Sunny Cal North - Manheim, Manheim & Berman.

Table 3-4

Annual Supplemental Recharge to the Beaumont Basin -- Calendar Year Accounting

Year	Supplemental Recharge (ac-ft)				
	Banning[1]	Beaumont[2]	BCVWD[1]	SGPWA[3]	Total
2003	-	-	-	-	-
2004	-	-	-	813.8	813.8
2005	-	-	-	687.4	687.4
2006	-	-	3,501.0	777.7	4,278.7
2007	-	-	4,501.0	541.3	5,042.3
2008	1,534.0	-	2,399.0	1,047.4	4,980.4
2009	2,741.2	-	2,741.2	823.4	6,305.8
2010	1,338.0	-	5,727.0	1,222.3	8,287.3
2011	800.0	-	7,979.0	1,842.0	10,621.0
2012	1,200.0	-	7,783.0	1,827.2	10,810.2
2013	1,200.0	-	7,403.0	881.8	9,484.8
2014	608.0	-	4,405.0	16.5	5,029.5
2015	694.0	-	2,773.0	9.2	3,476.2
2016	1,477.0	-	9,319.0	17.8	10,813.8
2017	1,350.0	-	13,590.0	-	14,940.0
Totals	**12,942.2**	**-**	**72,121.2**	**10,507.8**	**95,571.2**

1.- SWP water recharged in the BCVWD Noble Creek Recharge Facility

2.- The City of Beaumont is seeking credit for recycled water recharge in the Beaumont Basin from DP-007 in an unnamed tributary to Marshall Creek. A technical demonstration of the estimated amount of recharge in the Beaumont Basin is pending.

3.- SWP water recharged in the Pass Agency's Little San Gorgonio Creek Spreading Ponds

Table 3-5

City of Beaumont Wastewater Treatment Plant - Monthly Discharges Since 2007

Recycled Water Daily Average Discharges (mgd) to DDP1 - Coopers's Canyon

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average (mgd)	Annual (ac-ft)
2007	2.32	2.17	2.25	2.23	2.61	2.57	2.57	2.66	2.66	2.67	2.63	2.50	2.49	2,786
2008	2.44	2.79	2.49	2.65	2.55	2.59	2.55	2.59	2.60	2.50	2.57	2.65	2.58	2,889
2009	2.52	2.66	2.56	2.58	2.59	2.56	2.44	2.63	2.60	2.61	2.63	2.69	2.59	2,902
2010	2.83	2.65	2.66	2.60	2.00	1.88	1.94	1.96	1.94	2.00	2.04	2.22	2.23	2,495
2011	2.07	2.12	2.06	2.01	2.04	2.25	2.23	2.13	2.10	2.08	2.19	2.13	2.12	2,371
2012	2.19	2.64	2.19	2.23	2.29	2.24	2.28	2.29	2.24	2.70	2.38	2.33	2.33	2,614
2013	2.76	2.80	2.80	2.81	2.78	2.78	2.81	2.82	2.89	2.83	2.21	2.50	2.73	3,061
2014	2.62	2.22	2.45	2.48	2.61	2.62	2.61	2.74	2.87	2.74	2.99	3.12	2.67	2,992
2015	2.87	2.94	2.97	2.90	2.92	2.98	2.99	3.10	3.08	3.08	3.06	3.11	3.00	3,360
2016	3.15	3.06	3.01	3.07	3.11	3.15	3.15	3.26	3.22	3.18	3.19	3.30	3.15	3,533
2017	3.36	3.26	3.17	3.35	3.22	3.18	3.21	3.31	3.32	3.26	3.29	3.31	3.27	3,663

Recycled Water Daily Average Discharges (mgd) to DDP7 - Marshall's Canyon

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average (mgd)	Annual (ac-ft)
2010	0.00	0.00	0.82	0.67	0.57	0.62	0.70	0.69	0.69	0.70	0.67	0.65	0.68	633
2011	0.66	0.63	0.63	0.63	0.58	0.45	0.52	0.63	0.64	0.60	0.55	0.54	0.59	660
2012	0.54	0.54	0.52	0.47	0.45	0.45	0.45	0.49	0.50	0.47	0.41	0.53	0.49	545
2013	0.48	0.52	0.45	0.43	0.25	0.44	0.52	0.61	0.33	0.69	0.57	0.41	0.47	530
2014	0.21	0.65	0.61	0.66	0.61	0.42	0.49	0.35	0.21	0.24	0.02	0.02	0.37	418
2015	0.24	0.20	0.31	0.31	0.22	0.38	0.37	0.23	0.00	0.00	0.00	0.00	0.19	212
2016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-

Table 3-6
Overlying Parties Production Rights Allocation Based on Revised Safe Yield

Overlying Party to the 2003 Judgment	Initial Overlying Water Right through 2013	New Overlying Water Right Starting in 2014	5-Year (2013-17) Average Production (ac-ft)	5-Year (2013-17) Running Avg % of Water Right
California Oak Valley Golf and Resort LLC [1]	950.0	735.8	637.6	86.6%
Plantation on the Lake LLC	581.0	450.0	354.3	78.7%
Sharondale Mesa Owners Association	200.0	154.9	108.5	70.1%
Tukwet Canyon Golf Club	2,200.0	1,704.0	1,019.1	59.8%
Rancho Calimesa Mobile Home Park	150.0	116.2	25.5	21.9%
Gutierrez, Hector, et al.	10.0	7.7	1.4	18.5%
Darmont, Boris and Miriam	2.5	1.9	0.4	18.1%
Aldama, Nicolas and Amalia	7.0	5.4	0.9	16.0%
McAmis, Ronald L.	5.0	3.9	0.6	14.5%
Nikodinov, Nick	20.0	15.5	0.8	5.0%
Beckman, Walter M.	75.0	58.1	0.9	1.5%
Albor Properties III, LP	300.0	232.4	2.4	1.0%
Stearns, Leonard M. and Dorothy D.	200.0	154.9	0.7	0.5%
Sunny-Cal Egg and Poultry Company	1,439.5	1,115.0	4.3	0.4%
Merlin Properties	550.0	426.0	1.6	0.4%
Oak Valley Partners, LP [2]	1,806.0	1,398.9	2.5	0.2%
Roman Catholic Bishop of San Bernardino	154.0	119.3	0.0	0.0%
	8,650.0	**6,700.0**	**2,161.5**	**32.3%**

(1) - California Oak Valley Golf and Resort LLC exceeded its annual production right in 2015 and 2017; however, their average production over the 2013-17 period is below its water right.

(2) - Under Resolution 17-02, adopted August 30, 2017, Oak Valley Partners LP transferred all of its Overlying rights to the Yucaipa Valley Water District to serve a number of parcels in the Beaumont Basin. If the Overlying Right from OVP is converted to an Overlying-Appropriative Right in favor of YVWD prior to 2022, then the quantity of water available for Appropriators in 2022 will be adjusted accordingly.

Table 3-7
Summary of Unused Overlying Water and Allocation to Appropriators (ac-ft)

Accounting Year	Overlying Water Right	Overlying Production	Unused Overlying Water Right
2003	4,325	2,441	1,884
2004	8,650	3,576	5,074
2005	8,650	3,293	5,357
2006	8,650	3,597	5,053
2007	8,650	3,307	5,343
2008	8,650	2,872	5,778
2009	8,650	2,838	5,812
2010	8,650	1,976	6,674
2011	8,650	1,971	6,679
2012	8,650	2,085	6,565
2013	8,650	2,285	6,365
2014	6,700	2,219	4,481
2015	6,700	2,086	4,614
2016	6,700	1,937	4,763
2017	6,700	2,405	4,295

Allocation Year	City of Banning	City of Beaumont	Beaumont Cherry Valley WD	South Mesa Water Co.	Yucaipa Valley Water District	Total
2008	592	0	801	235	256	1,884
2009	1,595	0	2,157	633	689	5,074
2010	1,684	0	2,277	669	728	5,357
2011	1,588	0	2,148	631	686	5,053
2012	1,679	0	2,272	667	726	5,343
2013	1,816	0	2,456	721	785	5,778
2014	1,827	0	2,471	725	789	5,812
2015	2,097	0	2,837	833	906	6,674
2016	2,099	0	2,839	833	907	6,679
2017	2,063	0	2,791	819	891	6,565
2018	2,001	0	2,706	794	864	6,365
2019	1,408	0	1,905	559	609	4,481
2020	1,450	0	1,962	576	627	4,614
2021	1,497	0	2,025	594	647	4,763
2022	1,350	0	1,826	536	583	4,295

Note - Under Resolution 17-02, adopted August 30, 2017, Oak Valley Partners LP transferred all of its Overlying rights to the Yucaipa Valley Water District to serve a number of parcels in the Beaumont Basin. If the Overlying Right from OVP is converted to an Overlying-Appropriative Right in favor of YVWD prior to 2022, then the quantity of water available for Appropriators in 2022 will be adjusted accordingly.

Table 3-8
Consolidation of Appropriator Production and Storage Accounts
Calendar Year Accounting (ac-ft) 2003 through 2017

Calendar Year	Storage Account Balance at Beginning of CY	Share of Surplus Water	Groundwater Production for CY	Additions to Storage Account							Ending Account Balance
				Under / Over Production [1]	Unused Overlying Production Allocation	Transfers Among Appropriators	Supplemental Water		Local Recharge	Total Additions to Storage Account	
							SWP Water Recharge	Recycled Water Recharge			
City of Banning - Authorized Storage Account: 80,000 ac-ft											
2003	0.0	2,514.5	2,174.2	340.3	0.0	0.0	0.0	0.0	0.0	340.3	340.3
2004	340.3	5,029.0	3,397.3	1,631.7	0.0	0.0	0.0	0.0	0.0	1,631.7	1,972.0
2005	1,972.0	5,029.0	1,808.6	3,220.4	0.0	0.0	0.0	0.0	0.0	3,220.4	5,192.5
2006	5,192.5	5,029.0	1,827.5	3,201.5	0.0	0.0	0.0	0.0	0.0	3,201.5	8,393.9
2007	8,393.9	5,029.0	2,772.6	2,256.4	0.0	1,500.0	0.0	0.0	0.0	3,756.4	12,150.3
2008	12,150.3	5,029.0	2,933.6	2,095.4	592.2	0.0	1,534.0	0.0	0.0	4,221.6	16,371.9
2009	16,371.9	5,029.0	2,096.0	2,934.0	1,594.7	0.0	2,741.2	0.0	0.0	7,269.8	23,641.8
2010	23,641.8	5,029.0	1,143.6	3,885.4	1,683.8	0.0	1,338.0	0.0	0.0	6,907.2	30,549.0
2011	30,549.0	5,029.0	1,341.7	3,687.3	1,588.2	0.0	800.0	0.0	0.0	6,075.6	36,624.5
2012	36,624.5	5,029.0	1,038.3	3,990.7	1,679.5	0.0	1,200.0	0.0	0.0	6,870.2	43,494.7
2013	43,494.7	2,514.5	2,100.7	413.8	1,816.1	0.0	1,200.0	0.0	0.0	3,430.0	46,924.7
2014	46,924.7	0.0	2,585.1	-2,585.1	1,826.7	0.0	608.0	0.0	0.0	-150.4	46,774.3
2015	46,774.3	0.0	1,678.3	-1,678.3	2,097.5	0.0	694.0	0.0	0.0	1,113.2	47,887.5
2016	47,887.5	0.0	1,472.7	-1,472.7	2,099.1	0.0	1,477.0	0.0	0.0	2,103.4	49,990.8
2017	49,990.8	0.0	1,443.5	-1,443.5	2,063.2	0.0	1,350.0	0.0	0.0	1,969.8	51,960.6
Beaumont Cherry Valley Water District - Authorized Storage Account: 80,000 ac-ft											
2003	0.0	3,401.0	3,511.9	-110.9	0.0	0.0	0.0	0.0	0.0	-110.9	-110.9
2004	-110.9	6,802.0	6,873.9	-71.9	0.0	0.0	0.0	0.0	0.0	-71.9	-182.8
2005	-182.8	6,802.0	7,025.6	-223.6	0.0	0.0	0.0	0.0	0.0	-223.6	-406.4
2006	-406.4	6,802.0	9,054.1	-2,252.1	0.0	0.0	3,501.0	0.0	0.0	1,248.9	842.5
2007	842.5	6,802.0	11,383.3	-4,581.3	0.0	1,500.0	4,501.0	0.0	0.0	1,419.7	2,262.2
2008	2,262.2	6,802.0	10,710.5	-3,908.5	801.0	2,500.0	2,399.0	0.0	0.0	1,791.5	4,053.7
2009	4,053.7	6,802.0	10,133.9	-3,331.9	2,156.8	2,000.0	2,741.2	0.0	0.0	3,566.1	7,619.8
2010	7,619.8	6,802.0	9,421.3	-2,619.3	2,277.4	0.0	5,727.0	0.0	0.0	5,385.1	13,004.9
2011	13,004.9	6,802.0	9,431.3	-2,629.3	2,148.1	3,500.0	7,979.0	0.0	0.0	10,997.8	24,002.8
2012	24,002.8	6,802.0	10,162.0	-3,360.0	2,271.5	0.0	7,783.0	0.0	0.0	6,694.5	30,697.3
2013	30,697.3	3,401.0	11,097.4	-7,696.4	2,456.4	0.0	7,403.0	0.0	0.0	2,163.0	32,860.3
2014	32,860.3	0.0	10,805.5	-10,805.5	2,470.6	0.0	4,405.0	0.0	0.0	-3,929.9	28,930.4
2015	28,930.4	0.0	8,972.8	-8,972.8	2,836.9	0.0	2,773.0	0.0	0.0	-3,362.8	25,567.6
2016	25,567.6	0.0	10,159.8	-10,159.8	2,839.1	0.0	9,319.0	0.0	0.0	1,998.3	27,565.9
2017	27,565.9	0.0	11,650.7	-11,650.7	2,790.6	0.0	13,590.0	0.0	0.0	4,729.9	32,295.7

Table 3-8
Consolidation of Appropriator Production and Storage Accounts
Calendar Year Accounting (ac-ft) 2003 through 2017

Calendar Year	Storage Account Balance at Beginning of CY	Share of Surplus Water	Groundwater Production for CY	Additions to Storage Account							Ending Account Balance
				Under / Over Production [1]	Unused Overlying Production Allocation	Transfers Among Appropriators	Supplemental Water		Local Recharge	Total Additions to Storage Account	
							SWP Water Recharge	Recycled Water Recharge			
City of Beaumont - Authorized Storage Account: 30,000 ac-ft											
2003	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2014	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2015	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
South Mesa Water Company - Authorized Storage Account: 20,000 ac-ft											
2003	0.0	998.0	223.2	774.8	0.0	0.0	0.0	0.0	0.0	774.8	774.8
2004	774.8	1,996.0	482.5	1,513.5	0.0	0.0	0.0	0.0	0.0	1,513.5	2,288.3
2005	2,288.3	1,996.0	663.2	1,332.8	0.0	0.0	0.0	0.0	0.0	1,332.8	3,621.1
2006	3,621.1	1,996.0	616.0	1,380.0	0.0	0.0	0.0	0.0	0.0	1,380.0	5,001.1
2007	5,001.1	1,996.0	665.8	1,330.2	0.0	-3,000.0	0.0	0.0	0.0	-1,669.8	3,331.3
2008	3,331.3	1,996.0	470.9	1,525.2	235.2	-2,500.0	0.0	0.0	0.0	-739.7	2,591.6
2009	2,591.6	1,996.0	382.2	1,613.8	633.2	-2,000.0	0.0	0.0	0.0	247.0	2,838.6
2010	2,838.6	1,996.0	405.0	1,591.0	668.6	0.0	0.0	0.0	0.0	2,259.6	5,098.2
2011	5,098.2	1,996.0	419.9	1,576.1	630.6	-3,500.0	0.0	0.0	0.0	-1,293.3	3,805.0
2012	3,805.0	1,996.0	448.5	1,547.5	666.9	0.0	0.0	0.0	0.0	2,214.4	6,019.3
2013	6,019.3	998.0	308.4	689.7	721.1	0.0	0.0	0.0	0.0	1,410.8	7,430.1
2014	7,430.1	0.0	473.7	-473.7	725.3	0.0	0.0	0.0	0.0	251.6	7,681.7
2015	7,681.7	0.0	317.2	-317.2	832.9	0.0	0.0	0.0	0.0	516.7	8,198.4
2016	8,198.4	0.0	352.6	-352.6	833.5	0.0	0.0	0.0	0.0	482.9	8,681.3
2017	8,681.3	0.0	368.1	-368.1	819.3	0.0	0.0	0.0	0.0	451.2	9,132.5

Table 3-8
Consolidation of Appropriator Production and Storage Accounts
Calendar Year Accounting (ac-ft) 2003 through 2017

Calendar Year	Storage Account Balance at Beginning of CY	Share of Surplus Water	Groundwater Production for CY	Additions to Storage Account							Ending Account Balance
				Under / Over Production [1]	Unused Overlying Production Allocation	Transfers Among Appropriators	Supplemental Water		Local Recharge	Total Additions to Storage Account	
							SWP Water Recharge	Recycled Water Recharge			
Morongo Band of Mission Indians - Authorized Storage Account: 20,000 ac-ft											
2013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2014	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2015	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yucaipa Valley Water District - Authorized Storage Account: 50,000 ac-ft											
2003	0.0	1,086.5	1,162.4	-75.9	0.0	0.0	0.0	0.0	0.0	-75.9	-75.9
2004	-75.9	2,173.0	1,833.7	339.3	0.0	0.0	0.0	0.0	0.0	339.3	263.4
2005	263.4	2,173.0	1,281.3	891.7	0.0	0.0	0.0	0.0	0.0	891.7	1,155.1
2006	1,155.1	2,173.0	2,027.3	145.7	0.0	0.0	0.0	0.0	0.0	145.7	1,300.8
2007	1,300.8	2,173.0	1,682.9	490.1	0.0	0.0	0.0	0.0	0.0	490.1	1,790.9
2008	1,790.9	2,173.0	572.0	1,601.0	255.9	0.0	0.0	0.0	0.0	1,856.8	3,647.8
2009	3,647.8	2,173.0	504.4	1,668.6	689.0	0.0	0.0	0.0	0.0	2,357.6	6,005.4
2010	6,005.4	2,173.0	672.4	1,500.6	727.5	0.0	0.0	0.0	0.0	2,228.1	8,233.5
2011	8,233.5	2,173.0	534.1	1,638.9	686.2	0.0	0.0	0.0	0.0	2,325.1	10,558.6
2012	10,558.6	2,173.0	700.1	1,472.9	725.6	0.0	0.0	0.0	0.0	2,198.5	12,757.1
2013	12,757.1	1,086.5	1,030.8	55.7	784.7	0.0	0.0	0.0	0.0	840.4	13,597.6
2014	13,597.6	0.0	1,198.5	-1,198.5	789.2	0.0	0.0	0.0	0.0	-409.2	13,188.4
2015	13,188.4	0.0	119.2	-119.2	906.3	0.0	0.0	0.0	0.0	788.1	13,976.4
2016	13,976.4	0.0	4.6	-4.6	907.0	0.0	0.0	0.0	0.0	904.4	14,880.8
2017	14,880.8	1.0	0.1	0.9	891.5	0.0	0.0	0.0	0.0	895.3	15,776.2

Table 3-8
Consolidation of Appropriator Production and Storage Accounts
Calendar Year Accounting (ac-ft) 2003 through 2017

Calendar Year	Storage Account Balance at Beginning of CY	Share of Surplus Water	Groundwater Production for CY	Additions to Storage Account							Ending Account Balance
				Under / Over Production [1]	Unused Overlying Production Allocation	Transfers Among Appropriators	Supplemental Water		Local Recharge	Total Additions to Storage Account	
							SWP Water Recharge	Recycled Water Recharge			
Totals											
2003	0.0	8,000.0	7,071.7	928.3	0.0	0.0	0.0	0.0	0.0	928.3	928.3
2004	928.3	16,000.0	12,587.4	3,412.6	0.0	0.0	0.0	0.0	0.0	3,412.6	4,340.9
2005	4,340.9	16,000.0	10,778.6	5,221.4	0.0	0.0	0.0	0.0	0.0	5,221.4	9,562.3
2006	9,562.3	16,000.0	13,524.9	2,475.1	0.0	0.0	3,501.0	0.0	0.0	5,976.1	15,538.3
2007	15,538.3	16,000.0	16,504.6	-504.6	0.0	0.0	4,501.0	0.0	0.0	3,996.4	19,534.8
2008	19,534.8	16,000.0	14,687.0	1,313.0	1,884.2	0.0	3,933.0	0.0	0.0	7,130.2	26,665.0
2009	26,665.0	16,000.0	13,115.6	2,884.4	5,073.7	0.0	5,482.4	0.0	0.0	13,440.6	40,105.6
2010	40,105.6	16,000.0	11,642.3	4,357.7	5,357.4	0.0	7,065.0	0.0	0.0	16,780.0	56,885.6
2011	56,885.6	16,000.0	11,727.1	4,272.9	5,053.3	0.0	8,779.0	0.0	0.0	18,105.2	74,990.9
2012	74,990.9	16,000.0	12,348.9	3,651.1	5,343.5	0.0	8,983.0	0.0	0.0	17,977.6	92,968.5
2013	92,968.5	8,000.0	14,537.2	-6,537.2	5,778.4	0.0	8,603.0	0.0	0.0	7,844.2	100,812.7
2014	100,812.7	0.0	15,062.8	-15,062.8	5,811.8	0.0	5,013.0	0.0	0.0	-4,237.9	96,574.8
2015	96,574.8	0.0	11,087.4	-11,087.4	6,673.5	0.0	3,467.0	0.0	0.0	-944.9	95,629.9
2016	95,629.9	0.0	11,989.7	-11,989.7	6,678.6	0.0	10,796.0	0.0	0.0	5,488.9	101,118.8
2017	101,118.8	1.0	13,462.4	-13,461.4	6,564.6	0.0	14,940.0	0.0	0.0	8,046.2	109,165.0

1 – Negative values of under production indicate that the appropriator pumped more than its share of the operating yield.

Section 4
Water Quality Conditions

The purpose of this section is to document the water quality conditions in the Beaumont Basin during the 2013-2017 reporting period. TDS and nitrate concentrations in the basin are compared against groundwater quality objectives for anti-degradation and maximum benefit as established by the Regional Board for TDS and nitrate-nitrogen in the Beaumont Management Zone (BMZ). In addition, water quality concentrations for a number of compounds are compared against Federal and State Drinking Water Standards. Figure 4-1 depicts all the wells that have groundwater quality data for the reporting period.

Sources and Availability of Water Quality Information

There are two main sources of data used in the assessment of water quality conditions in the Beaumont Basin and near surroundings; namely, the California Department of Public Health database and the Beaumont Management Zone Maximum Benefit Monitoring Program. The database obtained from the CDPH, which focuses primarily on drinking water sources, contains water quality information for the 2013-2017 reporting period; conversely, water quality from the BMZ Maximum Benefit Monitoring Program is only available through the end of 2016. Usually this later database is available in February or early March; its results will be incorporated in the final version of this annual report.

4.1 Comparison with Management Zone Objectives

Groundwater quality objectives for anti-degradation and maximum benefit have been established by the Regional Board for TDS and nitrate-nitrogen in the BMZ, which encompasses portions of the Beaumont Basin, the Singleton and South Beaumont basins, and limited portions of Edgar Canyon above the Banning Fault as illustrated in Figure 4-1. The anti-degradation objectives are based on the historic ambient TDS and nitrate-nitrogen concentration of 230 mg/L and 1.5 mg/L respectively.

The maximum benefit objectives were adopted by the Regional Board in 2004 at the request of STWMA and Beaumont to allow for recharge of imported water and the reuse of recycled water. The maximum benefit objectives, set to 330 mg/L for TDS and 5.0 mg/L for Nitrate-N, are relatively low compared to other basins and are protective of the beneficial uses of the Basin groundwater. According to the Basin Plan, salt mitigation will be required once the ambient TDS and nitrate-nitrogen concentration exceeds the BMZ maximum benefit objectives.

4.1.1 Total Dissolved Solids

Figure 4-2 shows the maximum TDS concentrations for 60 wells measured within and in the vicinity of the Beaumont Basin wells during the 2013-2017 reporting period. A total of 33 wells are located inside the basin with the remaining 27 in the Singleton Basin / Edgar Canyon and the South Beaumont Basin areas.

The maximum TDS concentrations for domestic wells within the basin ranged from 190 to 370 mg/L and averaged 248 mg/L; this average value is 22 mg/L lower than the average maximum TDS concentration reported in the 2008-11 Engineering Report indicating that TDS concentrations have been fairly stable in the last 10 years.

In the Singleton Basin / Edgar Canyon area, the maximum TDS concentration ranged from 190 to 550 mg/L and averaged 286 mg/L. The average TDS concentration for all samples in this area was 276 mg/L.

In the South Beaumont Basin, the maximum TDS concentration ranged from 220 to 780 mg/L and averaged 510 mg/L. The average TDS concentration for all samples in this area was 475 mg/L.

Average and maximum TDS concentrations for all sampled wells within the basin are as follows:

Well Classification	Count	Samples	Average Concentration	Avg Max Concentration
Beaumont Groundwater Basin				
Appropriators	15	34	226	247
Overlyiers	5	7	270	274
Other	7	8	244	244
Total	27	49		
Singleton Basin / Edgar Canyon Area				
All Wells	17	22	276	286
South Beaumont Basin				
All Wells	10	32	475	510

Of the 20 potable wells, 7 wells had a maximum concentration below the anti-degradation objective of 230 mg/L, 12 wells were between the anti-degradation and maximum benefit objective of 330 mg/L, and one exceeded the maximum benefit objective for the BMZ. None of the production wells samples exceeded the secondary federal or state drinking water standard for TDS (500 mg/L). BCVWD wells along Edgar Canyon were not included in the analysis of domestic wells.

In the Singleton Basin / Edgar Canyon area, five wells had a maximum concentration below the anti-degradation objective, seven wells were between the anti-degradation and maximum benefit objective of 330 mg/L, and the remaining four wells exceeded the maximum objective with one well also exceeding the secondary drinking standard.

In the South Beaumont Basin, one well had a maximum TDS concentration below the anti-degradation objective, one well was between this and the maximum objective, and the remaining eight wells exceeded the maximum objective. Most of the wells with the highest

TDS concentrations are located in the South Beaumont Basin. Table 4-1 presents the average and maximum TDS and Nitrate (as N) concentration for all the wells in the Beaumont Basin and surrounding areas.

4.1.2 Nitrate-Nitrogen

Figure 4-3 shows the maximum Nitrate-N concentrations for 62 wells measured within and in the vicinity of the Beaumont Basin wells during the 2013-2017 reporting period. A total of 35 wells are located inside the basin with the remaining 27 in the Singleton Basin / Edgar Canyon and the South Beaumont Basin areas.

Nitrate-N concentration in drinking water wells from the CDPH database range from a low of 0.4 mg/l to a high of 7.78 mg/l and averaged 3.75 mg/L. The average of maximum concentrations from individual wells was slightly higher at 3.8 mg/L.

Maximum Nitrate-N concentrations for domestic wells owned by Appropriators ranged from 0.4 to 7.8 mg/L and averaged 2.8 mg/L. Maximum concentrations for overlying wells was slightly higher as it ranged from 1.2 to 7.8 mg/L and averaged 4.0 mg/L. The average concentration for all potable wells was 2.6 mg/L.

In the Singleton Basin / Edgar Canyon area, the maximum Nitrate-N concentration ranged from 0.7 to 19.0 mg/L and averaged 4.5 mg/L. The average concentration for all samples in this area was 3.7 mg/L.

In the South Beaumont Basin, the maximum Nitrate-N concentration ranged from 4.0 to 22.0 mg/L and averaged 12.3 mg/L. The average concentration for all samples in this area was 10.7 mg/L.

Average and maximum Nitrate-N concentrations for all sampled wells within the basin are as follows:

Well Classification	No. of Wells	Samples	Average Concentration	Avg Max Concentration
Beaumont Groundwater Basin				
Appropriators	15	176	2.1	2.9
Overlyiers	5	61	4.3	5.2
Other	7	8	2.9	3.0
Total	27	245		
Singleton Basin / Edgar Canyon Area				
All Wells	17	34	3.7	4.5
South Beaumont Basin				
All Wells	10	44	10.7	12.3

Of the 20 potable wells, only two wells had a maximum concentration below the anti-degradation objective of 1.5 mg/L, 12 wells were between the anti-degradation and maximum benefit objective of 5.0 mg/L, and six exceeded the maximum benefit objective for the BMZ. None of the production wells samples exceeded the primary federal or state drinking water standard for Nitrate-N (10 mg/L). BCVWD wells along Edgar Canyon were not included in the analysis of domestic wells.

In the Singleton Basin / Edgar Canyon area, eight wells had a maximum concentration below the anti-degradation objective, five wells had concentrations between the anti-degradation and maximum objective while four wells exceeded the maximum benefit objective of 5.0 mg/L.

In the South Beaumont Basin, two wells had concentrations below the maximum objective while the remaining eight exceed it with four of these wells also exceeding drinking water standards. There were no wells with nitrate concentrations below the anti-degradation limit. Table 4-1 presents the average and maximum TDS and Nitrate (as N) concentration for all the wells in the Beaumont Basin and surrounding areas.

4.1.3 Nitrate Studies in the Beaumont Management Zone

Rising nitrate concentrations observed in 2005 along the northern portion of the Basin prompted STWMA to launch an investigation in 2006 to determine the potential impact on groundwater quality from on-site waste disposal systems (OSWDS) commonly used in the Cherry Valley Community of Interest (CVCOI). STWMA retained the services of Wildermuth Environmental Inc. (WEI) to conduct this study.

The results of this study were disputed by the Beaumont Board of Supervisors' Groundwater Quality Evaluation Committee (Committee) as they identified potential shortcomings in sampling design and project execution. The Committee recommended that an independent assessment be conducted. They recommended that the second study should expand the study area, consider reasonable build-out projections and other sources of groundwater contamination. This independent study was conducted by scientist at the University of California, Riverside and funded as a Supplemental Environmental Project by the State Water Resources Control Board. The results of this study were published in early 2012. A brief summary and their findings is presented below for information purposes only.

Summary of Wildermuth Environmental Inc. Study

This study is titled: "*Water Quality Impacts from On-Site Waste Disposal Systems in the Cherry Valley Community of Interest" (WEI, 2007).* The bases for this study include the following:

- A review of scientific literature,
- A field study to estimate nitrogen concentrations in soil water below selected OSWDS,
- A tracer study of nitrogen isotope and pharmaceutical and personal care products (PPCP) to confirm the presence of effluent from OSWDS,
- An estimation of current and future discharge from OSWDS to groundwater,

- A planning-level evaluation of basin impacts using the groundwater flow and nitrate transport model, and
- A review of the threshold used in California to compel sewering when OSWDS contaminate or threaten to contaminate groundwater

The results of the investigation are summarized as follows:

- Parcel density in the CVCOI violates the minimum half-acre parcel size requirement of the Regional Board to be on a septic system.
- Water produced from high nitrate wells in the area has a nitrogen isotopic signature and contain PPCPs consistent with discharge from OSWDS.
- Present contribution of OSWDS discharges is estimated at 665 ac-ft/yr.; this represents about five percent of total recharge to the BMZ. At ultimate buildout, there will be between 4,900 to 8,800 OSWDS in the CVCOI. Discharge contribution from these OSWDS is estimated between 1,700 and 3,100 ac-ft/yr. representing 13 to 21 percent of total recharge to the BMZ.
- At 4,900 lots, the contributions from OSWDS will significantly impact water quality to the point that well head treatment will be required at certain well locations in order to meet drinking water standards. At 8,800 lots, the contributions from OSWDS will rendered the entire BMZ non-potable.
- Left unmitigated, OSWDS discharges will contribute enough nitrate to exceed the Basin Plan objectives for the BMZ.
- There is sufficient evidence of groundwater contamination by OSWDS to warrant the Regional Board to issue a prohibition on new OSWDS in the CVCOI.

According to WEI, as a result of this investigation, the County of Riverside issued a moratorium, followed by a permanent prohibition on the installation of septic systems in Cherry Valley unless the septic system is designed to remove at least 50 percent of the nitrogen in the wastewater. In 2009, the County passed a new ordinance that removed the prohibition on conventional OSWDS. WEI further indicates that the Regional Board initiated a process in 2009 that may lead to amending the Basin Plan prohibiting conventional OSWDS and regulating the discharges to meet antidegradation objectives.

Summary of University of California, Riverside Study

This study is titled: *"Water Quality Assessment of the Beaumont Management Zone: Identifying Sources of Groundwater Contamination Using Chemical and Isotopic Tracers" (UCR, 2012).*

The study divides the BMZ into four distinct zones; their location is depicted in Figure 2 of the UCR report (not included here). A brief description of the zones is as follows:

Zone 1 – Region Influenced by Wastewater Treatment Plant Effluent. This zone occupies the southernmost area of the BMZ. Water quality in this zone is influenced by effluent from the City of Beaumont wastewater treatment plant.

Zone 2 – Wildland and Low Density Septic Disposal Region. This zone is defined as the area uphill of Edgar Canyon to the north of Cherry Valley. Water quality in this area had low to moderate concentrations of TDS and nitrate.

Zone 3 – Urban Region with On-site Septic Disposal Systems. This zone overlies the Cherry Valley area including the area around the Noble Creek and Little San Gorgonio Spreading Ponds. Human waste from homes and business in this zone is primarily disposed of in on-site waste disposal systems.

Zone 4 – Urban Region with Consolidate Sewer System. Zone 4 comprises those portions of the City of Beaumont utilizing a municipal wastewater system.

The UCR report attempted to answer a series of questions; the questions and a summary of their response is provided below.

1.- Can different groundwater regions within the BMZ be defined using isotope, PPCP, and general chemical parameters?

According to the study,

- Zone 1 was characterized by relatively high levels of PPCPs and it has the highest likelihood for nitrate contamination from human waste.
- Zone 2 had detectable levels of some PPCPs. Septic contributions to groundwater are relatively minor.
- Zone 3 had several wells with clear signs of contamination by septic systems. Groundwater in the central portion of Cherry Valley appeared to be more strongly affected by septic systems than on the periphery of Cherry Valley.
- Zone 4 shows the fewest signs of human waste as most homes are served by consolidated sewer systems.

1A.- Do areas with septic systems have different chemistry than areas with sewers?

The report indicates that there are statistically significant differences between groundwater in areas with septic systems and groundwater where sewer service is available. The concentrations of PPCPs, TDS, Nitrate-N, the sum of base cations, Boron, and Isotopes of Nitrate were all significantly higher in areas with septic systems than in areas with sewer service.

1B.- Do areas where groundwater recharge with water from the State Water Project or wastewater treatment plant effluent have different chemistry from other areas?

Strong evidence of nitrate deriving from human waste was detected in Zone 1 as well as strong biological attenuation of nitrate transported in groundwater.

2.- What sources contribute nitrate to groundwater of the BMZ?

The report indicates that in Zone 1 the isotopes of nitrate values overlap those expected for human or animal waste. Similarly, in Zone 3 the isotopic composition of water suggest a high probability of inputs of nitrate from human or animal waste. The presence of PPCPs in most

samples indicates the possibility that septic systems are contaminating groundwater within the central part of Cherry Valley.

3.- How much nitrate from human waste is making its way into the groundwater of the BMZ?

The report documents the following findings:

- Mixing models suggest that between 18 to 30 percent of the nitrate in central Cherry Valley groundwater is derived from septic systems.
- If septic systems were completely phased out, nitrate concentrations in central Cherry Valley groundwater could decline by 30 percent once a steady state condition is achieved. The time to reach a steady state is anticipated to be shorter than in other portions of the BMZ due to relatively high rates of recharge in Zone 3.
- Mass balance calculations show that nitrate-nitrogen inputs from septic systems is one of the largest inputs of nitrogen to groundwater in the BMZ.
- If the waste from septic tanks were to be conveyed to the City of Beaumont WWTP, about 30 percent of the current input of nitrate from human waste to groundwater would be removed.

4.2 Comparison with Federal and State Drinking Water Standards

The California Department of Health Services (CDPH) maintains an active water quality database of all public and private drinking water wells throughout the state. This database, available at CDPH's website, was assessed for the 2013-2017 reporting period for 20 domestic production wells in the Beaumont Basin. The objective of this analysis was to determine whether any of these potable wells had exceeded the Primary or Secondary Federal and State standards or the notification levels set by the state. Federal standards are set by the United States Environmental Protection Agency (USEPA) while state standards in California are set by CDPH. Primary standards at the federal and state level are enforceable criteria that have been established to protect the public against consumption of drinking water contaminants that present a risk to human health. Secondary standards are not enforceable standards; they have been established for aesthetic qualities of water, such as taste, color, and other. Contaminants with a secondary MCL are not considered to present a risk to human health at the established maximum level. Notification levels (NL) are not enforceable standards; however, they require that municipal water suppliers notify the public if the NL for a chemical has been exceeded.

A total of 1,266 water quality results were extracted from the CDPH database for the 20 production wells in the Beaumont Basin. Results were obtained for 176 analytes sampled between 2013 and 2017. The results of the analysis indicate that not a single production well exceeds either the primary or secondary federal and state standards during the reporting period. However, the California Notification Limit for Vanadium (100 ug/day) was exceeded once at SMWC Well No. 4 during the reporting period.

Additional water quality information from 2012 through 2016 was obtained from Dudek Engineering as part of the Maximum Benefit Monitoring Program. A total of 1,356 water

quality results were analyzed to determine if the water quality at non-domestic wells exceeded drinking water standards. Drinking standards were exceeded for a limited number of constituents as follows:

- Nitrate-N – Nine of the 17 monitoring wells sampled for Nitrate-N exceeded the federal and state primary MCL of 10 mg/L – Total of 98 readings. All of these wells are located outside the Beaumont Basin.
- pH – Nine of the 16 monitoring wells sampled for pH exceeded the secondary federal MCL of 8.5 – Total of 77 readings. One of these wells is located in the Beaumont Basin.
- Total Dissolved Solids – Nine of the 16 monitoring wells exceeded the federal and state secondary MCL of 500 mg/L – Total of 75 readings. These wells are located outside the Beaumont Basin.

Appendix E contains summary statistics of the analytical results for the 2013-2017 period for all chemicals that have a federal or state drinking water standard as reported in the CDPH website. Information in this appendix will be updated once the Maximum Benefit Monitoring Program database for CY 2017 is incorporated.

4.2.1 Trace Metals

As indicated earlier, not a single domestic well exceeded either the primary or secondary federal and state standards during the reporting period. This represents a significant improvement over previous reporting periods when several wells exceeded the MCL for trace metals. Trace metals are briefly discussed here and compared to previous reporting periods.

Aluminum. There were 34 water samples taken during the reporting period and tested for aluminum. Aluminum concentration at all wells was below 50 ug/L, significantly below the secondary MCL of 200 ug/L. Aluminum above the MCL can add color to water. One well exceeded the MCL during the FY 2004-08 reporting period.

Arsenic. There were 35 water samples collected and tested for arsenic during the reporting period. The highest arsenic concentration was observed at SMWC's Well No. 4; arsenic concentration at this well has increased from 4.2 mg/L in 2009, to 4.6 mg/L in 2012, to the highest value of 5.2 mg/L in April 2013. Latest value, recorded in April 2016, arsenic concentration was down to 4.4 mg/L. One well exceeded the MCL during the FY 2004-08 reporting period.

Iron. A total of 34 water samples were taken during the reporting period and tested for iron. In most cases iron concentration was below 100 ug/L., which is significantly below the current secondary MCL of 300 ug/L. However, there is one well that exceeded the MCL during the 2012-16 period; BCVWD Well No. 3 at 450 mg/L. Iron at a concentration above the MCL can impact color, odor, and taste in water. Five wells exceeded the MCL during the FY 2004-08 reporting period.

Lead. There were 34 water samples collected and tested for lead during the reporting period. The highest concentration reported were 0.0065 mg/L at BCVWD Well No. 25 and 0.0058 mg/L at Rancho Calimesa Mobile Home Park Well No. 1. Both of these concentrations are significantly

below the current primary MCL for Lead of 0.015 mg/L. Lead concentrations in water above the MCL can have significant impacts on human health. One well exceeded the MCL during the FY 2004-08 reporting period.

Manganese. There were 34 water samples taken during the reporting period and tested for Manganese. Manganese concentration at all wells was below 20 ug/L, significantly below the secondary MCL of 50 ug/L. Manganese can significantly impact color and taste in water at concentrations above the MCL. One monitoring well exceeded the MCL during the FY 2004-08 reporting period.

Total Chromium. A total of 34 water samples were taken during the reporting period and tested for total chromium. The highest reported concentrations of total chromium were observed in January 2013 at BCVWD Well 26 at 17 ug/L and in March 2017 at Banning C-3 at 15 ug/L. Both of these values are significantly below the current state primary MCL of 50 ug/L. One well exceeded the state primary MCL during the FY 2004-08 reporting period.

Vanadium. Three water samples were tested for vanadium during the reporting period from SMWC's Well 4 and YVWD No. 48. Vanadium at the SMWC well has been consistently hovering around 100 ug/L doubling the state notification level of 50 ug/L. Vanadium concentration at YVWD No. 48 was 25 ug/L in 2014, but increase to 90 ug/L in the summer of 2017.

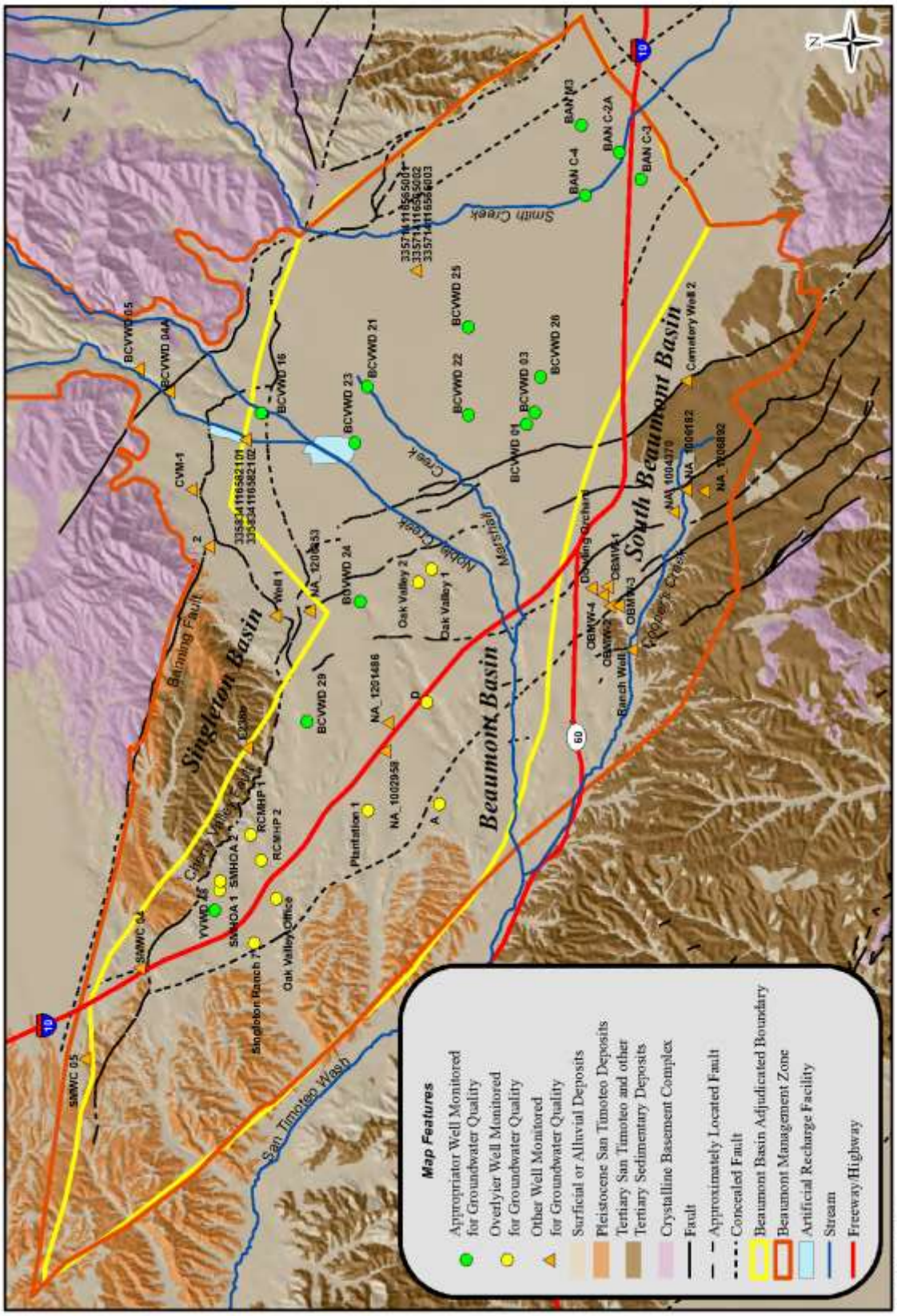
Copper. There were 34 water samples collected and tested for copper during the reporting period. Over the last five years only one well has exceeded the detection limit of 50 ug/L; the Rancho Calimesa Well No. 2 at 62 ug/L (Feb 2013). This concentration is significantly below the state primary MCL of 1,300 ug/L. This is consistent with previous reporting periods.

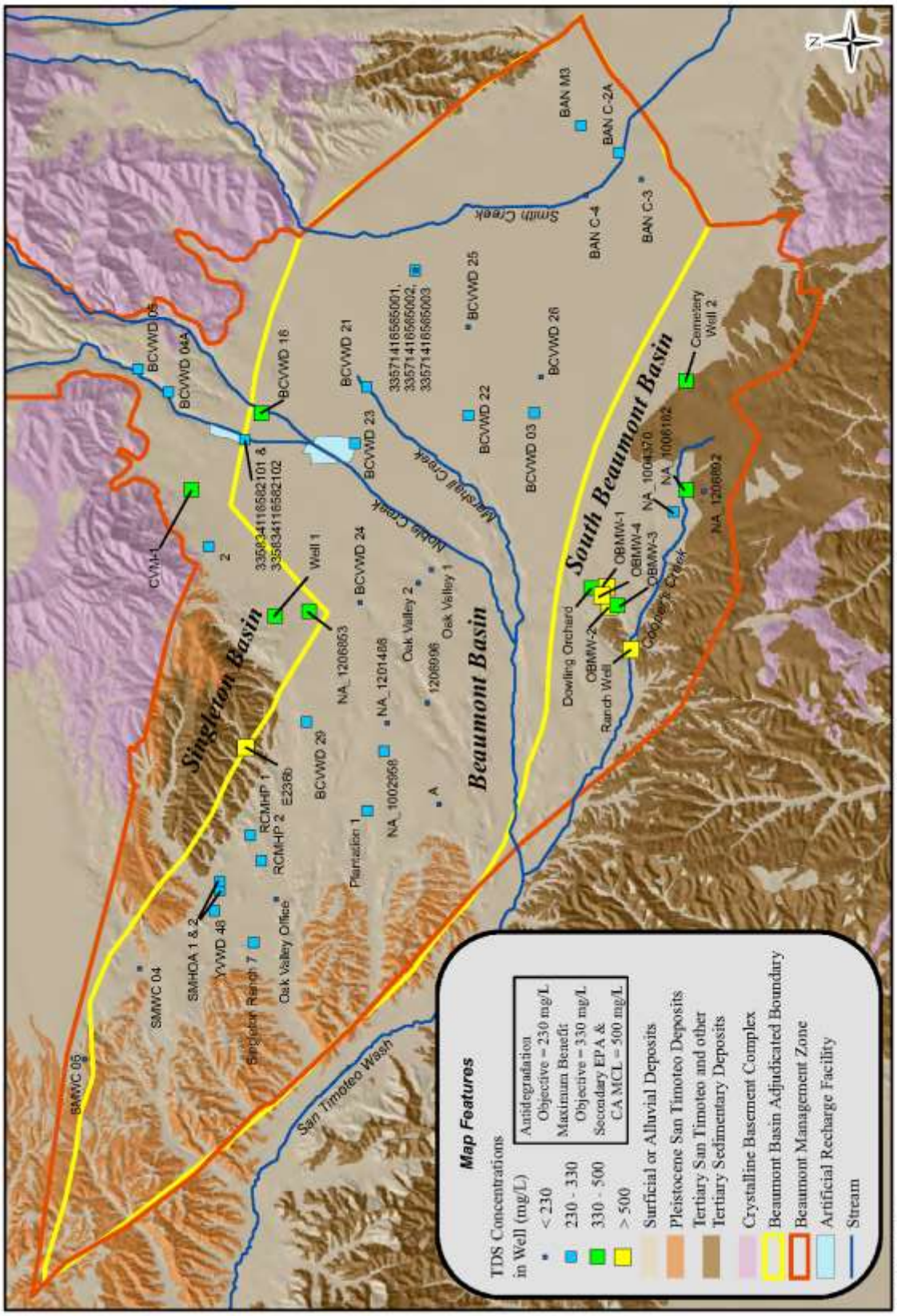
4.2.3 pH

There are two secondary standards for pH, a lower limit of 6.5 and an upper limit of 8.5. With the exception of one well, all other production wells were within these limits. pH concentrations ranging from a low of 7.0 to a high of 8.9 (SMWC Well No. 4) with most wells in the 7.8 to 8.0 range. Four wells in the basin exceeded the upper limit for pH during the FY 2004-08 reporting period.

4.2.4 Turbidity

Turbidity is a measure of the cloudiness of water, and is used to indicate water quality and filtration effectiveness. All production wells in the Basin were tested for turbidity and none exceeded the primary federal and state MCL of 5 NTU.


Map Features
Appropriator Well Monitored for Groundwater Quality
Overlyier Well Monitored for Groundwater Quality
Other Well Monitored for Groundwater Quality
Surficial or Alluvial Deposits
Pleistocene San Timoteo Deposits
Tertiary San Timoteo and other Tertiary Sedimentary Deposits
Crystalline Basement Complex
Fault
Approximately Located Fault
Concealed Fault
Beaumont Basin Adjudicated Boundary
Beaumont Management Zone
Artificial Recharge Facility
Stream
Freeway/Highway
Singleton Basin
Beaumont Basin
South Beaumont Basin
San Timoteo Wash
Banning Fault
Cherry Valley Fault
Noble Creek
Smith Creek
Marshall
Dowling Orchard
Cemetery Well 2
Oak Valley 1
Oak Valley 2
Oak Valley Office
Singleton Ranch 1
Plantation 1
Well 1
Ranch Well
SMWC 04
SMWC 05
SMHOA 1
SMHOA 2
RCMHP 1
RCMHP 2
YVWD 15
CVM-1
BCVWD 04A
BCVWD 05
BCVWD 16
BCVWD 21
BCVWD 22
BCVWD 23
BCVWD 24
BCVWD 25
BCVWD 26
BCVWD 29
BCVWD 01
BCVWD 03
BAN C-2A
BAN C-3
BAN C-4
BAN M3
OBMW-1
OBMW-2
OBMW-3
OBMW-4
NA_1004378
NA_1006182
NA_1006192
NA_1201486
NA_1002958
10
60
0 0.5 1 2 Miles
NAD 83 UTM Zone 11
Wells with Groundwater Quality Data in the Beaumont Basin
Figure 4-1
Alda, Inc. in association with
Thomas Harder & Co.
Groundwater Consulting



Total Dissolved Solids in Groundwater (Maximum Concentrations 2012 to 2017)
Figure 4-2

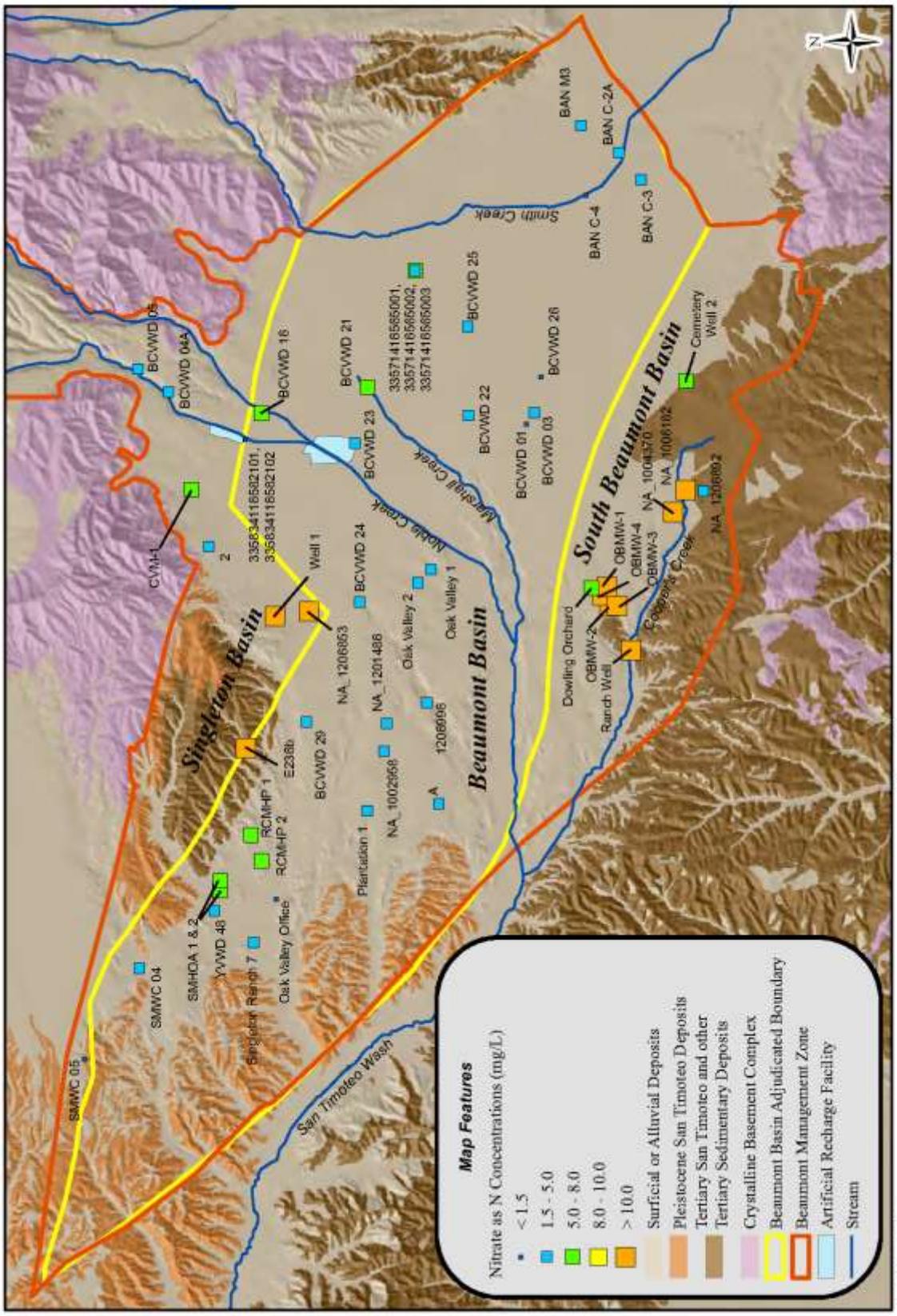

Nitrate in Groundwater
(Maximum Concentrations 2012 to 2017)
Figure 4-3
Alda, Inc. in association with
Thomas Harder & Co.
Groundwater Consulting
Map Features
Nitrate as N Concentrations (mg/L)
< 1.5
1.5 - 5.0
5.0 - 8.0
8.0 - 10.0
> 10.0
Surficial or Alluvial Deposits
Pleistocene San Timoteo Deposits
Tertiary San Timoteo and other
Tertiary Sedimentary Deposits
Crystalline Basement Complex
Beaumont Basin Adjudicated Boundary
Beaumont Management Zone
Artificial Recharge Facility
Stream
Singleton Basin
Beaumont Basin
South Beaumont Basin
San Timoteo Wash
Noble Creek
Smith Creek
Cottonwood Creek
SMWC 05
SMWC 04
SMHOA 1 & 2
YVWD 48
Singleton Ranch 7
Oak Valley Office
RCMHP 1
RCMHP 2
E23(b)
Plantation 1
BCVWD 29
NA_1002958
NA_1206853
NA_1201486
Oak Valley 2
Oak Valley 1
1206696
A
CVM-1
2
3358341165821O1,
3358341165821O2
Well 1
BCVWD 24
BCVWD 23
BCVWD 21
BCVWD 18
BCVWD 04A
BCVWD 05
3357141656001,
3357141656002,
3357141656003
BCVWD 25
BCVWD 22
BCVWD 01
BCVWD 03
BCVWD 26
BAN M3
BAN C-2A
BAN C-4
BAN C-3
Cemetery
Well 2
NA_1006102
NA_1006370
NA_1206882
OBMW-1
OBMW-4
OBMW-3
OBMW-2
Dowling Orchard
Ranch Well
N
0
0.5
1
2
Miles
NAD 83 UTM Zone 11

Table 4-1

Summary of Nitrate and TDS by Well in and around the Beaumont Basin (2013-17)

Rec No.	Well Name	Nitrate as N			TDS		
		Count	Avg	Max	Count	Avg	Max
Appropriators							
1007031	BAN C-2A	7	1.9	2.4	1	240	240
1004377	BAN C-3	7	1.7	1.9	2	180	190
1206706	BAN C-4	7	1.0	1.1	1	185	190
1206700	BAN M-3	6	1.9	2.2	2	295	300
1004350	BCVWD 03				2	225	240
1002938	BCVWD 16	48	5.7	7.3	2	350	370
1201487	BCVWD 21	48	3.5	7.8	2	285	290
1002966	BCVWD 22	5	1.3	3.0	2	235	260
1207328	BCVWD 23	11	2.5	3.3	3	243	300
1208224	BCVWD 24	5	1.5	1.7	1	210	210
1220057	BCVWD 25	4	1.1	1.6	1	220	220
1220058	BCVWD 26	2	1.0	1.0	1	190	190
1201480	BCVWD 29	3	2.1	2.3	2	250	280
1003035	SMWC 04	9	3.2	4.0	2	180	190
1003063	YVWD 48	7	2.1	2.4	9	190	230
		Avg:	2.2	3.0	Avg:	232	247
Overlyier - Available through 2016 - to be updated for final report							
1206844	1	11	5.1	6.1			
1206845	2	4	4.5	5.0			
1206995	A	1	2.0	2.0	1	220	220
1206996	D	1	2.2	2.2	1	200	200
1007025	Oak Valley 1	1	2.1	2.1	1	210	210
1207769	Oak Valley 2	1	2.8	2.8	1	180	180
1201561	Oak Valley Office	1	1.2	1.2	1	200	200
0	Plantation 1				1	250	250
0	RCMHP 1	7	4.5	6.2	1	260	260
	RCMHP 2	2	6.3	7.8	2	295	320
1003072	Singleton Ranch 7	1	2.2	2.2	1	230	230
0	SMHOA 1	19	4.8	6.0	1	260	260
0	SMHOA 2	7	4.5	4.9	1	260	260
		Avg:	3.5	4.0	Avg:	233	235
Other - Inside Basin - Available through 2016 - to be updated for final report							
1207773	335714116565001	1	4.7	4.7	1	251	251
1207770	335714116565002	1	5.1	5.1	1	203	203
1207771	335714116565003	1	6.6	6.6	1	221	221
1207827	335834116582101	1	0.5	0.5	1	310	310
1207828	335834116582102	1	0.5	0.5	1	280	280

Table 4-1

Summary of Nitrate and TDS by Well in and around the Beaumont Basin (2013-17)

Rec No.	Well Name	Nitrate as N			TDS		
		Count	Avg	Max	Count	Avg	Max
1002958	NA_1002958	1	1.5	1.5	1	230	230
1201486	NA_1201486	2	1.8	1.9	2	210	210
		Avg:	2.9	3.0	Avg:	244	244
All Wells within the Beaumont Basin			**2.8**	**3.4**		**235**	**242**
Singleton Basin / Edgar Cyn - to be updated for final report							
1208430	CVM-1	2	7.5	7.6	2	330	340
1207012	E236b	2	12.5	19.0	2	440	550
1201450	2	1	1.7	1.7	1	270	270
1206853	NA_1206853	2	11.5	13.0	2	315	340
1007022	Well 1	2	11.5	12.0	2	365	370
1002931	BCVWD 04A	2	1.8	1.9	1	320	320
1002935	BCVWD 05	2	2.9	3.2	1	260	260
1002917	BCVWD 06	2	2.5	2.5	1	260	260
1002896	BCVWD 10	3	3.6	8.1	1	290	290
1002901	BCVWD 11	1	1.0	1.0	2	230	230
1002891	BCVWD 12	2	0.9	1.0	1	220	220
1002890	BCVWD 13	1	0.8	0.8			
1002899	BCVWD 14	2	0.6	0.7	1	250	250
1002895	BCVWD 18	2	1.4	1.5	1	240	240
1007011	BCVWD 19	2	0.7	0.8	1	230	230
1007014	BCVWD 20	2	1.1	1.2	2	210	220
1003032	SMWC 05	4	1.2	1.3	1	190	190
		Avg:	3.7	4.5	Avg:	276	286
South Beaumont Basin - to be updated for final report							
1220050	Cemetery Well 2	4	6.2	7.7	4	283	370
1221612	Dowling Orchard	6	6.2	6.6	4	383	420
1004370	NA_1004370	3	13.7	14.0	3	277	280
1006182	NA_1006182	1	22.0	22.0	1	370	370
1206892	NA_1206892	2	3.7	4.0	2	215	220
1208432	Ranch Well	3	15.3	16.0	3	690	720
1232662	OBMW-1	6	1.7	12.0	4	698	770
1232663	OBMW-2	6	15.3	17.0	5	678	710
1232664	OBMW-3	7	10.2	11.0	3	448	460
1232665	OBMW-4	6	12.3	13.0	3	703	780
		Avg:	10.7	12.3	Avg:	475	510

Section 5
Land Subsidence

In the first ten years of operations under the Judgment, a temporary surplus was established that allows up to 160,000 acre-ft of overdraft within the Basin. The purpose of the temporary surplus was to create room for the safe storage of supplemental water and to reduce losses from the basin. A major concern is that overdraft of the groundwater basin may lead to the lowering of groundwater levels and, subsequently, to land subsidence and ground fissuring. To proactively address this concern, the STWMA and the Watermaster developed a monitoring program specifically to assess the occurrence of subsidence from past groundwater pumping and future pumping. To implement this program, the STWMA, on behalf of the Watermaster, successfully applied for an AB303 Grant from the California Department of Water Resources (DWR)

The Subsidence Monitoring Program was established in 2005. Initially, ground level information for the 1928 to 2000 period was analyzed. In mid to late 2006, 72 benchmark monuments were installed across the Basin and in nearby basins and an initial ground-level survey conducted to establish the initial elevations of all benchmarks. A second survey was conducted in 2007. A comparison analysis of the two surveying efforts reveals little vertical change; in addition, this minimum subsidence was fairly evenly distributed across the Basin. According to the program, the ground level survey of all benchmarks was to be conducted on a tri-annual basis with the next round of survey scheduled for the spring of 2009. The 2009 survey was not conducted by Watermaster since it was determined that the level of subsidence was minimal. No additional surveys are scheduled at this time.

Appendix A
Board Resolutions 17-01 and 17-02

RESOLUTION NO. 2017-01

A RESOLUTION OF THE BEAUMONT BASIN WATERMASTER TO CONFIRM AND ADOPT SAN GORGONIO PASS WATER AGENCY'S ("SGPWA") APPLICATION FOR GROUNDWATER STORAGE AGREEMENT, SUBJECT TO STATED CONDITIONS

WHEREAS, the Stipulated Judgment establishing the Beaumont Basin Watermaster (Riverside Superior Court Case No. 389197) empowers the Beaumont Basin Watermaster to adopt appropriate rules and regulations for the conduct of Watermaster affairs; and

WHEREAS, pursuant to its authority, the Beaumont Basin Watermaster established principles of groundwater storage in the Beaumont Basin via Resolution No. 2005-01, the foundation for San Gorgonio Pass Water Agency Application for Groundwater Storage Agreement; and

WHEREAS, San Gorgonio Pass Water Agency is a state water contractor formed in 1961 for the purpose of importing water from the State Water Project into the San Gorgonio Pass area; and

WHEREAS, the San Gorgonio Pass Water Agency service area includes the Beaumont Basin; and

WHEREAS, the San Gorgonio Pass Water Agency submitted to the Beaumont Basin Watermaster a Groundwater Storage Application requesting, in pertinent part, to store up to 10,000 acre-feet of water in the Beaumont Basin through artificial recharge of water from the State Water Project, via proposed recharge facilities to be located in the southwest corner of Brookside Avenue and Beaumont Avenue; and

WHEREAS, the Beaumont Basin Watermaster issued copies of SGPWA's Groundwater Storage Application to members of its Watermaster Committee for review; and,

WHEREAS, the Beaumont Basin Watermaster met on numerous occasions to discuss SGPWA's Groundwater Storage Application agreeing to support such under the following conditions:

1. The San Gorgonio Pass Water Agency shall add imported water to their Groundwater Storage Account via spreading basins when the quantity of imported water available to the Region exceeds the demands and/or requests for imported water by the Watermaster Committee members as provided in the SGPWA application.

2. The San Gorgonio Pass Water Agency may recharge the excess imported water in the Beaumont Avenue Recharge Facility, or any other location approved by the Beaumont Basin Watermaster.

3. The imported water stored by the SGPWA pursuant to the conditions herein and the Groundwater Storage Application, will be made available, at any time, to the members of the Beaumont Basin Watermaster consistent with the laws, resolutions, ordinances, and policies of the San Gorgonio Pass Water Agency.

4. Members of the Watermaster Committee shall maintain the right(s) of first refusal to purchase imported water placed in storage by the San Gorgonio Pass Water Agency at times when the San Gorgonio Pass water Agency determines that it has stored supplemental water available for sale, transfer, or exchange. At such times, the San Gorgonio Pass Water Agency shall notify all Watermaster Committee members via electronic mail a minimum of 60 calendar days prior to any sale, transfer, or exchange of any supplemental water in the storage account of the San Gorgonio Pass Water Agency to any person, entity, or Watermaster member. The Watermaster shall determine what amount(s), if any, of the stored imported water available by the San Gorgonio Pass Water Agency will be purchased individually or collectively by the Watermaster Committee members, which right(s) of first refusal must be exercised in writing received by the San Gorgonio Pass Water Agency within 60 calendar days notice was sent by the San Gorgonio Pass Water Agency; and

WHEREAS, the Beaumont Basin Watermaster reviewed and discussed this Resolution on June 6, 2017 to take this matter up, finding that the foregoing is true and accurate.

NOW, THEREFORE, BE IT RESOLVED BY THE BEAUMONT BASIN WATERMASTER that it does hereby accept SGPWA's Groundwater Storage Application and does hereby grant SGPWA a water storage account pursuant to SGPWA's Groundwater Storage Application, subject to the conditions set forth in this Resolution, and subject to the Judgment establishing the Beaumont Basin Watermaster (Riverside Superior Court Case No. 389197), its rules and regulations for the Beaumont Basin - to include groundwater storage in the Beaumont Basin by Non-Appropriators - a classification applying to SGPWA in the amount of 10,000 acre feet.

PASSED AND ADOPTED this 6th day of June 2017.

BEAUMONT BASIN WATERMASTER

By: _____

Art Vela, Chairman of the
Beaumont Basin Watermaster

RESOLUTION NO. 2017-02

A RESOLUTION OF THE BEAUMONT BASIN WATERMASTER APPROVING THE TRANSFER OF OVERLYING WATER RIGHTS TO SPECIFIC PARCELS

WHEREAS, the Stipulated Judgment establishing the Beaumont Basin Watermaster (Riverside Superior Court Case No. 389197) ("Adjudication") was filed with the Superior Count of California, County of Riverside on February 4, 2004; and

WHEREAS, Oak Valley Partners, L.P. ("OVP") was designated as holding Overlying Water Rights within the Adjudication, with an overall water amount of 1806 acre-feet/year spread over 5,331.65 acres under the then-specified Safe Yield of the basin as described in the Adjudication. As specified in the Adjudication, OVP's property consists of numerous assessor parcels that are identified within Exhibit D of the Adjudication ("OVP Adjudication Parcels"). Section III, 3(G) of the Adjudication outlines OVP's intended development of its property and specifies the process that OVP may utilize to arrange the transfer of its Overlying Water Rights to particular development parcels eventually to be serviced by one or more retail water service providers upon annexation; and

WHEREAS, OVP now desires to have its designated Overlying Water Rights acknowledged in the Adjudication assigned to the requisite Assessor Parcel Numbers within the Summerwind Ranch Specific Plan ("Project") that correlate to certain of the OVP Adjudication Parcels; and

WHEREAS, the OVP Adjudication Parcels listed on Exhibit D of the Adjudication that correlate to the Project parcels and which total 2409.02 acres include the following parcel numbers from Exhibit D:

- 413-040-002;
- 413-160-003 through 007;
- 413-170-020, 021, 023, 027 through 031, 033, and 035;
- 413-180-017 and 019;
- 413-190-001 and 011;
- 413-200-002, 010, 014, 015, 020, 023, 024, 026 through 030, and 034 through 037;
- 413-290-003 and 007;
- 413-460-038; and

WHEREAS, the Assessor Parcel Numbers for the Project parcels that correlate to the above-designated OVP Adjudication Parcels as contained in Exhibit D to the Adjudication are listed and specified in Exhibit 1 attached hereto; and

WHEREAS, OVP desires that Watermaster approve the transfer of all of OVP's Overlying Water Rights designated within the Adjudication to the Project parcels identified in Exhibit 1 attached hereto for the development of the Project by OVP and its successors and/or assigns; and

WHEREAS, OVP further intends to secure commitments from the Yucaipa Valley Water District to provide water service to development phases of the Project, and requests that when those commitments are made and water service is provided to the designated Project parcels that the Overlying Water Rights for those Project parcels be transferred to the Yucaipa Valley Water District ("YVWD") consistent with the Adjudication.

NOW, THEREFORE, BE IT RESOLVED BY THE BEAUMONT BASIN WATERMASTER as follows:

1. Transfer of Overlying Water Rights. Watermaster hereby approves the transfer of all of OVP's Overlying Water Rights to the Project parcels listed on Exhibit 1 attached hereto to provide for the development phases of the Project by OVP and its successors/assigns. OVP shall immediately inform Watermaster of any successor or assign who takes ownership of one or more Project parcels listed on Exhibit 1 to which Overlying Water Rights have been transferred. As of this time, the amount of water associated with the OVP Overlying Water Rights is consistent with the relationship between the redetermined safe yield (6700 acre-feet) and the original Safe Yield (8650 acre-feet), or in other words 77.5% of the original amount identified to OVP in Exhibit B to the Adjudication.

2. Transfer of Rights on Confirmed Water Service by YVWD. Once OVP and/or its successor(s) or assigns secures commitments from the Yucaipa Valley Water District to provide water service to the development phases of the Project, and when water service is provided to the designated Project parcels, then the overlying water rights for those Project parcels shall be transferred to YVWD. YVWD shall report to Watermaster when it has provided retail water service to various properties making up portions of the Project and Watermaster shall account for the same consistent with Section VI, 5. W. of the Adjudication.

3. Use of Wells. The existing and future wells on the Project parcels may be used to extract water for use on the Project parcels and/or any remaining OVP parcels, consistent with the Adjudication and current and future Watermaster rules, regulations and policies.

4. Further Documentation or Action. The Chief of Watermaster Services or Watermaster Engineer is hereby authorized and directed to execute such further documents and instruments, and take such further action, as shall be reasonably required to carry out the purposes and intent of this resolution.

5. Effective Date. The effective date of this resolution is August 30, 2017.

PASSED AND ADOPTED by the Beaumont Basin Watermaster this 30th day of August 2017.

4554311.1 -- N1356.1

BEAUMONT BASIN WATERMASTER

By:_____
Art Vela, Chairman of the
Beaumont Basin Watermaster

Appendix B
Active and Interested Party List

Beaumont Basin - 2017 Active and Interested Party List

City of Banning
Arturo Vela
Post Office Box 998
Banning, CA 92220
avela@ci.banning.ca.us

Yucaipa Valley Water District
Joseph Zoba
Post Office Box 730
Yucaipa, CA 92399
jzoba@yvwd.dst.ca.us

South Mesa Mutual Water Company
George Jorritsma
Post Office Box 458
Calimesa, CA 92320
smwc@verizon.net

South Mesa Mutual Water Company
Dave Armstrong
Post Office Box 458
Calimesa, CA 92320
darmstrongsmwc@yahoo.com

Beaumont-Cherry Valley Water District
Dan Jaggers
560 Magnolia Avenue
Beaumont, CA 92223
eric.fraser@bcvwd.org

Beaumont-Cherry Valley Water District
Anthony Lara
560 Magnolia Avenue
Beaumont, CA 92223
tony.lara@bcvwd.org

Yucaipa Valley Water District
Jennifer Ares
Post Office Box 730
Yucaipa, CA 92399
Jennifer Ares (jares@yvwd.dst.ca.us)

Yucaipa Valley Water District
Mike Kostelecky
Post Office Box 730
Yucaipa, CA 92399

Beaumont-Cherry Valley Water District
Andy Ramirez, Director
560 Magnolia Avenue
Beaumont, CA 92223

Beaumont-Cherry Valley Water District
Claudeen Diaz, Director
560 Magnolia Avenue
Beaumont, CA 92223

City of Beaumont
Kyle Warsinski
550 East Sixth Street
Beaumont, CA 92223
kwarsinski@ci.beaumont.ca.us

Sharondale Mesa Owners Association
William Wood
9525 Sharon Way
Calimesa, CA 92320

Sharondale Mesa Owners Association
Ira Pace
9525 Sharon Way
Calimesa, CA 92320
rbnjp@msn.com

Plantation on the Lake
James Krueger
10961 Desert Lawn Drive
Calimesa, CA 92320
jimk@mrc1.com

California Oak Valley Golf and Resort, LLC.
Ron Sullivan
27710 Jefferson Avenue, Suite 301
Temecula, CA 92590

Oak Valley Partners, LP.
John Ohanian
Post Office Box 645
10410 Roberts Road
Calimesa, CA 92320

San Bernardino Valley MWD
Douglas Headrick
380 East Vanderbilt Way
San Bernardino, CA 92408

Mrs. Beckman
38201 Cherry Valley Boulevard
Cherry Valley, CA 92223

Merlin Properties, LLC.
Fred and Richard Reidman
6475 East Pacific Coast Highway, Suite 399
Long Beach, CA 90803
riedman@gte.net

San Gorgonio Pass Water Agency
David Fenn, Director
1210 Beaumont Avenue
Beaumont, CA 92223

San Gorgonio Pass Water Agency
Jeff Davis, General Manager
1210 Beaumont Avenue
Beaumont, CA 92223

Beaumont Basin - 2017 Active and Interested Party List

Beaumont-Cherry Valley Water District
Daniel Slawson, Director
560 Magnolia Avenue
Beaumont, CA 92223

Beaumont-Cherry Valley Water District
John Covington, Director
560 Magnolia Avenue
Beaumont, CA 92223

Beaumont-Cherry Valley Water District
David Hoffman, Director
560 Magnolia Avenue
Beaumont, CA 92223

Leonard Stearns
Post Office Box 141
Calimesa, CA 92320

Latham and Watkins, LLP.
Paul Singarella, Esq.
650 Town Center Drive, 20th Floor
Costa Mesa, CA 92626-1925

Southern California Professional Golfers Association of America
Tom Addis
36201 Champions Drive
Beaumont, CA 92223

Ted Haring
10961 - 354 Desert Lawn Drive
Calimesa, CA 92320
tdharing@msn.com

Redwine and Sherrill
Gil Granito, Esq.
1950 Market Street
Riverside, CA 92501

Patsy Reeley
10096 Live Oak Avenue
Cherry Valley, CA 92223

Luwana Ryan
9574 Mountain View Avenue
Cherry Valley, CA 92223

Frances Flanders
41045 Mohawk Circle
Cherry Valley, CA 92223

Albor Properties
Eric Borstein
12301 Wilshire Boulevard, Suite 302
Los Angeles, CA 90025

Niki Magee
38455 Vineland Street
Cherry Valley, CA 92223

San Gorgonio Pass Water Agency
Ron Duncan, Director
1210 Beaumont Avenue
Beaumont, CA 92223

San Gorgonio Pass Water Agency
Leonard Stevenson, Director
1210 Beaumont Avenue
Beaumont, CA 92223

San Gorgonio Pass Water Agency
Dr. Blair Ball, Director
1210 Beaumont Avenue
Beaumont, CA 92223

San Gorgonio Pass Water Agency
David Castaldo, Director
1210 Beaumont Avenue
Beaumont, CA 92223

San Gorgonio Pass Water Agency
Steve Lehtonen
1210 Beaumont Avenue
Beaumont, CA 92223

San Gorgonio Pass Water Agency
Mike Thompson
1210 Beaumont Avenue
Beaumont, CA 92223

San Gorgonio Pass Water Agency
Cheryle Rasmussen
1210 Beaumont Avenue
Beaumont, CA 92223

Robert C. Newman
29455 Live Oak Canyon Road
Redlands, CA 92373
newman4governor@aol.com

Judy Bingham
115 Viele Avenue
Beaumont, CA 92223

Thomas Harder and Company
Thomas Harder
1260 N. Hancock, Suite 109
Anaheim, CA 92807
tharder@thomashardercompany.com
714.792.3875

Alvarado Smith
Thierry Montoya
1 Mac Arthur Place
Santa Ana, CA 92707
714.852.6800

Best, Best and Krieger
Greg Wilkinson, Esq.
3750 University Avenue, Suite 400
Riverside, CA 92501

Sunny Cal Egg and Poultry Company
Steve Anderson, Esq.
c/o Best, Best and Krieger
3750 University Avenue, Suite 400
Riverside, CA 92501

Alda, Inc.
Anibal Blandon
5928 Vineyard Avenue
Rancho Cucamonga, CA 91701
blandona@aldaengineering.com
909.587.9916

Manheim, Manheim and Berman
Steve Anderson, Esq.
c/o Best, Best and Krieger
3750 University Avenue, Suite 400
Riverside, CA 92501

Appendix C
Fiscal Year 2016-17 Audit Letter

BEAUMONT BASIN WATERMASTER

INDEPENDENT ACCOUNTANT'S REPORT ON APPLYING AGREED-UPON PROCEDURES ON THE BEAUMONT BASIN WATERMASTER SCHEDULES

June 30, 2017

ROGERS, ANDERSON, MALODY & SCOTT, LLP
CERTIFIED PUBLIC ACCOUNTANTS, SINCE 1948

ROGERS, ANDERSON, MALODY & SCOTT, LLP
CERTIFIED PUBLIC ACCOUNTANTS SINCE 1948

735 E. Carnegie Dr. Suite 100
San Bernardino, CA 92408
909 889 0871 T
909 889 5361 F
ramscpa.net

INDEPENDENT ACCOUNTANT'S REPORT ON APPLYING AGREED-UPON PROCEDURES

Yucaipa Valley Water District as Treasurer
of the Beaumont Basin Watermaster
Yucaipa, California

We have performed the procedures enumerated below, which were agreed to by the Yucaipa Valley Water District (District), as treasurer of the Beaumont Basin Watermaster (Watermaster), solely to assist the District in evaluating certain amounts reported in the Watermaster Schedules (Schedules), attached as Exhibit A and Exhibit B, on the full accrual basis of accounting as of June 30, 2017 and for the year then ended. The District and Watermaster are responsible for the accuracy of the Schedules. The sufficiency of these procedures is solely the responsibility of those parties specified in this report. Consequently, we make no representation regarding the sufficiency of the procedures enumerated below either for the purpose for which this report has been requested or for any other purpose.

Our procedures and findings are as follows:

1. **Procedure**

   Agree the opening equity on Exhibit B to the ending equity noted on the trial balance for the fiscal year ended June 30, 2016.

   Finding

   No exceptions were noted as a result of applying the procedure.

2. **Procedure**

   Agree the cash balance reported on Exhibit A to the bank reconciliation, bank statement and trial balance. Select all of the deposits in transit and outstanding checks and trace their clearing to the subsequent month's bank statement.

   Finding

   No exceptions were noted as a result of applying the procedure.

3. **Procedure**

   Trace all member agency assessments recorded in the schedule to invoices and the bank statements.

   Finding

   No exceptions were noted as a result of applying the procedure.

4. **Procedure**

   Compare the ending check number for the fiscal year ended June 30, 2016 to the beginning check number for the period beginning on July 1, 2016. Note any breaks in check sequence for the period of July 1, 2016 through June 30, 2017.

   Finding

   No exceptions were noted as a result of applying the procedure.

5. **Procedure**

   Based on the population of checks issued during July 1, 2016 through June 30, 2017, select all payments and trace the check to supporting invoice noting whether the activity pertains to the Watermaster. Agree the dollar amount and vendor on the invoice to the check for accuracy.

   Finding

   No exceptions were noted as a result of applying the procedure.

6. **Procedure**

   Obtain the general ledger detail for the period of July 1, 2016 to June 30, 2017. Select all journal entries and trace the transaction to an approved journal entry and documentation supporting the nature and rationale of the journal entry.

   Finding

   No exceptions were noted as a result of applying the procedure.

This agreed-upon procedures engagement was conducted in accordance with attestation standards established by the American Institute of Certified Public Accountants. We were not engaged to and did not conduct an examination or review, the objective of which would be the expression of an opinion or conclusion, respectively, on the schedules of assets, liabilities and net position (Exhibit A) and assessments and expenses (Exhibit B). Accordingly, we do not express such an opinion or conclusion. Had we performed additional procedures, other matters might have come to our attention that would have been reported to you.

This report is intended solely for the information and use of the Watermaster and the District and is not intended to be and should not be used by anyone other than the specified parties.

Rogers, Anderson, Malody & Scott, LLP.

August 16, 2017
San Bernardino, California

Exhibit A

Beaumont Basin Watermaster
Schedule of Assets, Liabilities and Net Position
(Unaudited)
June 30, 2017

Assets	
Cash and cash equivalents	$ 190,797
Liabilities	
Accounts payable	1,537
Net position	
Unrestricted	$ 189,260

Exhibit B

Beaumont Basin Watermaster
Schedule of Revenues and Expenses
(Unaudited)
For the Year Ended June 30, 2017

Revenues	
Assessments	$ 130,985
Interest	101
Total revenues	131,086
Expenses	
Special projects	
Acquisition/computation and annual report	49,724
Engineering	3,423
Monitoring and data acquisition	56,138
Administrative	
Meetings and miscellaneous	137
Legal and professional	10,448
Bank charges	50
Total expenses	119,920
Change in net position	11,166
Unrestricted net position, beginning of year	178,094
Unrestricted net position, end of year	$ 189,260

Appendix D
Production Estimation Methods for Unmetered Overlying Producers

Production Estimation for Un-metered Overlying Producers

Introduction

The Water Duty Method is a method used to estimate groundwater production for individual Overlying Users whose wells do not have water meters. The method was initially developed by Wildermuth Environmental Inc. (WEI) during the preparation of the 2005-06 Annual Report for the Watermaster. This method was later updated by WEI and it has been used since.

This appendix presents a list of un-metered Overlying Users, a summary of the Water Duty Method, and updated production estimates.

Unmetered Overlying Users

The Water Duty Method was applied to the following un-metered Overlying Users:

- Merlin Properties
- Roman Catholic Bishop of San Bernardino County
- Leonard M. and Dorothy D. Stearns
- Sunny-Cal Egg and Poultry Company
- Albor Properties III, LP
- Nick Nikodinov
- Ronald L. McAmis
- Nicolas and Amalia Aldama
- Hector Gutierrez, Luis Gutierrez, and Sebastian Monroy
- Boris and Miriam Darmont

Water Duty Method

The following is a summary of the main elements of the water duty method.

- The method is used to estimate groundwater pumping for indoor, outdoor, and agricultural use.
- Indoor water use is estimated based on the number of dwelling units on each producer's property. From historical water sales records in the BCVWD's service area, indoor water used was estimated 0.35 ac-ft/yr per dwelling unit. This consumption rate was applied to each Overlying User based on the number of dwelling units in their property.
- Outdoor water uses the Crop Water Requirement approach to estimate, based on the acreage of irrigated landscape, the volume of water pumped on each producer's property. This approach uses evapotranspiration records from the CIMIS Station 44, located at the University of California, Riverside, and crop type to determine the amount

of water required for landscape use; an irrigation efficiency of 70 percent is then used to estimate the volume of water pumped.

- Agricultural water use was limited to the operations of the former Sunny-Cal Egg and Poultry Company. The approach considers the water consumption of chickens and the amount of water used for washing ranch facilities. A water consumption rate of 60 gallons per day per 1,000 chickens was used, based on published daily nutritional requirements. Water for washing of ranch facilities was considered to be equal to the amount use for landscape irrigation on a per acre basis.

Estimated Water Production

The estimate of groundwater production from un-metered Overlying Users is presented for each user in the tables attached. It should be noted that very small differences exist between the amounts published in previous reports and the numbers presented here. The differences are based on the evapotranspiration values obtained from the CIMIS station; some published values currently used were slightly different than those used in the past for selected months.

University of California Riverside - CIMIS Station 44
Monthly Evapotranspiration Values - 2002 through 2016

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2003	3.05	2.57	4.61	5.00	5.65	5.16	7.05	7.46	5.54	4.08	2.23	2.07	54.47
2004	2.49	2.76	4.81	5.90	7.10	6.50	7.55	6.81	5.83	3.39	2.44	2.30	57.88
2005	2.02	2.21	3.93	5.41	6.47	6.49	7.28	6.68	5.32	3.65	2.84	2.15	54.45
2006	2.92	3.35	3.42	4.26	6.02	7.16	7.73	7.20	5.70	3.95	3.14	2.94	57.79
2007	3.28	2.91	5.02	5.04	6.47	7.16	7.57	7.09	5.44	4.34	2.81	2.24	59.37
2008	1.69	2.31	5.30	6.04	6.28	7.59	7.53	7.23	5.79	5.02	3.14	1.89	59.81
2009	3.32	2.41	4.62	5.58	6.32	5.37	7.60	6.68	5.89	4.40	3.18	2.08	57.45
2010	2.35	2.44	4.67	5.11	6.18	6.25	6.57	6.99	5.45	2.10	3.22	1.78	53.11
2011	2.91	2.91	4.22	5.57	6.67	6.95	7.76	7.65	5.47	4.03	2.45	2.82	59.41
2012	3.02	3.41	4.51	5.85	7.00	7.62	7.93	7.83	6.44	4.38	2.72	1.70	62.41
2013	2.72	3.18	4.80	5.71	7.01	7.36	7.13	7.37	6.14	4.27	2.76	2.80	61.25
2014	3.27	3.03	4.95	6.52	7.65	7.62	7.76	7.29	6.19	4.40	3.21	2.01	63.90
2015	2.76	3.33	5.83	6.30	5.38	7.42	6.76	7.67	5.83	3.81	2.77	1.84	59.70
2016	2.09	4.28	4.91	6.00	5.34	6.95	7.26	6.67	4.84	3.67	3.10	1.83	56.94
2017	2.41	2.08	5.01	6.13	5.95	6.98	7.11	6.40	4.92	4.54	2.35	3.09	56.97

Crop Coefficient (Warm Season Bermuda Grass)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Kc	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7

Monthly Water Requirements (inches)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2004	1.74	1.93	3.37	4.13	4.97	4.55	5.29	4.77	4.08	2.37	1.71	1.61	40.52
2005	1.41	1.55	2.75	3.79	4.53	4.54	5.10	4.68	3.72	2.56	1.99	1.51	38.12
2006	2.04	2.35	2.39	2.98	4.21	5.01	5.41	5.04	3.99	2.77	2.20	2.06	40.45
2007	2.30	2.04	3.51	3.53	4.53	5.01	5.30	4.96	3.81	3.04	1.97	1.57	41.56
2008	1.18	1.62	3.71	4.23	4.40	5.31	5.27	5.06	4.05	3.51	2.20	1.32	41.87
2009	2.32	1.69	3.23	3.91	4.42	3.76	5.32	4.68	4.12	3.08	2.23	1.46	40.22
2010	1.65	1.71	3.27	3.58	4.33	4.38	4.60	4.89	3.82	1.47	2.25	1.25	37.18
2011	2.04	2.04	2.95	3.90	4.67	4.87	5.43	5.36	3.83	2.82	1.72	1.97	41.59
2012	2.11	2.39	3.16	4.10	4.90	5.33	5.55	5.48	4.51	3.07	1.90	1.19	43.69
2013	1.90	2.23	3.36	4.00	4.91	5.15	4.99	5.16	4.30	2.99	1.93	1.96	42.88
2014	2.29	2.12	3.47	4.56	5.36	5.33	5.43	5.10	4.33	3.08	2.25	1.41	44.73
2015	1.93	2.33	4.08	4.41	3.77	5.19	4.73	5.37	4.08	2.67	1.94	1.29	41.79
2016	1.46	3.00	3.44	4.20	3.74	4.87	5.08	4.67	3.39	2.57	2.17	1.28	39.86
2017	1.69	1.46	3.51	4.29	4.17	4.89	4.98	4.48	3.44	3.18	1.65	2.16	39.88

Indoor Water Use: 0.35 ac-ft/yr/du Irrigation Efficienty: 70%

Estimated Pumping - All Unmetered Accounts

Year	Total Use (ac-ft/yr)
2004	466.11
2005	443.64
2006	81.28
2007	12.23
2008	13.78
2009	13.47
2010	11.85
2011	12.67
2012	13.07
2013	12.98
2014	13.17
2015	12.87
2016	12.67
2017	#REF!

Estimated Pumping by Merlin Properties

Year	Parcel Size (acres)	No. DU	Indoor Water Use (ac-ft/yr)	Irrigated Acres	Irrigation Requirement (ac-ft/yr)	Outdoor Water Use (ac-ft/yr)	Total Use (ac-ft/yr)
2004	48	3	1.05	0.11	0.37	0.53	1.58
2005	48	3	1.05	0.11	0.35	0.50	1.55
2006	48	3	1.05	0.11	0.37	0.53	1.58
2007	48	3	1.05	0.11	0.38	0.54	1.59
2008	48	3	1.05	0.11	0.38	0.55	1.60
2009	48	3	1.05	0.11	0.37	0.53	1.58
2010	48	3	1.05	0.11	0.34	0.49	1.54
2011	48	3	1.05	0.11	0.38	0.54	1.59
2012	48	3	1.05	0.11	0.40	0.57	1.62
2013	48	3	1.05	0.11	0.39	0.56	1.61
2014	48	3	1.05	0.11	0.41	0.59	1.64
2015	48	3	1.05	0.11	0.38	0.55	1.60
2016	48	3	1.05	0.11	0.37	0.52	1.57
2017	48	3	1.05	0.11	0.37	0.52	1.57

Estimated Pumping by Roman Catholic Bishop of San Bernardino

Year	Parcel Size (acres)	No. DU	Indoor Water Use (ac-ft/yr)	Irrigated Acres	Irrigation Requirement (ac-ft/yr)	Outdoor Water Use (ac-ft/yr)	Total Use (ac-ft/yr)
2004	34	2	0.70	12.10	40.85	58.36	59.06
2005	34	2	0.70	12.10	38.43	54.90	55.60
2006	34	2	0.70	12.10	40.79	58.27	58.97
2007	34	2	0.70	0.00	0.00	0.00	0.70
2008	34	2	0.70	0.00	0.00	0.00	0.70
2009	34	2	0.70	0.00	0.00	0.00	0.70
2010	34	0	0.00	0.00	0.00	0.00	0.00
2011	34	0	0.00	0.00	0.00	0.00	0.00
2012	34	0	0.00	0.00	0.00	0.00	0.00
2013	34	0	0.00	0.00	0.00	0.00	0.00
2014	34	0	0.00	0.00	0.00	0.00	0.00
2015	34	0	0.00	0.00	0.00	0.00	0.00
2016	34	0	0.00	0.00	0.00	0.00	0.00
2017	48	0	0.00	0.00	0.00	0.00	0.00

Estimated Pumping by Leonard Stearns

Year	Parcel Size (acres)	No. DU	Indoor Water Use (ac-ft/yr)	Irrigated Acres	Irrigation Requirement (ac-ft/yr)	Outdoor Water Use (ac-ft/yr)	Total Use (ac-ft/yr)
2004	91	3	1.05	0.00	0.00	0.00	1.05
2005	91	3	1.05	0.00	0.00	0.00	1.05
2006	91	3	1.05	0.00	0.00	0.00	1.05
2007	91	3	1.05	0.00	0.00	0.00	1.05
2008	91	3	1.05	0.00	0.00	0.00	1.05
2009	91	3	1.05	0.00	0.00	0.00	1.05
2010	91	2	0.70	0.00	0.00	0.00	0.70
2011	91	2	0.70	0.00	0.00	0.00	0.70
2012	91	2	0.70	0.00	0.00	0.00	0.70
2013	91	2	0.70	0.00	0.00	0.00	0.70
2014	91	2	0.70	0.00	0.00	0.00	0.70
2015	91	2	0.70	0.00	0.00	0.00	0.70
2016	91	2	0.70	0.00	0.00	0.00	0.70
2017	91	2	0.70	0.00	0.00	0.00	0.70

Estimated Pumping by Sunny Cal

Year	Parcel Size (acres)	No. DU	Indoor Water Use (ac-ft/yr)	Number of Chickens	Chicken Water Use (ac-ft/yr)	Irrigated Acres	Irrigation Requirement (ac-ft/yr)	Outdoor Water Use (ac-ft/yr)	Total Use (ac-ft/yr)
2004	200	10	3.50	1,200,000	80.65	66.40	224.19	320.27	404.42
2005	200	10	3.50	1,200,000	80.65	66.40	210.90	301.29	385.44
2006	185	2	0.70	0.00	0.00	0.40	1.35	1.93	2.63
2007	185	2	0.70	0.00	0.00	0.40	1.39	1.98	2.68
2008	185	2	0.70	0.00	0.00	0.70	2.44	3.49	4.19
2009	185	2	0.70	0.00	0.00	0.70	2.35	3.35	4.05
2010	185	2	0.70	0.00	0.00	0.70	2.17	3.10	3.80
2011	185	2	0.70	0.00	0.00	0.70	2.43	3.47	4.17
2012	185	2	0.70	0.00	0.00	0.70	2.55	3.64	4.34
2013	185	2	0.70	0.00	0.00	0.70	2.55	3.64	4.34
2014	185	2	0.70	0.00	0.00	0.70	2.55	3.64	4.34
2015	185	2	0.70	0.00	0.00	0.70	2.55	3.64	4.34
2015	185	2	0.70	0.00	0.00	0.70	2.55	3.64	4.34
2016	185	2	0.70	0.00	0.00	0.70	2.55	3.64	4.34
2017	185	2	0.70	0.00	0.00	0.70	2.55	3.64	4.34

Water consumption per chicken estimated at 6.0 gal/100 chickens

Estimated Pumping by Albor Properties

Year	Parcel Size (acres)	No. DU	Indoor Water Use (ac-ft/yr)	Irrigated Acres	Irrigation Requirement (ac-ft/yr)	Outdoor Water Use (ac-ft/yr)	Total Use (ac-ft/yr)
2004	0	0	0.00	0.00	0.00	0.00	0.00
2005	0	0	0.00	0.00	0.00	0.00	0.00
2006	122	2	0.70	2.60	8.76	12.52	13.22
2007	122	1	0.35	0.40	1.39	1.98	2.33
2008	122	1	0.35	0.40	1.40	1.99	2.34
2009	122	1	0.35	0.40	1.34	1.92	2.27
2010	122	1	0.35	0.40	1.24	1.77	2.12
2011	122	1	0.35	0.40	1.39	1.98	2.33
2012	122	1	0.35	0.40	1.46	2.08	2.43
2013	122	1	0.35	0.40	1.43	2.04	2.39
2014	122	1	0.35	0.40	1.49	2.13	2.48
2015	122	1	0.35	0.40	1.39	1.99	2.34
2016	122	1	0.35	0.40	1.33	1.90	2.25
2017	122	1	0.35	0.40	1.33	1.90	2.25

Estimated Pumping by Nikodinov

Year	Parcel Size (acres)	No. DU	Indoor Water Use (ac-ft/yr)	Irrigated Acres	Irrigation Requirement (ac-ft/yr)	Outdoor Water Use (ac-ft/yr)	Total Use (ac-ft/yr)
2004	0	0	0.00	0.00	0.00	0.00	0.00
2005	0	0	0.00	0.00	0.00	0.00	0.00
2006	10	1	0.35	0.08	0.27	0.39	0.74
2007	10	1	0.35	0.08	0.28	0.40	0.75
2008	10	1	0.35	0.08	0.28	0.40	0.75
2009	10	1	0.35	0.08	0.27	0.38	0.73
2010	10	1	0.35	0.08	0.25	0.35	0.70
2011	10	1	0.35	0.08	0.28	0.40	0.75
2012	10	1	0.35	0.08	0.29	0.42	0.77
2013	10	1	0.35	0.08	0.29	0.41	0.76
2014	10	1	0.35	0.08	0.30	0.43	0.78
2015	10	1	0.35	0.08	0.28	0.40	0.75
2016	10	1	0.35	0.08	0.27	0.38	0.73
2017	10	1	0.35	0.08	0.27	0.38	0.73

Estimated Pumping by McAmis

Year	Parcel Size (acres)	No. DU	Indoor Water Use (ac-ft/yr)	Irrigated Acres	Irrigation Requirement (ac-ft/yr)	Outdoor Water Use (ac-ft/yr)	Total Use (ac-ft/yr)
2004	0	0	0.00	0.00	0.00	0.00	0.00
2005	0	0	0.00	0.00	0.00	0.00	0.00
2006	0.9	1	0.35	0.04	0.13	0.19	0.54
2007	0.9	1	0.35	0.04	0.14	0.20	0.55
2008	0.9	1	0.35	0.04	0.14	0.20	0.55
2009	0.9	1	0.35	0.04	0.13	0.19	0.54
2010	0.9	1	0.35	0.04	0.12	0.18	0.53
2011	0.9	1	0.35	0.04	0.14	0.20	0.55
2012	0.9	1	0.35	0.04	0.15	0.21	0.56
2013	0.9	1	0.35	0.04	0.14	0.20	0.55
2014	0.9	1	0.35	0.04	0.15	0.21	0.56
2015	0.9	1	0.35	0.04	0.14	0.20	0.55
2016	0.9	1	0.35	0.04	0.13	0.19	0.54
2017	0.9	1	0.35	0.04	0.13	0.19	0.54

Estimated Pumping by Aldama

Year	Parcel Size (acres)	No. DU	Indoor Water Use (ac-ft/yr)	Irrigated Acres	Irrigation Requirement (ac-ft/yr)	Outdoor Water Use (ac-ft/yr)	Total Use (ac-ft/yr)
2004	0	0	0.00	0.00	0.00	0.00	0.00
2005	0	0	0.00	0.00	0.00	0.00	0.00
2006	1.4	1	0.35	0.10	0.34	0.48	0.83
2007	1.4	1	0.35	0.10	0.35	0.49	0.84
2008	1.4	1	0.35	0.10	0.35	0.50	0.85
2009	1.4	1	0.35	0.10	0.34	0.48	0.83
2010	1.4	1	0.35	0.10	0.31	0.44	0.79
2011	1.4	1	0.35	0.10	0.35	0.50	0.85
2012	1.4	1	0.35	0.10	0.36	0.52	0.87
2013	1.4	1	0.35	0.10	0.36	0.51	0.86
2014	1.4	1	0.35	0.10	0.37	0.53	0.88
2015	1.4	1	0.35	0.10	0.35	0.50	0.85
2016	1.4	1	0.35	0.10	0.33	0.47	0.82
2017	1.4	1	0.35	0.10	0.33	0.47	0.82

Estimated Pumping by Gutierrez

Year	Parcel Size (acres)	No. DU	Indoor Water Use (ac-ft/yr)	Irrigated Acres	Irrigation Requirement (ac-ft/yr)	Outdoor Water Use (ac-ft/yr)	Total Use (ac-ft/yr)
2004	0	0	0.00	0.00	0.00	0.00	0.00
2005	0	0	0.00	0.00	0.00	0.00	0.00
2006	2	2	0.70	0.14	0.47	0.67	1.37
2007	2	2	0.70	0.14	0.48	0.69	1.39
2008	2	2	0.70	0.14	0.49	0.70	1.40
2009	2	2	0.70	0.14	0.47	0.67	1.37
2010	2	2	0.70	0.14	0.43	0.62	1.32
2011	2	2	0.70	0.14	0.49	0.69	1.39
2012	2	2	0.70	0.14	0.51	0.73	1.43
2013	2	2	0.70	0.14	0.50	0.71	1.41
2014	2	2	0.70	0.14	0.52	0.75	1.45
2015	2	2	0.70	0.14	0.49	0.70	1.40
2016	2	2	0.70	0.14	0.47	0.66	1.36
2017	2	2	0.70	0.14	0.47	0.66	1.36

Estimated Pumping by Damont

Year	Parcel Size (acres)	No. DU	Indoor Water Use (ac-ft/yr)	Irrigated Acres	Irrigation Requirement (ac-ft/yr)	Outdoor Water Use (ac-ft/yr)	Total Use (ac-ft/yr)
2004	0	0	0.00	0.00	0.00	0.00	0.00
2005	0	0	0.00	0.00	0.00	0.00	0.00
2006	0.5	1	0.35	0.00	0.00	0.00	0.35
2007	0.5	1	0.35	0.00	0.00	0.00	0.35
2008	0.5	1	0.35	0.00	0.00	0.00	0.35
2009	0.5	1	0.35	0.00	0.00	0.00	0.35
2010	0.5	1	0.35	0.00	0.00	0.00	0.35
2011	0.5	1	0.35	0.00	0.00	0.00	0.35
2012	0.5	1	0.35	0.00	0.00	0.00	0.35
2013	0.5	1	0.35	0.00	0.00	0.00	0.35
2014	0.5	1	0.35	0.00	0.00	0.00	0.35
2015	0.5	1	0.35	0.00	0.00	0.00	0.35
2016	0.5	1	0.35	0.00	0.00	0.00	0.35
2017	0.5	1	0.35	0.00	0.00	0.00	0.35

Appendix E
Water Quality Analysis Summary (2013-2017) for Production Wells

Water Quality Information to be Revised for Final Report

Appendix E
2013-17 Water Quality for Selected Compounds

Well_Name	Sample Date	Analyte	Concent.	Unit
Ban - C2A	3/25/2014	ALKALINITY (TOTAL) AS CACO3	160	MG/L
Ban - C2A	3/25/2014	ALUMINUM	< 50	UG/L
Ban - C2A	3/25/2014	ARSENIC	< 2	UG/L
Ban - C2A	3/25/2014	BICARBONATE ALKALINITY	200	MG/L
Ban - C2A	3/25/2014	CALCIUM	44	MG/L
Ban - C2A	3/25/2014	CARBONATE ALKALINITY	< 3	MG/L
Ban - C2A	3/25/2014	CHLORIDE	11	MG/L
Ban - C2A	3/25/2014	CHROMIUM (TOTAL)	15	UG/L
Ban - C2A	12/10/2014	CHROMIUM, HEXAVALENT	17	UG/L
Ban - C2A	3/24/2015	CHROMIUM, HEXAVALENT	17	UG/L
Ban - C2A	6/27/2015	CHROMIUM, HEXAVALENT	17	UG/L
Ban - C2A	10/2/2015	CHROMIUM, HEXAVALENT	17	UG/L
Ban - C2A	12/30/2015	CHROMIUM, HEXAVALENT	16	UG/L
Ban - C2A	3/29/2016	CHROMIUM, HEXAVALENT	15	UG/L
Ban - C2A	6/24/2016	CHROMIUM, HEXAVALENT	15	UG/L
Ban - C2A	9/22/2016	CHROMIUM, HEXAVALENT	16	UG/L
Ban - C2A	1/4/2017	CHROMIUM, HEXAVALENT	16	UG/L
Ban - C2A	11/13/2017	CHROMIUM, HEXAVALENT	16	UG/L
Ban - C2A	3/25/2014	COPPER	< 50	UG/L
Ban - C2A	3/25/2014	DIBROMOCHLOROPROPANE (DBCP)	< 0.01	UG/L
Ban - C2A	3/25/2014	FLUORIDE (F) (NATURAL-SOURCE)	0.3	MG/L
Ban - C2A	3/25/2014	HARDNESS (TOTAL) AS CACO3	150	MG/L
Ban - C2A	3/25/2014	HYDROXIDE ALKALINITY	< 3	MG/L
Ban - C2A	3/25/2014	IRON	< 100	UG/L
Ban - C2A	3/25/2014	LEAD	< 5	UG/L
Ban - C2A	3/25/2014	MAGNESIUM	9.5	MG/L
Ban - C2A	3/25/2014	MANGANESE	< 20	UG/L
Ban - C2A	4/27/2016	NITRATE (AS N)	1.8	MG/L
Ban - C2A	4/26/2017	NITRATE (AS N)	1.9	MG/L
Ban - C2A	6/16/2012	NITRATE (AS NO3)	8.6	MG/L
Ban - C2A	6/27/2013	NITRATE (AS NO3)	7.7	MG/L
Ban - C2A	7/24/2013	NITRATE (AS NO3)	8.1	MG/L
Ban - C2A	3/25/2014	NITRATE (AS NO3)	8.5	MG/L
Ban - C2A	5/29/2014	NITRATE (AS NO3)	11	MG/L
Ban - C2A	4/30/2015	NITRATE (AS NO3)	8.1	MG/L
Ban - C2A	3/25/2014	NITRITE (AS N)	< 100	MG/L
Ban - C2A	4/27/2016	NITRITE (AS N)	< 0.1	MG/L
Ban - C2A	4/26/2017	NITRITE (AS N)	< 0.1	MG/L
Ban - C2A	3/25/2014	POTASSIUM	1.3	MG/L
Ban - C2A	3/25/2014	SODIUM	26	MG/L
Ban - C2A	3/25/2014	SPECIFIC CONDUCTANCE	380	US
Ban - C2A	3/25/2014	SULFATE	10	MG/L
Ban - C2A	3/25/2014	TETRACHLOROETHYLENE	< 0.5	UG/L
Ban - C2A	3/25/2014	TOTAL DISSOLVED SOLIDS	240	MG/L
Ban - C2A	3/25/2014	TRICHLOROETHYLENE	< 0.5	UG/L
Ban - C2A	3/25/2014	TURBIDITY, LABORATORY	< 0.2	NTU
Ban - C2A	3/25/2014	ZINC	< 50	UG/L

Well_Name	Sample Date	Analyte	Concent.	Unit
BCVWD - W24	12/2/2016	ALKALINITY (TOTAL) AS CACO3	160	MG/L
BCVWD - W24	12/9/2016	ALUMINUM	< 50	UG/L
BCVWD - W24	12/6/2016	ARSENIC	< 2	UG/L
BCVWD - W24	12/2/2016	BICARBONATE ALKALINITY	190	MG/L
BCVWD - W24	12/9/2016	CALCIUM	37	MG/L
BCVWD - W24	12/2/2016	CARBONATE ALKALINITY	< 3	MG/L
BCVWD - W24	12/2/2016	CHLORIDE	5.6	MG/L
BCVWD - W24	12/7/2016	CHROMIUM (TOTAL)	7.2	UG/L
BCVWD - W24	10/22/2014	CHROMIUM, HEXAVALENT	7.5	UG/L
BCVWD - W24	11/12/2015	CHROMIUM, HEXAVALENT	7.7	UG/L
BCVWD - W24	12/9/2016	COPPER	< 50	UG/L
BCVWD - W24	12/7/2016	FLUORIDE (F) (NATURAL-SOURCE)	0.5	MG/L
BCVWD - W24	12/9/2016	HARDNESS (TOTAL) AS CACO3	140	MG/L
BCVWD - W24	12/2/2016	HYDROXIDE ALKALINITY	< 3	MG/L
BCVWD - W24	12/9/2016	IRON	< 100	UG/L
BCVWD - W24	12/6/2016	LEAD	< 5	UG/L
BCVWD - W24	12/9/2016	MAGNESIUM	12	MG/L
BCVWD - W24	12/9/2016	MANGANESE	< 20	UG/L
BCVWD - W24	12/2/2016	NITRATE (AS N)	1.7	MG/L
BCVWD - W24	11/22/2017	NITRATE (AS N)	1.7	MG/L
BCVWD - W24	12/18/2012	NITRATE (AS NO3)	6.4	MG/L
BCVWD - W24	10/23/2013	NITRATE (AS NO3)	7	MG/L
BCVWD - W24	6/25/2014	NITRATE (AS NO3)	5.8	MG/L
BCVWD - W24	12/4/2015	NITRATE (AS NO3)	6.4	MG/L
BCVWD - W24	12/1/2016	NITRITE (AS N)	< 0.1	MG/L
BCVWD - W24	12/9/2016	POTASSIUM	1.4	MG/L
BCVWD - W24	12/9/2016	SODIUM	19	MG/L
BCVWD - W24	12/2/2016	SPECIFIC CONDUCTANCE	360	US
BCVWD - W24	12/2/2016	SULFATE	11	MG/L
BCVWD - W24	12/3/2016	TETRACHLOROETHYLENE	< 0.5	UG/L
BCVWD - W24	12/2/2016	TOTAL DISSOLVED SOLIDS	210	MG/L
BCVWD - W24	12/3/2016	TRICHLOROETHYLENE	< 0.5	UG/L
BCVWD - W24	12/1/2016	TURBIDITY, LABORATORY	< 0.1	NTU
BCVWD - W24	12/9/2016	ZINC	< 50	UG/L
BCVWD - W25	1/6/2013	ALKALINITY (TOTAL) AS CACO3	160	MG/L
BCVWD - W25	1/6/2013	ALUMINUM	< 50	UG/L
BCVWD - W25	1/6/2013	ARSENIC	< 2	UG/L
BCVWD - W25	1/6/2013	BICARBONATE ALKALINITY	200	MG/L
BCVWD - W25	1/6/2013	CALCIUM	43	MG/L
BCVWD - W25	1/6/2013	CARBONATE ALKALINITY	< 3	MG/L
BCVWD - W25	1/6/2013	CHLORIDE	7	MG/L
BCVWD - W25	1/6/2013	CHROMIUM (TOTAL)	14	UG/L
BCVWD - W25	10/22/2014	CHROMIUM, HEXAVALENT	11	UG/L
BCVWD - W25	4/1/2015	CHROMIUM, HEXAVALENT	8.3	UG/L
BCVWD - W25	8/11/2015	CHROMIUM, HEXAVALENT	11	UG/L
BCVWD - W25	9/2/2015	CHROMIUM, HEXAVALENT	11	UG/L
BCVWD - W25	1/6/2013	COPPER	< 50	UG/L

Well_Name	Sample Date	Analyte	Concent.	Unit
Ban - C3	3/25/2014	ALKALINITY (TOTAL) AS CACO3	140	MG/L
Ban - C3	3/15/2017	ALKALINITY (TOTAL) AS CACO3	140	MG/L
Ban - C3	3/25/2014	ALUMINUM	< 50	UG/L
Ban - C3	3/13/2017	ALUMINUM	< 50	UG/L
Ban - C3	3/25/2014	ARSENIC	< 2	UG/L
Ban - C3	3/13/2017	ARSENIC	< 2	UG/L
Ban - C3	3/25/2014	BICARBONATE ALKALINITY	160	MG/L
Ban - C3	3/15/2017	BICARBONATE ALKALINITY	160	MG/L
Ban - C3	3/25/2014	CALCIUM	32	MG/L
Ban - C3	3/13/2017	CALCIUM	31	MG/L
Ban - C3	3/25/2014	CARBONATE ALKALINITY	< 3	MG/L
Ban - C3	3/15/2017	CARBONATE ALKALINITY	< 3	MG/L
Ban - C3	3/25/2014	CHLORIDE	12	MG/L
Ban - C3	3/8/2017	CHLORIDE	9.9	MG/L
Ban - C3	3/25/2014	CHROMIUM (TOTAL)	13	UG/L
Ban - C3	3/9/2017	CHROMIUM (TOTAL)	15	UG/L
Ban - C3	12/10/2014	CHROMIUM, HEXAVALENT	16	UG/L
Ban - C3	3/24/2015	CHROMIUM, HEXAVALENT	15	UG/L
Ban - C3	6/27/2015	CHROMIUM, HEXAVALENT	16	UG/L
Ban - C3	10/2/2015	CHROMIUM, HEXAVALENT	14	UG/L
Ban - C3	1/2/2016	CHROMIUM, HEXAVALENT	16	UG/L
Ban - C3	3/29/2016	CHROMIUM, HEXAVALENT	15	UG/L
Ban - C3	6/24/2016	CHROMIUM, HEXAVALENT	14	UG/L
Ban - C3	9/22/2016	CHROMIUM, HEXAVALENT	15	UG/L
Ban - C3	5/16/2017	CHROMIUM, HEXAVALENT	14	UG/L
Ban - C3	8/17/2017	CHROMIUM, HEXAVALENT	14	UG/L
Ban - C3	11/13/2017	CHROMIUM, HEXAVALENT	15	UG/L
Ban - C3	3/25/2014	COPPER	< 50	UG/L
Ban - C3	3/13/2017	COPPER	< 50	UG/L
Ban - C3	3/25/2014	DIBROMOCHLOROPROPANE (DBCP)	< 0.01	UG/L
Ban - C3	3/14/2017	DIBROMOCHLOROPROPANE (DBCP)	< 0.01	UG/L
Ban - C3	3/25/2014	FLUORIDE (F) (NATURAL-SOURCE)	0.5	MG/L
Ban - C3	3/15/2017	FLUORIDE (F) (NATURAL-SOURCE)	0.4	MG/L
Ban - C3	3/25/2014	HARDNESS (TOTAL) AS CACO3	100	MG/L
Ban - C3	3/13/2017	HARDNESS (TOTAL) AS CACO3	100	MG/L
Ban - C3	3/25/2014	HYDROXIDE ALKALINITY	< 3	MG/L
Ban - C3	3/15/2017	HYDROXIDE ALKALINITY	< 3	MG/L
Ban - C3	3/25/2014	IRON	< 100	UG/L
Ban - C3	3/13/2017	IRON	< 100	UG/L
Ban - C3	3/25/2014	LEAD	< 5	UG/L
Ban - C3	3/13/2017	LEAD	< 5	UG/L
Ban - C3	3/25/2014	MAGNESIUM	5.9	MG/L
Ban - C3	3/13/2017	MAGNESIUM	5.7	MG/L
Ban - C3	3/25/2014	MANGANESE	< 20	UG/L
Ban - C3	3/13/2017	MANGANESE	< 20	UG/L
Ban - C3	4/23/2016	NITRATE (AS N)	1.6	MG/L
Ban - C3	3/8/2017	NITRATE (AS N)	1.6	MG/L
BCVWD - W25	1/6/2013	FLUORIDE (F) (NATURAL-SOURCE)	0.3	MG/L
BCVWD - W25	1/6/2013	HARDNESS (TOTAL) AS CACO3	160	MG/L
BCVWD - W25	1/6/2013	HYDROXIDE ALKALINITY	< 3	MG/L
BCVWD - W25	1/6/2013	IRON	< 100	UG/L
BCVWD - W25	1/6/2013	LEAD	6.5	UG/L
BCVWD - W25	1/6/2013	MAGNESIUM	13	MG/L
BCVWD - W25	1/6/2013	MANGANESE	< 20	UG/L
BCVWD - W25	5/15/2017	NITRATE (AS N)	1.6	MG/L
BCVWD - W25	10/23/2017	NITRATE (AS N)	1.1	MG/L
BCVWD - W25	1/6/2013	NITRATE (AS NO3)	3.2	MG/L
BCVWD - W25	10/23/2013	NITRATE (AS NO3)	4.6	MG/L
BCVWD - W25	1/6/2013	NITRITE (AS N)	< 100	MG/L
BCVWD - W25	1/6/2013	POTASSIUM	1.5	MG/L
BCVWD - W25	1/6/2013	SODIUM	22	MG/L
BCVWD - W25	1/6/2013	SPECIFIC CONDUCTANCE	400	US
BCVWD - W25	1/6/2013	SULFATE	12	MG/L
BCVWD - W25	1/6/2013	TETRACHLOROETHYLENE	< 0.5	UG/L
BCVWD - W25	1/6/2013	TOTAL DISSOLVED SOLIDS	220	MG/L
BCVWD - W25	1/6/2013	TRICHLOROETHYLENE	< 0.5	UG/L
BCVWD - W25	1/6/2013	TURBIDITY, LABORATORY	< 0.2	NTU
BCVWD - W25	1/6/2013	ZINC	< 50	UG/L
BCVWD - W26	1/6/2013	ALKALINITY (TOTAL) AS CACO3	140	MG/L
BCVWD - W26	1/6/2013	ALUMINUM	< 50	UG/L
BCVWD - W26	1/6/2013	ARSENIC	< 2	UG/L
BCVWD - W26	1/6/2013	BICARBONATE ALKALINITY	170	MG/L
BCVWD - W26	1/6/2013	CALCIUM	33	MG/L
BCVWD - W26	1/6/2013	CARBONATE ALKALINITY	< 3	MG/L
BCVWD - W26	1/6/2013	CHLORIDE	7	MG/L
BCVWD - W26	1/6/2013	CHROMIUM (TOTAL)	17	UG/L
BCVWD - W26	10/22/2014	CHROMIUM, HEXAVALENT	14	UG/L
BCVWD - W26	4/1/2015	CHROMIUM, HEXAVALENT	13	UG/L
BCVWD - W26	1/6/2013	COPPER	< 50	UG/L
BCVWD - W26	1/6/2013	FLUORIDE (F) (NATURAL-SOURCE)	0.4	MG/L
BCVWD - W26	1/6/2013	HARDNESS (TOTAL) AS CACO3	120	MG/L
BCVWD - W26	1/6/2013	HYDROXIDE ALKALINITY	< 3	MG/L
BCVWD - W26	1/6/2013	IRON	< 100	UG/L
BCVWD - W26	1/6/2013	LEAD	< 5	UG/L
BCVWD - W26	1/6/2013	MAGNESIUM	9.7	MG/L
BCVWD - W26	1/6/2013	MANGANESE	< 20	UG/L
BCVWD - W26	1/6/2013	NITRATE (AS NO3)	4.3	MG/L
BCVWD - W26	10/23/2013	NITRATE (AS NO3)	4.7	MG/L
BCVWD - W26	1/6/2013	NITRITE (AS N)	< 100	MG/L
BCVWD - W26	1/6/2013	POTASSIUM	1.4	MG/L
BCVWD - W26	1/6/2013	SODIUM	26	MG/L
BCVWD - W26	1/6/2013	SPECIFIC CONDUCTANCE	340	US
BCVWD - W26	1/6/2013	SULFATE	8.3	MG/L
BCVWD - W26	1/6/2013	TETRACHLOROETHYLENE	< 0.5	UG/L

Appendix E

2013-17 Water Quality for Selected Compounds

Well_Name	Sample Date	Analyte	Concent.	Unit
Ban - C3	4/26/2017	NITRATE (AS N)	1.8	MG/L
Ban - C3	6/16/2012	NITRATE (AS NO3)	7.4	MG/L
Ban - C3	6/20/2013	NITRATE (AS NO3)	7.2	MG/L
Ban - C3	3/25/2014	NITRATE (AS NO3)	8.5	MG/L
Ban - C3	5/29/2014	NITRATE (AS NO3)	7.5	MG/L
Ban - C3	4/22/2015	NITRATE (AS NO3)	7.1	MG/L
Ban - C3	7/17/2013	NITRITE (AS N)	< 100	MG/L
Ban - C3	3/25/2014	NITRITE (AS N)	< 100	MG/L
Ban - C3	4/22/2016	NITRITE (AS N)	< 0.1	MG/L
Ban - C3	3/8/2017	NITRITE (AS N)	< 0.1	MG/L
Ban - C3	4/25/2017	NITRITE (AS N)	< 0.1	MG/L
Ban - C3	3/25/2014	POTASSIUM	1.6	MG/L
Ban - C3	3/13/2017	POTASSIUM	1.5	MG/L
Ban - C3	3/25/2014	SODIUM	31	MG/L
Ban - C3	3/13/2017	SODIUM	29	MG/L
Ban - C3	3/25/2014	SPECIFIC CONDUCTANCE	320	US
Ban - C3	3/13/2017	SPECIFIC CONDUCTANCE	330	US
Ban - C3	3/25/2014	SULFATE	5.9	MG/L
Ban - C3	3/8/2017	SULFATE	6	MG/L
Ban - C3	3/25/2014	TETRACHLOROETHYLENE	< 0.5	UG/L
Ban - C3	3/9/2017	TETRACHLOROETHYLENE	< 0.5	UG/L
Ban - C3	3/25/2014	TOTAL DISSOLVED SOLIDS	190	MG/L
Ban - C3	3/13/2017	TOTAL DISSOLVED SOLIDS	170	MG/L
Ban - C3	3/25/2014	TRICHLOROETHYLENE	< 0.5	UG/L
Ban - C3	3/9/2017	TRICHLOROETHYLENE	< 0.5	UG/L
Ban - C3	3/25/2014	TURBIDITY, LABORATORY	< 0.2	NTU
Ban - C3	3/9/2017	TURBIDITY, LABORATORY	0.18	NTU
Ban - C3	3/25/2014	ZINC	< 50	UG/L
Ban - C3	3/13/2017	ZINC	< 50	UG/L
Ban - C4	3/22/2014	ALKALINITY (TOTAL) AS CACO3	160	MG/L
Ban - C4	3/13/2017	ALKALINITY (TOTAL) AS CACO3	120	MG/L
Ban - C4	3/22/2014	ALUMINUM	< 50	UG/L
Ban - C4	3/13/2017	ALUMINUM	< 50	UG/L
Ban - C4	3/22/2014	ARSENIC	< 2	UG/L
Ban - C4	3/13/2017	ARSENIC	< 2	UG/L
Ban - C4	3/22/2014	BICARBONATE ALKALINITY	190	MG/L
Ban - C4	3/13/2017	BICARBONATE ALKALINITY	140	MG/L
Ban - C4	3/22/2014	CALCIUM	37	MG/L
Ban - C4	3/13/2017	CALCIUM	22	MG/L
Ban - C4	3/22/2014	CARBONATE ALKALINITY	< 3	MG/L
Ban - C4	3/13/2017	CARBONATE ALKALINITY	< 3	MG/L
Ban - C4	3/22/2014	CHLORIDE	7.1	MG/L
Ban - C4	3/6/2017	CHLORIDE	5.6	MG/L
Ban - C4	3/22/2014	CHROMIUM (TOTAL)	13	UG/L
Ban - C4	3/9/2017	CHROMIUM (TOTAL)	9.9	UG/L
Ban - C4	12/12/2014	CHROMIUM, HEXAVALENT	13	UG/L
Ban - C4	4/1/2015	CHROMIUM, HEXAVALENT	13	UG/L

Well_Name	Sample Date	Analyte	Concent.	Unit
BCVWD - W26	1/6/2013	TOTAL DISSOLVED SOLIDS	190	MG/L
BCVWD - W26	1/6/2013	TRICHLOROETHYLENE	< 0.5	UG/L
BCVWD - W26	1/6/2013	TURBIDITY, LABORATORY	< 0.2	NTU
BCVWD - W26	1/6/2013	ZINC	< 50	UG/L
BCVWD - W29	1/6/2013	ALKALINITY (TOTAL) AS CACO3	150	MG/L
BCVWD - W29	12/9/2016	ALKALINITY (TOTAL) AS CACO3	160	MG/L
BCVWD - W29	1/6/2013	ALUMINUM	< 50	UG/L
BCVWD - W29	12/15/2016	ALUMINUM	< 50	UG/L
BCVWD - W29	1/6/2013	ARSENIC	< 2	UG/L
BCVWD - W29	12/14/2016	ARSENIC	< 2	UG/L
BCVWD - W29	1/6/2013	BICARBONATE ALKALINITY	180	MG/L
BCVWD - W29	12/9/2016	BICARBONATE ALKALINITY	190	MG/L
BCVWD - W29	1/6/2013	CALCIUM	42	MG/L
BCVWD - W29	12/15/2016	CALCIUM	42	MG/L
BCVWD - W29	1/6/2013	CARBONATE ALKALINITY	< 3	MG/L
BCVWD - W29	12/9/2016	CARBONATE ALKALINITY	< 3	MG/L
BCVWD - W29	1/6/2013	CHLORIDE	12	MG/L
BCVWD - W29	12/9/2016	CHLORIDE	13	MG/L
BCVWD - W29	1/6/2013	CHROMIUM (TOTAL)	8.7	UG/L
BCVWD - W29	12/15/2016	CHROMIUM (TOTAL)	7.6	UG/L
BCVWD - W29	10/22/2014	CHROMIUM, HEXAVALENT	8.1	UG/L
BCVWD - W29	12/14/2017	CHROMIUM, HEXAVALENT	8	UG/L
BCVWD - W29	1/6/2013	COPPER	< 50	UG/L
BCVWD - W29	12/15/2016	COPPER	< 50	UG/L
BCVWD - W29	12/9/2016	DIBROMOCHLOROPROPANE (DBCP)	< 0.01	UG/L
BCVWD - W29	1/6/2013	FLUORIDE (F) (NATURAL-SOURCE)	0.6	MG/L
BCVWD - W29	12/16/2016	FLUORIDE (F) (NATURAL-SOURCE)	0.4	MG/L
BCVWD - W29	1/6/2013	HARDNESS (TOTAL) AS CACO3	170	MG/L
BCVWD - W29	12/15/2016	HARDNESS (TOTAL) AS CACO3	170	MG/L
BCVWD - W29	1/6/2013	HYDROXIDE ALKALINITY	< 3	MG/L
BCVWD - W29	12/9/2016	HYDROXIDE ALKALINITY	< 3	MG/L
BCVWD - W29	1/6/2013	IRON	< 100	UG/L
BCVWD - W29	12/15/2016	IRON	< 100	UG/L
BCVWD - W29	1/6/2013	LEAD	< 5	UG/L
BCVWD - W29	12/14/2016	LEAD	< 5	UG/L
BCVWD - W29	1/6/2013	MAGNESIUM	15	MG/L
BCVWD - W29	12/15/2016	MAGNESIUM	15	MG/L
BCVWD - W29	1/6/2013	MANGANESE	< 20	UG/L
BCVWD - W29	12/15/2016	MANGANESE	< 20	UG/L
BCVWD - W29	12/9/2016	NITRATE (AS N)	2.3	MG/L
BCVWD - W29	12/14/2017	NITRATE (AS N)	2.3	MG/L
BCVWD - W29	1/6/2013	NITRATE (AS NO3)	8.2	MG/L
BCVWD - W29	10/23/2013	NITRATE (AS NO3)	9.3	MG/L
BCVWD - W29	1/6/2013	NITRITE (AS N)	< 100	MG/L
BCVWD - W29	12/8/2016	NITRITE (AS N)	< 0.1	MG/L
BCVWD - W29	1/6/2013	POTASSIUM	1.6	MG/L
BCVWD - W29	12/15/2016	POTASSIUM	1.5	MG/L

Well_Name	Sample Date	Analyte	Concent.	Unit
Ban - C4	6/27/2015	CHROMIUM, HEXAVALENT	17	UG/L
Ban - C4	10/2/2015	CHROMIUM, HEXAVALENT	16	UG/L
Ban - C4	12/30/2015	CHROMIUM, HEXAVALENT	17	UG/L
Ban - C4	3/29/2016	CHROMIUM, HEXAVALENT	10	UG/L
Ban - C4	6/24/2016	CHROMIUM, HEXAVALENT	15	UG/L
Ban - C4	9/22/2016	CHROMIUM, HEXAVALENT	15	UG/L
Ban - C4	1/4/2017	CHROMIUM, HEXAVALENT	13	UG/L
Ban - C4	5/30/2017	CHROMIUM, HEXAVALENT	11	UG/L
Ban - C4	8/17/2017	CHROMIUM, HEXAVALENT	15	UG/L
Ban - C4	11/14/2017	CHROMIUM, HEXAVALENT	15	UG/L
Ban - C4	3/22/2014	COPPER	< 50	UG/L
Ban - C4	3/13/2017	COPPER	< 50	UG/L
Ban - C4	3/22/2014	DIBROMOCHLOROPROPANE (DBCP)	< 0.01	UG/L
Ban - C4	3/8/2017	DIBROMOCHLOROPROPANE (DBCP)	< 0.01	UG/L
Ban - C4	3/22/2014	FLUORIDE (F) (NATURAL-SOURCE)	0.3	MG/L
Ban - C4	3/13/2017	FLUORIDE (F) (NATURAL-SOURCE)	0.4	MG/L
Ban - C4	3/22/2014	HARDNESS (TOTAL) AS CACO3	120	MG/L
Ban - C4	3/13/2017	HARDNESS (TOTAL) AS CACO3	67	MG/L
Ban - C4	3/22/2014	HYDROXIDE ALKALINITY	< 3	MG/L
Ban - C4	3/13/2017	HYDROXIDE ALKALINITY	< 3	MG/L
Ban - C4	3/22/2014	IRON	< 100	UG/L
Ban - C4	3/13/2017	IRON	< 100	UG/L
Ban - C4	3/22/2014	LEAD	< 5	UG/L
Ban - C4	3/13/2017	LEAD	< 5	UG/L
Ban - C4	3/22/2014	MAGNESIUM	7.4	MG/L
Ban - C4	3/13/2017	MAGNESIUM	3.1	MG/L
Ban - C4	3/22/2014	MANGANESE	< 20	UG/L
Ban - C4	3/13/2017	MANGANESE	< 20	UG/L
Ban - C4	4/27/2016	NITRATE (AS N)	0.89	MG/L
Ban - C4	3/6/2017	NITRATE (AS N)	0.79	MG/L
Ban - C4	4/26/2017	NITRATE (AS N)	0.91	MG/L
Ban - C4	6/14/2012	NITRATE (AS NO3)	5.2	MG/L
Ban - C4	6/12/2013	NITRATE (AS NO3)	4	MG/L
Ban - C4	3/22/2014	NITRATE (AS NO3)	4.9	MG/L
Ban - C4	5/29/2014	NITRATE (AS NO3)	4.7	MG/L
Ban - C4	4/30/2015	NITRATE (AS NO3)	5	MG/L
Ban - C4	7/17/2013	NITRITE (AS N)	< 100	MG/L
Ban - C4	3/22/2014	NITRITE (AS N)	< 100	MG/L
Ban - C4	4/27/2016	NITRITE (AS N)	< 0.1	MG/L
Ban - C4	3/7/2017	NITRITE (AS N)	< 0.1	MG/L
Ban - C4	4/26/2017	NITRITE (AS N)	< 0.1	MG/L
Ban - C4	3/22/2014	POTASSIUM	1.5	MG/L
Ban - C4	3/13/2017	POTASSIUM	1.4	MG/L
Ban - C4	3/22/2014	SODIUM	27	MG/L
Ban - C4	3/13/2017	SODIUM	37	MG/L
Ban - C4	3/22/2014	SPECIFIC CONDUCTANCE	360	US
Ban - C4	3/9/2017	SPECIFIC CONDUCTANCE	290	US

Well_Name	Sample Date	Analyte	Concent.	Unit
BCVWD - W29	1/6/2013	SODIUM	19	MG/L
BCVWD - W29	12/15/2016	SODIUM	19	MG/L
BCVWD - W29	1/6/2013	SPECIFIC CONDUCTANCE	390	US
BCVWD - W29	12/20/2017	SPECIFIC CONDUCTANCE	400	US
BCVWD - W29	1/6/2013	SULFATE	10	MG/L
BCVWD - W29	12/9/2016	SULFATE	11	MG/L
BCVWD - W29	1/6/2013	TETRACHLOROETHYLENE	< 0.5	UG/L
BCVWD - W29	12/12/2016	TETRACHLOROETHYLENE	< 0.5	UG/L
BCVWD - W29	1/6/2013	TOTAL DISSOLVED SOLIDS	280	MG/L
BCVWD - W29	12/13/2016	TOTAL DISSOLVED SOLIDS	220	MG/L
BCVWD - W29	1/6/2013	TRICHLOROETHYLENE	< 0.5	UG/L
BCVWD - W29	12/12/2016	TRICHLOROETHYLENE	< 0.5	UG/L
BCVWD - W29	1/6/2013	TURBIDITY, LABORATORY	< 0.2	NTU
BCVWD - W29	12/8/2016	TURBIDITY, LABORATORY	< 0.1	NTU
BCVWD - W29	1/6/2013	ZINC	< 50	UG/L
BCVWD - W29	12/15/2016	ZINC	< 50	UG/L
BCVWD - W3	10/31/2013	ALKALINITY (TOTAL) AS CACO3	150	MG/L
BCVWD - W3	8/23/2016	ALKALINITY (TOTAL) AS CACO3	150	MG/L
BCVWD - W3	10/31/2013	ALUMINUM	< 50	UG/L
BCVWD - W3	8/25/2016	ALUMINUM	< 50	UG/L
BCVWD - W3	10/31/2013	ARSENIC	< 2	UG/L
BCVWD - W3	8/25/2016	ARSENIC	< 2	UG/L
BCVWD - W3	10/31/2013	BICARBONATE ALKALINITY	180	MG/L
BCVWD - W3	8/23/2016	BICARBONATE ALKALINITY	190	MG/L
BCVWD - W3	10/31/2013	CALCIUM	37	MG/L
BCVWD - W3	8/25/2016	CALCIUM	37	MG/L
BCVWD - W3	10/31/2013	CARBONATE ALKALINITY	< 3	MG/L
BCVWD - W3	8/23/2016	CARBONATE ALKALINITY	< 3	MG/L
BCVWD - W3	10/31/2013	CHLORIDE	7.6	MG/L
BCVWD - W3	8/19/2016	CHLORIDE	13	MG/L
BCVWD - W3	10/31/2013	CHROMIUM (TOTAL)	11	UG/L
BCVWD - W3	8/25/2016	CHROMIUM (TOTAL)	8.4	UG/L
BCVWD - W3	11/7/2013	CHROMIUM, HEXAVALENT	12	UG/L
BCVWD - W3	10/22/2014	CHROMIUM, HEXAVALENT	11	UG/L
BCVWD - W3	4/1/2015	CHROMIUM, HEXAVALENT	9.5	UG/L
BCVWD - W3	8/23/2016	CHROMIUM, HEXAVALENT	7.3	UG/L
BCVWD - W3	10/31/2013	COPPER	< 50	UG/L
BCVWD - W3	8/25/2016	COPPER	< 50	UG/L
BCVWD - W3	8/19/2016	DIBROMOCHLOROPROPANE (DBCP)	< 0.01	UG/L
BCVWD - W3	10/31/2013	FLUORIDE (F) (NATURAL-SOURCE)	0.3	MG/L
BCVWD - W3	8/25/2016	FLUORIDE (F) (NATURAL-SOURCE)	0.5	MG/L
BCVWD - W3	10/31/2013	HARDNESS (TOTAL) AS CACO3	130	MG/L
BCVWD - W3	10/31/2013	HYDROXIDE ALKALINITY	< 3	MG/L
BCVWD - W3	8/23/2016	HYDROXIDE ALKALINITY	< 3	MG/L
BCVWD - W3	10/31/2013	IRON	< 100	UG/L
BCVWD - W3	8/25/2016	IRON	450	UG/L
BCVWD - W3	10/31/2013	LEAD	< 5	UG/L

Well_Name	Sample Date	Analyte	Concent.	Unit
Ban - C4	3/22/2014	SULFATE	11	MG/L
Ban - C4	3/6/2017	SULFATE	13	MG/L
Ban - C4	3/22/2014	TETRACHLOROETHYLENE	< 0.5	UG/L
Ban - C4	3/7/2017	TETRACHLOROETHYLENE	< 0.5	UG/L
Ban - C4	3/22/2014	TOTAL DISSOLVED SOLIDS	180	MG/L
Ban - C4	3/8/2017	TOTAL DISSOLVED SOLIDS	190	MG/L
Ban - C4	3/22/2014	TRICHLOROETHYLENE	< 0.5	UG/L
Ban - C4	3/7/2017	TRICHLOROETHYLENE	< 0.5	UG/L
Ban - C4	3/22/2014	TURBIDITY, LABORATORY	< 0.2	NTU
Ban - C4	3/6/2017	TURBIDITY, LABORATORY	< 0.1	NTU
Ban - C4	3/22/2014	ZINC	< 50	UG/L
Ban - C4	3/13/2017	ZINC	< 50	UG/L
Ban - M3	3/20/2012	ALKALINITY (TOTAL) AS CACO3	180	MG/L
Ban - M3	3/24/2015	ALKALINITY (TOTAL) AS CACO3	150	MG/L
Ban - M3	3/20/2012	ALUMINUM	< 50	UG/L
Ban - M3	3/24/2015	ALUMINUM	< 50	UG/L
Ban - M3	3/20/2012	ARSENIC	< 2	UG/L
Ban - M3	3/24/2015	ARSENIC	< 2	UG/L
Ban - M3	3/20/2012	BICARBONATE ALKALINITY	220	MG/L
Ban - M3	3/24/2015	BICARBONATE ALKALINITY	190	MG/L
Ban - M3	3/20/2012	CALCIUM	41	MG/L
Ban - M3	3/24/2015	CALCIUM	39	MG/L
Ban - M3	3/20/2012	CARBONATE ALKALINITY	< 3	MG/L
Ban - M3	3/24/2015	CARBONATE ALKALINITY	< 3	MG/L
Ban - M3	3/20/2012	CHLORIDE	15	MG/L
Ban - M3	3/24/2015	CHLORIDE	14	MG/L
Ban - M3	3/20/2012	CHROMIUM (TOTAL)	10	UG/L
Ban - M3	3/24/2015	CHROMIUM (TOTAL)	8.5	UG/L
Ban - M3	12/9/2014	CHROMIUM, HEXAVALENT	9.3	UG/L
Ban - M3	3/24/2015	CHROMIUM, HEXAVALENT	9.7	UG/L
Ban - M3	6/27/2015	CHROMIUM, HEXAVALENT	10	UG/L
Ban - M3	10/1/2015	CHROMIUM, HEXAVALENT	10	UG/L
Ban - M3	12/30/2015	CHROMIUM, HEXAVALENT	9.9	UG/L
Ban - M3	3/29/2016	CHROMIUM, HEXAVALENT	9.4	UG/L
Ban - M3	6/24/2016	CHROMIUM, HEXAVALENT	9.1	UG/L
Ban - M3	9/22/2016	CHROMIUM, HEXAVALENT	9.3	UG/L
Ban - M3	1/4/2017	CHROMIUM, HEXAVALENT	9.4	UG/L
Ban - M3	6/6/2017	CHROMIUM, HEXAVALENT	9.9	UG/L
Ban - M3	8/16/2017	CHROMIUM, HEXAVALENT	9.2	UG/L
Ban - M3	11/21/2017	CHROMIUM, HEXAVALENT	9.1	UG/L
Ban - M3	3/20/2012	COPPER	< 50	UG/L
Ban - M3	3/24/2015	COPPER	< 50	UG/L
Ban - M3	3/20/2012	DIBROMOCHLOROPROPANE (DBCP)	< 0.01	UG/L
Ban - M3	3/24/2015	DIBROMOCHLOROPROPANE (DBCP)	< 0.01	UG/L
Ban - M3	3/20/2012	FLUORIDE (F) (NATURAL-SOURCE)	0.4	MG/L
Ban - M3	3/24/2015	FLUORIDE (F) (NATURAL-SOURCE)	0.3	MG/L
Ban - M3	3/20/2012	HARDNESS (TOTAL) AS CACO3	160	MG/L

Well_Name	Sample Date	Analyte	Concent.	Unit
BCVWD - W3	8/25/2016	LEAD	< 5	UG/L
BCVWD - W3	10/31/2013	MAGNESIUM	9.4	MG/L
BCVWD - W3	8/25/2016	MAGNESIUM	13	MG/L
BCVWD - W3	10/31/2013	MANGANESE	< 20	UG/L
BCVWD - W3	8/25/2016	MANGANESE	< 20	UG/L
BCVWD - W3	8/19/2016	NITRATE (AS N)	1.7	MG/L
BCVWD - W3	12/19/2012	NITRATE (AS NO3)	2.8	MG/L
BCVWD - W3	10/31/2013	NITRATE (AS NO3)	3.9	MG/L
BCVWD - W3	10/31/2013	NITRITE (AS N)	< 100	MG/L
BCVWD - W3	8/18/2016	NITRITE (AS N)	< 0.1	MG/L
BCVWD - W3	10/31/2013	POTASSIUM	1.7	MG/L
BCVWD - W3	8/25/2016	POTASSIUM	1.5	MG/L
BCVWD - W3	10/31/2013	SODIUM	25	MG/L
BCVWD - W3	8/25/2016	SODIUM	24	MG/L
BCVWD - W3	10/31/2013	SPECIFIC CONDUCTANCE	350	US
BCVWD - W3	8/19/2016	SPECIFIC CONDUCTANCE	380	US
BCVWD - W3	10/31/2013	SULFATE	11	MG/L
BCVWD - W3	8/19/2016	SULFATE	11	MG/L
BCVWD - W3	8/19/2016	TETRACHLOROETHYLENE	< 0.5	UG/L
BCVWD - W3	11/15/2013	TOTAL DISSOLVED SOLIDS	210	MG/L
BCVWD - W3	8/22/2016	TOTAL DISSOLVED SOLIDS	240	MG/L
BCVWD - W3	8/19/2016	TRICHLOROETHYLENE	< 0.5	UG/L
BCVWD - W3	10/31/2013	TURBIDITY, LABORATORY	< 0.2	NTU
BCVWD - W3	8/18/2016	TURBIDITY, LABORATORY	1.7	NTU
BCVWD - W3	10/31/2013	ZINC	< 50	UG/L
BCVWD - W3	8/25/2016	ZINC	< 50	UG/L
Plantation - W1	3/25/2014	ALKALINITY (TOTAL) AS CACO3	200	MG/L
Plantation - W1	3/23/2017	ALKALINITY (TOTAL) AS CACO3	200	MG/L
Plantation - W1	3/25/2014	ALUMINUM	< 50	UG/L
Plantation - W1	3/23/2017	ALUMINUM	< 50	UG/L
Plantation - W1	3/25/2014	ARSENIC	< 2	UG/L
Plantation - W1	3/27/2017	ARSENIC	< 2	UG/L
Plantation - W1	3/25/2014	BICARBONATE ALKALINITY	240	MG/L
Plantation - W1	3/23/2017	BICARBONATE ALKALINITY	240	MG/L
Plantation - W1	3/25/2014	CALCIUM	53	MG/L
Plantation - W1	3/23/2017	CALCIUM	50	MG/L
Plantation - W1	3/25/2014	CARBONATE ALKALINITY	< 3	MG/L
Plantation - W1	3/23/2017	CARBONATE ALKALINITY	< 3	MG/L
Plantation - W1	3/25/2014	CHLORIDE	14	MG/L
Plantation - W1	3/20/2017	CHLORIDE	14	MG/L
Plantation - W1	3/25/2014	CHROMIUM (TOTAL)	4.8	UG/L
Plantation - W1	3/22/2017	CHROMIUM (TOTAL)	5.4	UG/L
Plantation - W1	12/26/2014	CHROMIUM, HEXAVALENT	4.9	UG/L
Plantation - W1	3/25/2014	COPPER	< 50	UG/L
Plantation - W1	3/23/2017	COPPER	< 50	UG/L
Plantation - W1	3/25/2014	DIBROMOCHLOROPROPANE (DBCP)	< 0.01	UG/L
Plantation - W1	3/25/2014	FLUORIDE (F) (NATURAL-SOURCE)	0.5	MG/L

Well_Name	Sample Date	Analyte	Concent.	Unit
Ban - M3	3/24/2015	HARDNESS (TOTAL) AS CACO3	150	MG/L
Ban - M3	3/20/2012	HYDROXIDE ALKALINITY	< 3	MG/L
Ban - M3	3/24/2015	HYDROXIDE ALKALINITY	< 3	MG/L
Ban - M3	3/20/2012	IRON	< 100	UG/L
Ban - M3	3/24/2015	IRON	< 100	UG/L
Ban - M3	3/20/2012	LEAD	< 5	UG/L
Ban - M3	3/24/2015	LEAD	< 5	UG/L
Ban - M3	3/20/2012	MAGNESIUM	14	MG/L
Ban - M3	3/24/2015	MAGNESIUM	13	MG/L
Ban - M3	3/20/2012	MANGANESE	< 20	UG/L
Ban - M3	3/24/2015	MANGANESE	< 20	UG/L
Ban - M3	4/27/2016	NITRATE (AS N)	2.1	MG/L
Ban - M3	4/27/2017	NITRATE (AS N)	2.2	MG/L
Ban - M3	3/20/2012	NITRATE (AS NO3)	7.9	MG/L
Ban - M3	7/23/2013	NITRATE (AS NO3)	8.1	MG/L
Ban - M3	6/20/2014	NITRATE (AS NO3)	8	MG/L
Ban - M3	3/24/2015	NITRATE (AS NO3)	7.2	MG/L
Ban - M3	4/22/2015	NITRATE (AS NO3)	7.8	MG/L
Ban - M3	3/20/2012	NITRITE (AS N)	< 100	MG/L
Ban - M3	7/23/2013	NITRITE (AS N)	< 100	MG/L
Ban - M3	3/24/2015	NITRITE (AS N)	< 100	MG/L
Ban - M3	4/27/2016	NITRITE (AS N)	< 0.1	MG/L
Ban - M3	4/26/2017	NITRITE (AS N)	< 0.1	MG/L
Ban - M3	3/20/2012	POTASSIUM	2.3	MG/L
Ban - M3	3/24/2015	POTASSIUM	2	MG/L
Ban - M3	3/20/2012	SODIUM	38	MG/L
Ban - M3	3/24/2015	SODIUM	39	MG/L
Ban - M3	3/20/2012	SPECIFIC CONDUCTANCE	470	US
Ban - M3	3/24/2015	SPECIFIC CONDUCTANCE	460	US
Ban - M3	3/20/2012	SULFATE	36	MG/L
Ban - M3	3/24/2015	SULFATE	35	MG/L
Ban - M3	3/20/2012	TETRACHLOROETHYLENE	< 0.5	UG/L
Ban - M3	3/24/2015	TETRACHLOROETHYLENE	< 0.5	UG/L
Ban - M3	3/20/2012	TOTAL DISSOLVED SOLIDS	290	MG/L
Ban - M3	3/24/2015	TOTAL DISSOLVED SOLIDS	300	MG/L
Ban - M3	3/20/2012	TRICHLOROETHYLENE	< 0.5	UG/L
Ban - M3	3/24/2015	TRICHLOROETHYLENE	< 0.5	UG/L
Ban - M3	3/20/2012	TURBIDITY, LABORATORY	< 0.2	NTU
Ban - M3	3/24/2015	TURBIDITY, LABORATORY	< 0.2	NTU
Ban - M3	3/20/2012	ZINC	< 50	UG/L
Ban - M3	3/24/2015	ZINC	< 50	UG/L
BCVWD - W1	12/20/2012	NITRATE (AS NO3)	2.7	MG/L
BCVWD - W16	10/31/2013	ALKALINITY (TOTAL) AS CACO3	180	MG/L
BCVWD - W16	12/9/2016	ALKALINITY (TOTAL) AS CACO3	180	MG/L
BCVWD - W16	10/31/2013	ALUMINUM	< 50	UG/L
BCVWD - W16	12/15/2016	ALUMINUM	< 50	UG/L
BCVWD - W16	10/31/2013	ARSENIC	< 2	UG/L
Plantation - W1	3/24/2017	FLUORIDE (F) (NATURAL-SOURCE)	0.5	MG/L
Plantation - W1	3/25/2014	HARDNESS (TOTAL) AS CACO3	210	MG/L
Plantation - W1	3/23/2017	HARDNESS (TOTAL) AS CACO3	200	MG/L
Plantation - W1	3/25/2014	HYDROXIDE ALKALINITY	< 3	MG/L
Plantation - W1	3/23/2017	HYDROXIDE ALKALINITY	< 3	MG/L
Plantation - W1	3/25/2014	IRON	< 100	UG/L
Plantation - W1	3/23/2017	IRON	< 100	UG/L
Plantation - W1	3/25/2014	LEAD	< 5	UG/L
Plantation - W1	3/27/2017	LEAD	< 5	UG/L
Plantation - W1	3/25/2014	MAGNESIUM	18	MG/L
Plantation - W1	3/23/2017	MAGNESIUM	17	MG/L
Plantation - W1	3/25/2014	MANGANESE	< 20	UG/L
Plantation - W1	3/23/2017	MANGANESE	< 20	UG/L
Plantation - W1	2/24/2016	NITRATE (AS N)	1.8	MG/L
Plantation - W1	10/22/2016	NITRATE (AS N)	1.8	MG/L
Plantation - W1	3/20/2017	NITRATE (AS N)	1.8	MG/L
Plantation - W1	3/13/2012	NITRATE (AS NO3)	8	MG/L
Plantation - W1	3/27/2013	NITRATE (AS NO3)	7.5	MG/L
Plantation - W1	3/25/2014	NITRATE (AS NO3)	8.6	MG/L
Plantation - W1	5/31/2014	NITRATE (AS NO3)	1.8	MG/L
Plantation - W1	3/25/2014	NITRITE (AS N)	< 100	MG/L
Plantation - W1	3/21/2017	NITRITE (AS N)	< 0.1	MG/L
Plantation - W1	3/25/2014	SODIUM	20	MG/L
Plantation - W1	3/23/2017	SODIUM	20	MG/L
Plantation - W1	3/25/2014	SPECIFIC CONDUCTANCE	440	US
Plantation - W1	3/21/2017	SPECIFIC CONDUCTANCE	450	US
Plantation - W1	3/25/2014	SULFATE	12	MG/L
Plantation - W1	3/20/2017	SULFATE	10	MG/L
Plantation - W1	2/24/2016	TETRACHLOROETHYLENE	< 0.5	UG/L
Plantation - W1	3/25/2014	TOTAL DISSOLVED SOLIDS	250	MG/L
Plantation - W1	3/21/2017	TOTAL DISSOLVED SOLIDS	270	MG/L
Plantation - W1	2/24/2016	TRICHLOROETHYLENE	< 0.5	UG/L
Plantation - W1	3/25/2014	TURBIDITY, LABORATORY	0.28	NTU
Plantation - W1	3/20/2017	TURBIDITY, LABORATORY	< 0.1	NTU
Plantation - W1	3/25/2014	ZINC	< 50	UG/L
Plantation - W1	3/23/2017	ZINC	< 50	UG/L
RCMHP - W1	2/9/2016	ALKALINITY (TOTAL) AS CACO3	170	MG/L
RCMHP - W1	2/10/2016	ALUMINUM	< 50	UG/L
RCMHP - W1	2/10/2016	ARSENIC	< 2	UG/L
RCMHP - W1	2/9/2016	BICARBONATE ALKALINITY	210	MG/L
RCMHP - W1	2/10/2016	CALCIUM	44	MG/L
RCMHP - W1	2/9/2016	CARBONATE ALKALINITY	< 3	MG/L
RCMHP - W1	2/6/2016	CHLORIDE	14	MG/L
RCMHP - W1	2/9/2016	CHROMIUM (TOTAL)	6	UG/L
RCMHP - W1	8/6/2014	CHROMIUM, HEXAVALENT	5.3	UG/L
RCMHP - W1	2/9/2016	CHROMIUM, HEXAVALENT	6	UG/L
RCMHP - W1	2/10/2016	COPPER	< 50	UG/L

Well_Name	Sample Date	Analyte	Concent.	Unit
BCVWD - W16	12/14/2016	ARSENIC	< 2	UG/L
BCVWD - W16	10/31/2013	BICARBONATE ALKALINITY	220	MG/L
BCVWD - W16	12/9/2016	BICARBONATE ALKALINITY	220	MG/L
BCVWD - W16	10/31/2013	CALCIUM	52	MG/L
BCVWD - W16	12/15/2016	CALCIUM	53	MG/L
BCVWD - W16	10/31/2013	CARBONATE ALKALINITY	< 3	MG/L
BCVWD - W16	12/9/2016	CARBONATE ALKALINITY	< 3	MG/L
BCVWD - W16	10/31/2013	CHLORIDE	16	MG/L
BCVWD - W16	12/9/2016	CHLORIDE	20	MG/L
BCVWD - W16	10/31/2013	CHROMIUM (TOTAL)	11	UG/L
BCVWD - W16	12/15/2016	CHROMIUM (TOTAL)	4.1	UG/L
BCVWD - W16	10/22/2014	CHROMIUM, HEXAVALENT	4.4	UG/L
BCVWD - W16	11/5/2015	CHROMIUM, HEXAVALENT	4.6	UG/L
BCVWD - W16	10/31/2013	COPPER	< 50	UG/L
BCVWD - W16	12/15/2016	COPPER	< 50	UG/L
BCVWD - W16	10/31/2013	DIBROMOCHLOROPROPANE (DBCP)	< 0.01	UG/L
BCVWD - W16	10/31/2013	FLUORIDE (F) (NATURAL-SOURCE)	0.8	MG/L
BCVWD - W16	12/16/2016	FLUORIDE (F) (NATURAL-SOURCE)	0.8	MG/L
BCVWD - W16	10/31/2013	HARDNESS (TOTAL) AS CACO3	200	MG/L
BCVWD - W16	12/15/2016	HARDNESS (TOTAL) AS CACO3	210	MG/L
BCVWD - W16	10/31/2013	HYDROXIDE ALKALINITY	< 3	MG/L
BCVWD - W16	12/9/2016	HYDROXIDE ALKALINITY	< 3	MG/L
BCVWD - W16	10/31/2013	IRON	< 100	UG/L
BCVWD - W16	12/15/2016	IRON	< 100	UG/L
BCVWD - W16	10/31/2013	LEAD	< 5	UG/L
BCVWD - W16	12/14/2016	LEAD	< 5	UG/L
BCVWD - W16	10/31/2013	MAGNESIUM	18	MG/L
BCVWD - W16	12/15/2016	MAGNESIUM	18	MG/L
BCVWD - W16	10/31/2013	MANGANESE	< 20	UG/L
BCVWD - W16	12/15/2016	MANGANESE	< 20	UG/L
BCVWD - W16	12/15/2015	NITRATE (AS N)	5.7	MG/L
BCVWD - W16	1/12/2016	NITRATE (AS N)	5.9	MG/L
BCVWD - W16	2/10/2016	NITRATE (AS N)	5.8	MG/L
BCVWD - W16	4/13/2016	NITRATE (AS N)	6.2	MG/L
BCVWD - W16	5/26/2016	NITRATE (AS N)	5.9	MG/L
BCVWD - W16	6/15/2016	NITRATE (AS N)	5.8	MG/L
BCVWD - W16	6/15/2016	NITRATE (AS N)	5.8	MG/L
BCVWD - W16	9/21/2016	NITRATE (AS N)	5.3	MG/L
BCVWD - W16	12/9/2016	NITRATE (AS N)	6.1	MG/L
BCVWD - W16	2/1/2017	NITRATE (AS N)	6.9	MG/L
BCVWD - W16	5/24/2017	NITRATE (AS N)	6.6	MG/L
BCVWD - W16	6/20/2017	NITRATE (AS N)	6.2	MG/L
BCVWD - W16	7/19/2017	NITRATE (AS N)	6.1	MG/L
BCVWD - W16	8/14/2017	NITRATE (AS N)	6.2	MG/L
BCVWD - W16	9/12/2017	NITRATE (AS N)	6.1	MG/L
BCVWD - W16	10/23/2017	NITRATE (AS N)	5.8	MG/L
BCVWD - W16	11/22/2017	NITRATE (AS N)	5.7	MG/L

Well_Name	Sample Date	Analyte	Concent.	Unit
RCMHP - W1	2/5/2016	FLUORIDE (F) (NATURAL-SOURCE)	0.5	MG/L
RCMHP - W1	2/10/2016	HARDNESS (TOTAL) AS CACO3	180	MG/L
RCMHP - W1	2/9/2016	HYDROXIDE ALKALINITY	< 3	MG/L
RCMHP - W1	2/10/2016	IRON	< 100	UG/L
RCMHP - W1	2/10/2016	LEAD	< 5	UG/L
RCMHP - W1	2/10/2016	MAGNESIUM	16	MG/L
RCMHP - W1	2/10/2016	MANGANESE	< 20	UG/L
RCMHP - W1	1/5/2016	NITRATE (AS N)	4.6	MG/L
RCMHP - W1	2/6/2016	NITRATE (AS N)	4.1	MG/L
RCMHP - W1	1/17/2017	NITRATE (AS N)	4.6	MG/L
RCMHP - W1	1/6/2012	NITRATE (AS NO3)	20	MG/L
RCMHP - W1	1/5/2013	NITRATE (AS NO3)	17	MG/L
RCMHP - W1	1/4/2014	NITRATE (AS NO3)	19	MG/L
RCMHP - W1	4/5/2014	NITRATE (AS NO3)	28	MG/L
RCMHP - W1	1/2/2015	NITRATE (AS NO3)	19	MG/L
RCMHP - W1	2/5/2016	NITRITE (AS N)	< 0.1	MG/L
RCMHP - W1	2/10/2016	SODIUM	22	MG/L
RCMHP - W1	2/5/2016	SPECIFIC CONDUCTANCE	440	US
RCMHP - W1	2/6/2016	SULFATE	9	MG/L
RCMHP - W1	2/6/2016	TETRACHLOROETHYLENE	< 0.5	UG/L
RCMHP - W1	2/10/2016	TOTAL DISSOLVED SOLIDS	260	MG/L
RCMHP - W1	2/6/2016	TRICHLOROETHYLENE	< 0.5	UG/L
RCMHP - W1	2/5/2016	TURBIDITY, LABORATORY	0.11	NTU
RCMHP - W1	2/10/2016	ZINC	< 50	UG/L
RCMHP - W2	2/5/2013	ALKALINITY (TOTAL) AS CACO3	170	MG/L
RCMHP - W2	2/9/2016	ALKALINITY (TOTAL) AS CACO3	170	MG/L
RCMHP - W2	2/5/2013	ALUMINUM	< 50	UG/L
RCMHP - W2	2/10/2016	ALUMINUM	< 50	UG/L
RCMHP - W2	2/5/2013	ARSENIC	< 2	UG/L
RCMHP - W2	2/10/2016	ARSENIC	< 2	UG/L
RCMHP - W2	2/5/2013	BICARBONATE ALKALINITY	210	MG/L
RCMHP - W2	2/9/2016	BICARBONATE ALKALINITY	210	MG/L
RCMHP - W2	2/5/2013	CALCIUM	41	MG/L
RCMHP - W2	2/10/2016	CALCIUM	40	MG/L
RCMHP - W2	2/5/2013	CARBONATE ALKALINITY	< 3	MG/L
RCMHP - W2	2/9/2016	CARBONATE ALKALINITY	< 3	MG/L
RCMHP - W2	2/5/2013	CHLORIDE	23	MG/L
RCMHP - W2	2/6/2016	CHLORIDE	20	MG/L
RCMHP - W2	2/5/2013	CHROMIUM (TOTAL)	7.5	UG/L
RCMHP - W2	2/9/2016	CHROMIUM (TOTAL)	13	UG/L
RCMHP - W2	8/6/2014	CHROMIUM, HEXAVALENT	6.7	UG/L
RCMHP - W2	2/9/2016	CHROMIUM, HEXAVALENT	12	UG/L
RCMHP - W2	8/30/2016	CHROMIUM, HEXAVALENT	7	UG/L
RCMHP - W2	12/3/2016	CHROMIUM, HEXAVALENT	8.3	UG/L
RCMHP - W2	1/24/2017	CHROMIUM, HEXAVALENT	10	UG/L
RCMHP - W2	7/12/2017	CHROMIUM, HEXAVALENT	11	UG/L
RCMHP - W2	10/17/2017	CHROMIUM, HEXAVALENT	11	UG/L

Appendix E

2013-17 Water Quality for Selected Compounds

Well_Name	Sample Date	Analyte	Concent.	Unit
BCVWD - W16	12/11/2017	NITRATE (AS N)	5.6	MG/L
BCVWD - W16	6/20/2012	NITRATE (AS NO3)	22	MG/L
BCVWD - W16	8/8/2012	NITRATE (AS NO3)	17	MG/L
BCVWD - W16	9/18/2012	NITRATE (AS NO3)	19	MG/L
BCVWD - W16	10/30/2012	NITRATE (AS NO3)	26	MG/L
BCVWD - W16	12/19/2012	NITRATE (AS NO3)	25	MG/L
BCVWD - W16	5/22/2013	NITRATE (AS NO3)	21	MG/L
BCVWD - W16	6/13/2013	NITRATE (AS NO3)	21	MG/L
BCVWD - W16	8/20/2013	NITRATE (AS NO3)	23	MG/L
BCVWD - W16	9/17/2013	NITRATE (AS NO3)	22	MG/L
BCVWD - W16	10/16/2013	NITRATE (AS NO3)	22	MG/L
BCVWD - W16	10/31/2013	NITRATE (AS NO3)	21	MG/L
BCVWD - W16	11/26/2013	NITRATE (AS NO3)	21	MG/L
BCVWD - W16	12/11/2013	NITRATE (AS NO3)	24	MG/L
BCVWD - W16	2/26/2014	NITRATE (AS NO3)	26	MG/L
BCVWD - W16	3/19/2014	NITRATE (AS NO3)	28	MG/L
BCVWD - W16	4/16/2014	NITRATE (AS NO3)	27	MG/L
BCVWD - W16	5/13/2014	NITRATE (AS NO3)	24	MG/L
BCVWD - W16	6/10/2014	NITRATE (AS NO3)	25	MG/L
BCVWD - W16	7/23/2014	NITRATE (AS NO3)	25	MG/L
BCVWD - W16	8/13/2014	NITRATE (AS NO3)	22	MG/L
BCVWD - W16	9/18/2014	NITRATE (AS NO3)	24	MG/L
BCVWD - W16	10/8/2014	NITRATE (AS NO3)	24	MG/L
BCVWD - W16	12/8/2014	NITRATE (AS NO3)	28	MG/L
BCVWD - W16	1/22/2015	NITRATE (AS NO3)	33	MG/L
BCVWD - W16	2/19/2015	NITRATE (AS NO3)	26	MG/L
BCVWD - W16	3/18/2015	NITRATE (AS NO3)	27	MG/L
BCVWD - W16	4/22/2015	NITRATE (AS NO3)	26	MG/L
BCVWD - W16	5/13/2015	NITRATE (AS NO3)	26	MG/L
BCVWD - W16	6/9/2015	NITRATE (AS NO3)	25	MG/L
BCVWD - W16	7/30/2015	NITRATE (AS NO3)	27	MG/L
BCVWD - W16	9/1/2015	NITRATE (AS NO3)	25	MG/L
BCVWD - W16	9/30/2015	NITRATE (AS NO3)	28	MG/L
BCVWD - W16	10/27/2015	NITRATE (AS NO3)	27	MG/L
BCVWD - W16	11/4/2015	NITRATE (AS NO3)	27	MG/L
BCVWD - W16	12/3/2015	NITRATE (AS NO3)	26	MG/L
BCVWD - W16	10/31/2013	NITRITE (AS N)	< 100	MG/L
BCVWD - W16	12/8/2016	NITRITE (AS N)	< 0.1	MG/L
BCVWD - W16	10/31/2013	POTASSIUM	1.3	MG/L
BCVWD - W16	12/15/2016	POTASSIUM	1.2	MG/L
BCVWD - W16	10/31/2013	SODIUM	36	MG/L
BCVWD - W16	12/15/2016	SODIUM	38	MG/L
BCVWD - W16	10/31/2013	SPECIFIC CONDUCTANCE	540	US
BCVWD - W16	11/29/2017	SPECIFIC CONDUCTANCE	550	US
BCVWD - W16	10/31/2013	SULFATE	46	MG/L
BCVWD - W16	12/9/2016	SULFATE	46	MG/L
BCVWD - W16	10/31/2013	TETRACHLOROETHYLENE	< 0.5	UG/L

Well_Name	Sample Date	Analyte	Concent.	Unit
RCMHP - W2	2/5/2013	COPPER	62	UG/L
RCMHP - W2	2/10/2016	COPPER	< 50	UG/L
RCMHP - W2	2/5/2013	FLUORIDE (F) (NATURAL-SOURCE)	0.8	MG/L
RCMHP - W2	2/5/2016	FLUORIDE (F) (NATURAL-SOURCE)	0.7	MG/L
RCMHP - W2	2/5/2013	HARDNESS (TOTAL) AS CACO3	170	MG/L
RCMHP - W2	2/10/2016	HARDNESS (TOTAL) AS CACO3	170	MG/L
RCMHP - W2	2/5/2013	HYDROXIDE ALKALINITY	< 3	MG/L
RCMHP - W2	2/9/2016	HYDROXIDE ALKALINITY	< 3	MG/L
RCMHP - W2	2/5/2013	IRON	< 100	UG/L
RCMHP - W2	2/10/2016	IRON	< 100	UG/L
RCMHP - W2	2/5/2013	LEAD	< 5	UG/L
RCMHP - W2	2/10/2016	LEAD	< 5	UG/L
RCMHP - W2	2/5/2013	MAGNESIUM	17	MG/L
RCMHP - W2	2/10/2016	MAGNESIUM	16	MG/L
RCMHP - W2	2/5/2013	MANGANESE	< 20	UG/L
RCMHP - W2	2/10/2016	MANGANESE	< 20	UG/L
RCMHP - W2	1/5/2016	NITRATE (AS N)	4.9	MG/L
RCMHP - W2	2/6/2016	NITRATE (AS N)	4.9	MG/L
RCMHP - W2	7/1/2016	NITRATE (AS N)	5.5	MG/L
RCMHP - W2	12/3/2016	NITRATE (AS N)	6.2	MG/L
RCMHP - W2	1/17/2017	NITRATE (AS N)	6.1	MG/L
RCMHP - W2	7/10/2017	NITRATE (AS N)	6.6	MG/L
RCMHP - W2	10/16/2017	NITRATE (AS N)	4.8	MG/L
RCMHP - W2	1/6/2012	NITRATE (AS NO3)	35	MG/L
RCMHP - W2	4/7/2012	NITRATE (AS NO3)	30	MG/L
RCMHP - W2	7/7/2012	NITRATE (AS NO3)	31	MG/L
RCMHP - W2	10/5/2012	NITRATE (AS NO3)	32	MG/L
RCMHP - W2	1/5/2013	NITRATE (AS NO3)	31	MG/L
RCMHP - W2	2/5/2013	NITRATE (AS NO3)	31	MG/L
RCMHP - W2	4/8/2013	NITRATE (AS NO3)	31	MG/L
RCMHP - W2	7/6/2013	NITRATE (AS NO3)	32	MG/L
RCMHP - W2	10/11/2013	NITRATE (AS NO3)	30	MG/L
RCMHP - W2	1/4/2014	NITRATE (AS NO3)	29	MG/L
RCMHP - W2	7/12/2014	NITRATE (AS NO3)	28	MG/L
RCMHP - W2	10/11/2014	NITRATE (AS NO3)	27	MG/L
RCMHP - W2	1/2/2015	NITRATE (AS NO3)	25	MG/L
RCMHP - W2	4/4/2015	NITRATE (AS NO3)	26	MG/L
RCMHP - W2	7/10/2015	NITRATE (AS NO3)	23	MG/L
RCMHP - W2	10/17/2015	NITRATE (AS NO3)	27	MG/L
RCMHP - W2	2/5/2013	NITRITE (AS N)	< 100	MG/L
RCMHP - W2	2/5/2016	NITRITE (AS N)	< 0.1	MG/L
RCMHP - W2	7/1/2016	NITRITE (AS N)	< 0.1	MG/L
RCMHP - W2	2/5/2013	POTASSIUM	1.4	MG/L
RCMHP - W2	2/5/2013	SODIUM	35	MG/L
RCMHP - W2	2/10/2016	SODIUM	32	MG/L
RCMHP - W2	2/5/2013	SPECIFIC CONDUCTANCE	470	US
RCMHP - W2	2/5/2016	SPECIFIC CONDUCTANCE	470	US

Appendix E
2013-17 Water Quality for Selected Compounds

Well_Name	Sample Date	Analyte	Concent.	Unit
BCVWD - W16	12/12/2016	TETRACHLOROETHYLENE	< 0.5	UG/L
BCVWD - W16	10/31/2013	TOTAL DISSOLVED SOLIDS	370	MG/L
BCVWD - W16	12/13/2016	TOTAL DISSOLVED SOLIDS	330	MG/L
BCVWD - W16	10/31/2013	TRICHLOROETHYLENE	< 0.5	UG/L
BCVWD - W16	12/12/2016	TRICHLOROETHYLENE	< 0.5	UG/L
BCVWD - W16	10/31/2013	TURBIDITY, LABORATORY	< 0.2	NTU
BCVWD - W16	12/8/2016	TURBIDITY, LABORATORY	< 0.1	NTU
BCVWD - W16	10/31/2013	ZINC	< 50	UG/L
BCVWD - W16	12/15/2016	ZINC	< 50	UG/L
BCVWD - W21	1/6/2013	ALKALINITY (TOTAL) AS CACO3	140	MG/L
BCVWD - W21	12/4/2015	ALKALINITY (TOTAL) AS CACO3	180	MG/L
BCVWD - W21	1/6/2013	ALUMINUM	< 50	UG/L
BCVWD - W21	12/4/2015	ALUMINUM	< 50	UG/L
BCVWD - W21	1/6/2013	ARSENIC	< 2	UG/L
BCVWD - W21	12/7/2015	ARSENIC	< 2	UG/L
BCVWD - W21	1/6/2013	BICARBONATE ALKALINITY	170	MG/L
BCVWD - W21	12/4/2015	BICARBONATE ALKALINITY	220	MG/L
BCVWD - W21	1/6/2013	CALCIUM	45	MG/L
BCVWD - W21	12/4/2015	CALCIUM	49	MG/L
BCVWD - W21	1/6/2013	CARBONATE ALKALINITY	< 3	MG/L
BCVWD - W21	12/4/2015	CARBONATE ALKALINITY	< 3	MG/L
BCVWD - W21	1/6/2013	CHLORIDE	13	MG/L
BCVWD - W21	12/3/2015	CHLORIDE	14	MG/L
BCVWD - W21	1/6/2013	CHROMIUM (TOTAL)	5.4	UG/L
BCVWD - W21	12/8/2015	CHROMIUM (TOTAL)	6.4	UG/L
BCVWD - W21	10/22/2014	CHROMIUM, HEXAVALENT	6.8	UG/L
BCVWD - W21	11/12/2015	CHROMIUM, HEXAVALENT	6.7	UG/L
BCVWD - W21	1/6/2013	COPPER	< 50	UG/L
BCVWD - W21	12/4/2015	COPPER	< 50	UG/L
BCVWD - W21	10/31/2013	DIBROMOCHLOROPROPANE (DBCP)	< 0.01	UG/L
BCVWD - W21	1/6/2013	FLUORIDE (F) (NATURAL-SOURCE)	1	MG/L
BCVWD - W21	12/6/2015	FLUORIDE (F) (NATURAL-SOURCE)	0.5	MG/L
BCVWD - W21	1/6/2013	HARDNESS (TOTAL) AS CACO3	180	MG/L
BCVWD - W21	12/4/2015	HARDNESS (TOTAL) AS CACO3	200	MG/L
BCVWD - W21	1/6/2013	HYDROXIDE ALKALINITY	< 3	MG/L
BCVWD - W21	12/4/2015	HYDROXIDE ALKALINITY	< 3	MG/L
BCVWD - W21	1/6/2013	IRON	< 100	UG/L
BCVWD - W21	12/4/2015	IRON	< 100	UG/L
BCVWD - W21	1/6/2013	LEAD	< 5	UG/L
BCVWD - W21	12/7/2015	LEAD	< 5	UG/L
BCVWD - W21	1/6/2013	MAGNESIUM	16	MG/L
BCVWD - W21	12/4/2015	MAGNESIUM	18	MG/L
BCVWD - W21	1/6/2013	MANGANESE	< 20	UG/L
BCVWD - W21	12/4/2015	MANGANESE	< 20	UG/L
BCVWD - W21	12/15/2015	NITRATE (AS N)	3.3	MG/L
BCVWD - W21	1/12/2016	NITRATE (AS N)	3.2	MG/L
BCVWD - W21	4/13/2016	NITRATE (AS N)	3.4	MG/L

Well_Name	Sample Date	Analyte	Concent.	Unit
RCMHP - W2	2/5/2013	SULFATE	10	MG/L
RCMHP - W2	2/6/2016	SULFATE	10	MG/L
RCMHP - W2	2/7/2016	TETRACHLOROETHYLENE	< 0.5	UG/L
RCMHP - W2	2/5/2013	TOTAL DISSOLVED SOLIDS	320	MG/L
RCMHP - W2	2/9/2016	TOTAL DISSOLVED SOLIDS	270	MG/L
RCMHP - W2	2/7/2016	TRICHLOROETHYLENE	< 0.5	UG/L
RCMHP - W2	2/5/2013	TURBIDITY, LABORATORY	< 0.2	NTU
RCMHP - W2	2/5/2016	TURBIDITY, LABORATORY	0.33	NTU
RCMHP - W2	2/5/2013	ZINC	< 50	UG/L
RCMHP - W2	2/10/2016	ZINC	< 50	UG/L
Sharondale - W1	7/14/2015	ALKALINITY (TOTAL) AS CACO3	200	MG/L
Sharondale - W1	7/14/2015	ALUMINUM	< 50	UG/L
Sharondale - W1	7/14/2015	ARSENIC	< 2	UG/L
Sharondale - W1	7/14/2015	BICARBONATE ALKALINITY	240	MG/L
Sharondale - W1	7/14/2015	CALCIUM	43	MG/L
Sharondale - W1	7/14/2015	CARBONATE ALKALINITY	< 3	MG/L
Sharondale - W1	7/14/2015	CHLORIDE	20	MG/L
Sharondale - W1	7/14/2015	CHROMIUM (TOTAL)	6.2	UG/L
Sharondale - W1	8/6/2014	CHROMIUM, HEXAVALENT	5.4	UG/L
Sharondale - W1	7/14/2015	COPPER	< 50	UG/L
Sharondale - W1	7/14/2015	FLUORIDE (F) (NATURAL-SOURCE)	0.5	MG/L
Sharondale - W1	7/14/2015	HARDNESS (TOTAL) AS CACO3	170	MG/L
Sharondale - W1	7/14/2015	HYDROXIDE ALKALINITY	< 3	MG/L
Sharondale - W1	7/14/2015	IRON	< 100	UG/L
Sharondale - W1	7/14/2015	LEAD	< 5	UG/L
Sharondale - W1	7/14/2015	MAGNESIUM	16	MG/L
Sharondale - W1	7/14/2015	MANGANESE	< 20	UG/L
Sharondale - W1	1/5/2016	NITRATE (AS N)	4.3	MG/L
Sharondale - W1	7/1/2016	NITRATE (AS N)	4.3	MG/L
Sharondale - W1	10/4/2016	NITRATE (AS N)	4.3	MG/L
Sharondale - W1	12/3/2016	NITRATE (AS N)	4.9	MG/L
Sharondale - W1	1/7/2017	NITRATE (AS N)	5.2	MG/L
Sharondale - W1	4/8/2017	NITRATE (AS N)	2.5	MG/L
Sharondale - W1	7/10/2017	NITRATE (AS N)	4.6	MG/L
Sharondale - W1	10/16/2017	NITRATE (AS N)	4.4	MG/L
Sharondale - W1	1/6/2012	NITRATE (AS NO3)	24	MG/L
Sharondale - W1	4/6/2012	NITRATE (AS NO3)	23	MG/L
Sharondale - W1	11/10/2012	NITRATE (AS NO3)	22	MG/L
Sharondale - W1	1/4/2013	NITRATE (AS NO3)	27	MG/L
Sharondale - W1	4/8/2013	NITRATE (AS NO3)	21	MG/L
Sharondale - W1	7/6/2013	NITRATE (AS NO3)	21	MG/L
Sharondale - W1	12/7/2013	NITRATE (AS NO3)	23	MG/L
Sharondale - W1	1/4/2014	NITRATE (AS NO3)	22	MG/L
Sharondale - W1	4/5/2014	NITRATE (AS NO3)	23	MG/L
Sharondale - W1	7/12/2014	NITRATE (AS NO3)	21	MG/L
Sharondale - W1	10/11/2014	NITRATE (AS NO3)	21	MG/L
Sharondale - W1	1/2/2015	NITRATE (AS NO3)	27	MG/L

Well_Name	Sample Date	Analyte	Concent.	Unit
BCVWD - W21	5/26/2016	NITRATE (AS N)	3.2	MG/L
BCVWD - W21	6/14/2016	NITRATE (AS N)	3.1	MG/L
BCVWD - W21	9/21/2016	NITRATE (AS N)	2.8	MG/L
BCVWD - W21	12/2/2016	NITRATE (AS N)	3.4	MG/L
BCVWD - W21	2/1/2017	NITRATE (AS N)	3.6	MG/L
BCVWD - W21	5/24/2017	NITRATE (AS N)	3.4	MG/L
BCVWD - W21	6/19/2017	NITRATE (AS N)	3.4	MG/L
BCVWD - W21	7/19/2017	NITRATE (AS N)	3.4	MG/L
BCVWD - W21	8/14/2017	NITRATE (AS N)	3.2	MG/L
BCVWD - W21	9/12/2017	NITRATE (AS N)	3.2	MG/L
BCVWD - W21	10/23/2017	NITRATE (AS N)	3.1	MG/L
BCVWD - W21	11/22/2017	NITRATE (AS N)	3.2	MG/L
BCVWD - W21	12/11/2017	NITRATE (AS N)	3.2	MG/L
BCVWD - W21	2/22/2012	NITRATE (AS NO3)	17	MG/L
BCVWD - W21	3/30/2012	NITRATE (AS NO3)	18	MG/L
BCVWD - W21	4/30/2012	NITRATE (AS NO3)	18	MG/L
BCVWD - W21	5/18/2012	NITRATE (AS NO3)	18	MG/L
BCVWD - W21	6/20/2012	NITRATE (AS NO3)	17	MG/L
BCVWD - W21	8/8/2012	NITRATE (AS NO3)	14	MG/L
BCVWD - W21	9/19/2012	NITRATE (AS NO3)	16	MG/L
BCVWD - W21	10/30/2012	NITRATE (AS NO3)	18	MG/L
BCVWD - W21	1/6/2013	NITRATE (AS NO3)	35	MG/L
BCVWD - W21	3/6/2013	NITRATE (AS NO3)	18	MG/L
BCVWD - W21	5/22/2013	NITRATE (AS NO3)	17	MG/L
BCVWD - W21	6/13/2013	NITRATE (AS NO3)	17	MG/L
BCVWD - W21	8/20/2013	NITRATE (AS NO3)	16	MG/L
BCVWD - W21	9/17/2013	NITRATE (AS NO3)	16	MG/L
BCVWD - W21	10/16/2013	NITRATE (AS NO3)	17	MG/L
BCVWD - W21	10/31/2013	NITRATE (AS NO3)	16	MG/L
BCVWD - W21	11/26/2013	NITRATE (AS NO3)	14	MG/L
BCVWD - W21	12/11/2013	NITRATE (AS NO3)	18	MG/L
BCVWD - W21	2/26/2014	NITRATE (AS NO3)	15	MG/L
BCVWD - W21	3/19/2014	NITRATE (AS NO3)	16	MG/L
BCVWD - W21	4/16/2014	NITRATE (AS NO3)	16	MG/L
BCVWD - W21	5/13/2014	NITRATE (AS NO3)	16	MG/L
BCVWD - W21	6/10/2014	NITRATE (AS NO3)	16	MG/L
BCVWD - W21	7/23/2014	NITRATE (AS NO3)	16	MG/L
BCVWD - W21	8/13/2014	NITRATE (AS NO3)	14	MG/L
BCVWD - W21	9/17/2014	NITRATE (AS NO3)	15	MG/L
BCVWD - W21	10/8/2014	NITRATE (AS NO3)	15	MG/L
BCVWD - W21	12/8/2014	NITRATE (AS NO3)	16	MG/L
BCVWD - W21	1/22/2015	NITRATE (AS NO3)	16	MG/L
BCVWD - W21	2/19/2015	NITRATE (AS NO3)	15	MG/L
BCVWD - W21	3/18/2015	NITRATE (AS NO3)	16	MG/L
BCVWD - W21	4/22/2015	NITRATE (AS NO3)	15	MG/L
BCVWD - W21	5/13/2015	NITRATE (AS NO3)	15	MG/L
BCVWD - W21	6/9/2015	NITRATE (AS NO3)	14	MG/L

Well_Name	Sample Date	Analyte	Concent.	Unit
Sharondale - W1	5/6/2015	NITRATE (AS NO3)	18	MG/L
Sharondale - W1	7/14/2015	NITRATE (AS NO3)	19	MG/L
Sharondale - W1	10/17/2015	NITRATE (AS NO3)	22	MG/L
Sharondale - W1	7/14/2015	NITRITE (AS N)	< 100	MG/L
Sharondale - W1	7/14/2015	SODIUM	43	MG/L
Sharondale - W1	7/14/2015	SPECIFIC CONDUCTANCE	500	US
Sharondale - W1	7/14/2015	SULFATE	16	MG/L
Sharondale - W1	3/8/2013	TETRACHLOROETHYLENE	< 0.5	UG/L
Sharondale - W1	7/14/2015	TOTAL DISSOLVED SOLIDS	260	MG/L
Sharondale - W1	3/8/2013	TRICHLOROETHYLENE	< 0.5	UG/L
Sharondale - W1	7/14/2015	TURBIDITY, LABORATORY	0.53	NTU
Sharondale - W1	7/14/2015	ZINC	< 50	UG/L
Sharondale - W2	7/14/2015	ALKALINITY (TOTAL) AS CACO3	200	MG/L
Sharondale - W2	7/14/2015	ALUMINUM	< 50	UG/L
Sharondale - W2	7/14/2015	ARSENIC	< 2	UG/L
Sharondale - W2	7/14/2015	BICARBONATE ALKALINITY	240	MG/L
Sharondale - W2	7/14/2015	CALCIUM	46	MG/L
Sharondale - W2	7/14/2015	CARBONATE ALKALINITY	< 3	MG/L
Sharondale - W2	7/14/2015	CHLORIDE	28	MG/L
Sharondale - W2	7/14/2015	CHROMIUM (TOTAL)	8.9	UG/L
Sharondale - W2	8/6/2014	CHROMIUM, HEXAVALENT	7.9	UG/L
Sharondale - W2	7/14/2015	COPPER	< 50	UG/L
Sharondale - W2	7/14/2015	FLUORIDE (F) (NATURAL-SOURCE)	0.7	MG/L
Sharondale - W2	7/14/2015	HARDNESS (TOTAL) AS CACO3	190	MG/L
Sharondale - W2	7/14/2015	HYDROXIDE ALKALINITY	< 3	MG/L
Sharondale - W2	7/14/2015	IRON	< 100	UG/L
Sharondale - W2	7/14/2015	LEAD	< 5	UG/L
Sharondale - W2	7/14/2015	MAGNESIUM	18	MG/L
Sharondale - W2	7/14/2015	MANGANESE	< 20	UG/L
Sharondale - W2	1/5/2016	NITRATE (AS N)	4.9	MG/L
Sharondale - W2	1/7/2017	NITRATE (AS N)	5.1	MG/L
Sharondale - W2	10/16/2017	NITRATE (AS N)	4.7	MG/L
Sharondale - W2	1/6/2012	NITRATE (AS NO3)	22	MG/L
Sharondale - W2	7/7/2012	NITRATE (AS NO3)	18	MG/L
Sharondale - W2	1/4/2013	NITRATE (AS NO3)	20	MG/L
Sharondale - W2	1/4/2014	NITRATE (AS NO3)	19	MG/L
Sharondale - W2	1/2/2015	NITRATE (AS NO3)	19	MG/L
Sharondale - W2	7/14/2015	NITRATE (AS NO3)	21	MG/L
Sharondale - W2	7/14/2015	NITRITE (AS N)	< 100	MG/L
Sharondale - W2	7/14/2015	SODIUM	39	MG/L
Sharondale - W2	7/14/2015	SPECIFIC CONDUCTANCE	510	US
Sharondale - W2	7/14/2015	SULFATE	14	MG/L
Sharondale - W2	3/8/2013	TETRACHLOROETHYLENE	< 0.5	UG/L
Sharondale - W2	7/14/2015	TOTAL DISSOLVED SOLIDS	260	MG/L
Sharondale - W2	3/8/2013	TRICHLOROETHYLENE	< 0.5	UG/L
Sharondale - W2	7/14/2015	TURBIDITY, LABORATORY	0.22	NTU
Sharondale - W2	7/14/2015	ZINC	< 50	UG/L

Appendix E

2013-17 Water Quality for Selected Compounds

Well_Name	Sample Date	Analyte	Concent.	Unit	Well_Name	Sample Date	Analyte	Concent.	Unit
BCVWD - W21	7/30/2015	NITRATE (AS NO3)	15	MG/L	SMWC - W4	4/8/2013	ALKALINITY (TOTAL) AS CACO3	100	MG/L
BCVWD - W21	8/31/2015	NITRATE (AS NO3)	14	MG/L	SMWC - W4	4/12/2016	ALKALINITY (TOTAL) AS CACO3	110	MG/L
BCVWD - W21	9/30/2015	NITRATE (AS NO3)	15	MG/L	SMWC - W4	4/8/2013	ALUMINUM	< 0	UG/L
BCVWD - W21	10/27/2015	NITRATE (AS NO3)	14	MG/L	SMWC - W4	4/15/2016	ALUMINUM	< 0	UG/L
BCVWD - W21	11/4/2015	NITRATE (AS NO3)	15	MG/L	SMWC - W4	3/15/2012	ARSENIC	4.6	UG/L
BCVWD - W21	12/3/2015	NITRATE (AS NO3)	14	MG/L	SMWC - W4	4/8/2013	ARSENIC	5.2	UG/L
BCVWD - W21	1/6/2013	NITRITE (AS N)	< 100	MG/L	SMWC - W4	4/21/2016	ARSENIC	4.4	UG/L
BCVWD - W21	12/2/2015	NITRITE (AS N)	< 100	MG/L	SMWC - W4	4/8/2013	BICARBONATE ALKALINITY	89	MG/L
BCVWD - W21	12/1/2016	NITRITE (AS N)	< 0.1	MG/L	SMWC - W4	4/12/2016	BICARBONATE ALKALINITY	110	MG/L
BCVWD - W21	1/6/2013	POTASSIUM	1.4	MG/L	SMWC - W4	4/8/2013	CALCIUM	6.8	MG/L
BCVWD - W21	12/4/2015	POTASSIUM	1.6	MG/L	SMWC - W4	4/25/2016	CALCIUM	8.8	MG/L
BCVWD - W21	1/6/2013	SODIUM	26	MG/L	SMWC - W4	4/8/2013	CARBONATE ALKALINITY	16	MG/L
BCVWD - W21	12/4/2015	SODIUM	25	MG/L	SMWC - W4	4/12/2016	CARBONATE ALKALINITY	12	MG/L
BCVWD - W21	1/6/2013	SPECIFIC CONDUCTANCE	460	US	SMWC - W4	4/8/2013	CHLORIDE	17	MG/L
BCVWD - W21	12/4/2015	SPECIFIC CONDUCTANCE	450	US	SMWC - W4	4/11/2016	CHLORIDE	17	MG/L
BCVWD - W21	1/6/2013	SULFATE	24	MG/L	SMWC - W4	4/8/2013	CHROMIUM (TOTAL)	< 0	UG/L
BCVWD - W21	12/3/2015	SULFATE	26	MG/L	SMWC - W4	4/21/2016	CHROMIUM (TOTAL)	< 0	UG/L
BCVWD - W21	10/31/2013	TETRACHLOROETHYLENE	< 0.5	UG/L	SMWC - W4	12/9/2014	CHROMIUM, HEXAVALENT	2.7	UG/L
BCVWD - W21	12/3/2016	TETRACHLOROETHYLENE	< 0.5	UG/L	SMWC - W4	12/7/2017	CHROMIUM, HEXAVALENT	2.3	UG/L
BCVWD - W21	1/6/2013	TOTAL DISSOLVED SOLIDS	280	MG/L	SMWC - W4	4/8/2013	COPPER	< 0	UG/L
BCVWD - W21	12/7/2015	TOTAL DISSOLVED SOLIDS	290	MG/L	SMWC - W4	4/15/2016	COPPER	< 0	UG/L
BCVWD - W21	10/31/2013	TRICHLOROETHYLENE	< 0.5	UG/L	SMWC - W4	9/23/2015	DIBROMOCHLOROPROPANE (DBCP)	< 0	UG/L
BCVWD - W21	12/3/2016	TRICHLOROETHYLENE	< 0.5	UG/L	SMWC - W4	4/8/2013	FLUORIDE (F) (NATURAL-SOURCE)	0.38	MG/L
BCVWD - W21	1/6/2013	TURBIDITY, LABORATORY	< 0.2	NTU	SMWC - W4	4/11/2016	FLUORIDE (F) (NATURAL-SOURCE)	0.41	MG/L
BCVWD - W21	12/3/2015	TURBIDITY, LABORATORY	< 0.1	NTU	SMWC - W4	4/8/2013	HARDNESS (TOTAL) AS CACO3	22	MG/L
BCVWD - W21	1/6/2013	ZINC	< 50	UG/L	SMWC - W4	4/25/2016	HARDNESS (TOTAL) AS CACO3	29	MG/L
BCVWD - W21	12/4/2015	ZINC	< 50	UG/L	SMWC - W4	4/8/2013	HYDROXIDE ALKALINITY	< 0	MG/L
BCVWD - W22	10/31/2013	ALKALINITY (TOTAL) AS CACO3	170	MG/L	SMWC - W4	4/12/2016	HYDROXIDE ALKALINITY	< 0	MG/L
BCVWD - W22	12/2/2016	ALKALINITY (TOTAL) AS CACO3	180	MG/L	SMWC - W4	4/8/2013	IRON	< 0	UG/L
BCVWD - W22	10/31/2013	ALUMINUM	< 50	UG/L	SMWC - W4	4/15/2016	IRON	< 0	UG/L
BCVWD - W22	12/9/2016	ALUMINUM	< 50	UG/L	SMWC - W4	4/8/2013	LEAD	< 0	UG/L
BCVWD - W22	10/31/2013	ARSENIC	< 2	UG/L	SMWC - W4	4/20/2016	LEAD	< 0	UG/L
BCVWD - W22	12/6/2016	ARSENIC	< 2	UG/L	SMWC - W4	4/8/2013	MAGNESIUM	1.1	MG/L
BCVWD - W22	10/31/2013	BICARBONATE ALKALINITY	210	MG/L	SMWC - W4	4/25/2016	MAGNESIUM	1.7	MG/L
BCVWD - W22	12/2/2016	BICARBONATE ALKALINITY	210	MG/L	SMWC - W4	4/8/2013	MANGANESE	< 0	UG/L
BCVWD - W22	10/31/2013	CALCIUM	40	MG/L	SMWC - W4	4/15/2016	MANGANESE	< 0	UG/L
BCVWD - W22	12/9/2016	CALCIUM	40	MG/L	SMWC - W4	4/11/2016	NITRATE (AS N)	3.2	MG/L
BCVWD - W22	10/31/2013	CARBONATE ALKALINITY	< 3	MG/L	SMWC - W4	6/1/2016	NITRATE (AS N)	3	MG/L
BCVWD - W22	12/2/2016	CARBONATE ALKALINITY	< 3	MG/L	SMWC - W4	9/2/2016	NITRATE (AS N)	3	MG/L
BCVWD - W22	10/31/2013	CHLORIDE	9.2	MG/L	SMWC - W4	12/1/2016	NITRATE (AS N)	4	MG/L
BCVWD - W22	12/2/2016	CHLORIDE	7.6	MG/L	SMWC - W4	3/3/2017	NITRATE (AS N)	3.8	MG/L
BCVWD - W22	10/31/2013	CHROMIUM (TOTAL)	6.9	UG/L	SMWC - W4	6/5/2017	NITRATE (AS N)	3.1	MG/L
BCVWD - W22	12/7/2016	CHROMIUM (TOTAL)	7.9	UG/L	SMWC - W4	9/14/2017	NITRATE (AS N)	4.9	MG/L
BCVWD - W22	10/22/2014	CHROMIUM, HEXAVALENT	7.1	UG/L	SMWC - W4	12/4/2017	NITRATE (AS N)	3.2	MG/L
BCVWD - W22	11/12/2015	CHROMIUM, HEXAVALENT	7.2	UG/L	SMWC - W4	7/11/2012	NITRATE (AS NO3)	12	MG/L
BCVWD - W22	10/31/2013	COPPER	< 50	UG/L	SMWC - W4	4/8/2013	NITRATE (AS NO3)	13	MG/L
BCVWD - W22	12/9/2016	COPPER	< 50	UG/L	SMWC - W4	7/16/2013	NITRATE (AS NO3)	13	MG/L

Well_Name	Sample Date	Analyte	Concent.	Unit
BCVWD - W22	10/31/2013	DIBROMOCHLOROPROPANE (DBCP)	< 0.01	UG/L
BCVWD - W22	10/31/2013	FLUORIDE (F) (NATURAL-SOURCE)	0.4	MG/L
BCVWD - W22	12/7/2016	FLUORIDE (F) (NATURAL-SOURCE)	0.4	MG/L
BCVWD - W22	10/31/2013	HARDNESS (TOTAL) AS CACO3	170	MG/L
BCVWD - W22	12/9/2016	HARDNESS (TOTAL) AS CACO3	170	MG/L
BCVWD - W22	10/31/2013	HYDROXIDE ALKALINITY	< 3	MG/L
BCVWD - W22	12/2/2016	HYDROXIDE ALKALINITY	< 3	MG/L
BCVWD - W22	10/31/2013	IRON	< 100	UG/L
BCVWD - W22	12/9/2016	IRON	< 100	UG/L
BCVWD - W22	10/31/2013	LEAD	< 5	UG/L
BCVWD - W22	12/6/2016	LEAD	< 5	UG/L
BCVWD - W22	10/31/2013	MAGNESIUM	17	MG/L
BCVWD - W22	12/9/2016	MAGNESIUM	17	MG/L
BCVWD - W22	10/31/2013	MANGANESE	< 20	UG/L
BCVWD - W22	12/9/2016	MANGANESE	< 20	UG/L
BCVWD - W22	12/2/2016	NITRATE (AS N)	3	MG/L
BCVWD - W22	12/14/2017	NITRATE (AS N)	0.89	MG/L
BCVWD - W22	12/18/2012	NITRATE (AS NO3)	3.4	MG/L
BCVWD - W22	10/31/2013	NITRATE (AS NO3)	5.1	MG/L
BCVWD - W22	12/4/2015	NITRATE (AS NO3)	3.7	MG/L
BCVWD - W22	10/31/2013	NITRITE (AS N)	< 100	MG/L
BCVWD - W22	12/1/2016	NITRITE (AS N)	< 0.1	MG/L
BCVWD - W22	10/31/2013	POTASSIUM	1.5	MG/L
BCVWD - W22	12/9/2016	POTASSIUM	1.4	MG/L
BCVWD - W22	10/31/2013	SODIUM	19	MG/L
BCVWD - W22	12/9/2016	SODIUM	18	MG/L
BCVWD - W22	10/31/2013	SPECIFIC CONDUCTANCE	390	US
BCVWD - W22	12/2/2016	SPECIFIC CONDUCTANCE	430	US
BCVWD - W22	10/31/2013	SULFATE	11	MG/L
BCVWD - W22	12/2/2016	SULFATE	24	MG/L
BCVWD - W22	10/31/2013	TETRACHLOROETHYLENE	< 0.5	UG/L
BCVWD - W22	12/3/2016	TETRACHLOROETHYLENE	< 0.5	UG/L
BCVWD - W22	10/31/2013	TOTAL DISSOLVED SOLIDS	210	MG/L
BCVWD - W22	12/2/2016	TOTAL DISSOLVED SOLIDS	260	MG/L
BCVWD - W22	10/31/2013	TRICHLOROETHYLENE	< 0.5	UG/L
BCVWD - W22	12/3/2016	TRICHLOROETHYLENE	< 0.5	UG/L
BCVWD - W22	10/31/2013	TURBIDITY, LABORATORY	< 0.2	NTU
BCVWD - W22	12/1/2016	TURBIDITY, LABORATORY	< 0.1	NTU
BCVWD - W22	10/31/2013	ZINC	< 50	UG/L
BCVWD - W22	12/9/2016	ZINC	< 50	UG/L
BCVWD - W23	12/21/2012	ALKALINITY (TOTAL) AS CACO3	180	MG/L
BCVWD - W23	12/4/2015	ALKALINITY (TOTAL) AS CACO3	170	MG/L
BCVWD - W23	12/8/2015	ALKALINITY (TOTAL) AS CACO3	160	MG/L
BCVWD - W23	12/21/2012	ALUMINUM	< 50	UG/L
BCVWD - W23	12/4/2015	ALUMINUM	< 50	UG/L
BCVWD - W23	12/8/2015	ALUMINUM	< 50	UG/L
BCVWD - W23	12/21/2012	ARSENIC	< 2	UG/L

Well_Name	Sample Date	Analyte	Concent.	Unit
SMWC - W4	7/14/2014	NITRATE (AS NO3)	13	MG/L
SMWC - W4	7/8/2015	NITRATE (AS NO3)	18	MG/L
SMWC - W4	4/8/2013	NITRITE (AS N)	< 0	MG/L
SMWC - W4	4/11/2016	NITRITE (AS N)	< 0	MG/L
SMWC - W4	4/8/2013	POTASSIUM	< 0	MG/L
SMWC - W4	4/25/2016	POTASSIUM	1	MG/L
SMWC - W4	4/8/2013	SODIUM	62	MG/L
SMWC - W4	4/25/2016	SODIUM	61	MG/L
SMWC - W4	4/8/2013	SPECIFIC CONDUCTANCE	320	US
SMWC - W4	4/12/2016	SPECIFIC CONDUCTANCE	330	US
SMWC - W4	4/8/2013	SULFATE	16	MG/L
SMWC - W4	4/11/2016	SULFATE	16	MG/L
SMWC - W4	8/14/2013	TETRACHLOROETHYLENE	< 0	UG/L
SMWC - W4	8/12/2016	TETRACHLOROETHYLENE	< 0	UG/L
SMWC - W4	4/8/2013	TOTAL DISSOLVED SOLIDS	170	MG/L
SMWC - W4	4/13/2016	TOTAL DISSOLVED SOLIDS	190	MG/L
SMWC - W4	8/14/2013	TRICHLOROETHYLENE	< 0	UG/L
SMWC - W4	8/12/2016	TRICHLOROETHYLENE	< 0	UG/L
SMWC - W4	4/8/2013	TURBIDITY, LABORATORY	< 0	NTU
SMWC - W4	4/11/2016	TURBIDITY, LABORATORY	0.3	NTU
SMWC - W4	4/8/2013	VANADIUM	84	UG/L
SMWC - W4	4/25/2016	VANADIUM	100	UG/L
SMWC - W4	4/8/2013	ZINC	< 0	UG/L
SMWC - W4	4/15/2016	ZINC	< 0	UG/L
YVWD - W48	5/22/2014	ALKALINITY (TOTAL) AS CACO3	140	MG/L
YVWD - W48	7/27/2017	ALKALINITY (TOTAL) AS CACO3	96	MG/L
YVWD - W48	5/22/2014	ALUMINUM	< 0	UG/L
YVWD - W48	7/19/2017	ALUMINUM	< 0	UG/L
YVWD - W48	5/22/2014	ARSENIC	< 0	UG/L
YVWD - W48	7/28/2017	ARSENIC	2.5	UG/L
YVWD - W48	5/22/2014	BICARBONATE ALKALINITY	170	MG/L
YVWD - W48	7/27/2017	BICARBONATE ALKALINITY	75	MG/L
YVWD - W48	5/22/2014	CALCIUM	31	MG/L
YVWD - W48	7/21/2017	CALCIUM	11	MG/L
YVWD - W48	5/22/2014	CARBONATE ALKALINITY	< 0	MG/L
YVWD - W48	7/27/2017	CARBONATE ALKALINITY	21	MG/L
YVWD - W48	5/22/2014	CHLORIDE	12	MG/L
YVWD - W48	7/21/2017	CHLORIDE	8.8	MG/L
YVWD - W48	5/22/2014	CHROMIUM (TOTAL)	< 0	UG/L
YVWD - W48	7/24/2017	CHROMIUM (TOTAL)	< 0	UG/L
YVWD - W48	2/27/2013	CHROMIUM, HEXAVALENT	6.2	UG/L
YVWD - W48	7/17/2017	CHROMIUM, HEXAVALENT	5.8	UG/L
YVWD - W48	5/22/2014	COPPER	< 0	UG/L
YVWD - W48	7/19/2017	COPPER	< 0	UG/L
YVWD - W48	8/21/2012	DIBROMOCHLOROPROPANE (DBCP)	< 0	UG/L
YVWD - W48	9/2/2015	DIBROMOCHLOROPROPANE (DBCP)	< 0	UG/L
YVWD - W48	5/22/2014	FLUORIDE (F) (NATURAL-SOURCE)	0.43	MG/L

Well_Name	Sample Date	Analyte	Concent.	Unit
BCVWD - W23	12/7/2015	ARSENIC	< 2	UG/L
BCVWD - W23	12/7/2015	ARSENIC	< 2	UG/L
BCVWD - W23	12/21/2012	BICARBONATE ALKALINITY	220	MG/L
BCVWD - W23	12/4/2015	BICARBONATE ALKALINITY	210	MG/L
BCVWD - W23	12/8/2015	BICARBONATE ALKALINITY	190	MG/L
BCVWD - W23	12/21/2012	CALCIUM	47	MG/L
BCVWD - W23	12/4/2015	CALCIUM	46	MG/L
BCVWD - W23	12/8/2015	CALCIUM	42	MG/L
BCVWD - W23	12/21/2012	CARBONATE ALKALINITY	< 3	MG/L
BCVWD - W23	12/4/2015	CARBONATE ALKALINITY	< 3	MG/L
BCVWD - W23	12/8/2015	CARBONATE ALKALINITY	< 3	MG/L
BCVWD - W23	12/21/2012	CHLORIDE	11	MG/L
BCVWD - W23	12/3/2015	CHLORIDE	9.9	MG/L
BCVWD - W23	12/4/2015	CHLORIDE	15	MG/L
BCVWD - W23	12/21/2012	CHROMIUM (TOTAL)	5.3	UG/L
BCVWD - W23	12/8/2015	CHROMIUM (TOTAL)	6.3	UG/L
BCVWD - W23	12/8/2015	CHROMIUM (TOTAL)	8.4	UG/L
BCVWD - W23	10/22/2014	CHROMIUM, HEXAVALENT	5.4	UG/L
BCVWD - W23	11/5/2015	CHROMIUM, HEXAVALENT	6.7	UG/L
BCVWD - W23	12/21/2012	COPPER	< 50	UG/L
BCVWD - W23	12/4/2015	COPPER	< 50	UG/L
BCVWD - W23	12/8/2015	COPPER	< 50	UG/L
BCVWD - W23	12/4/2015	DIBROMOCHLOROPROPANE (DBCP)	< 0.01	UG/L
BCVWD - W23	12/4/2015	DIBROMOCHLOROPROPANE (DBCP)	0.028	UG/L
BCVWD - W23	12/21/2012	FLUORIDE (F) (NATURAL-SOURCE)	0.6	MG/L
BCVWD - W23	12/6/2015	FLUORIDE (F) (NATURAL-SOURCE)	0.4	MG/L
BCVWD - W23	12/6/2015	FLUORIDE (F) (NATURAL-SOURCE)	0.3	MG/L
BCVWD - W23	12/21/2012	HARDNESS (TOTAL) AS CACO3	190	MG/L
BCVWD - W23	12/4/2015	HARDNESS (TOTAL) AS CACO3	170	MG/L
BCVWD - W23	12/8/2015	HARDNESS (TOTAL) AS CACO3	170	MG/L
BCVWD - W23	12/21/2012	HYDROXIDE ALKALINITY	< 3	MG/L
BCVWD - W23	12/4/2015	HYDROXIDE ALKALINITY	< 3	MG/L
BCVWD - W23	12/8/2015	HYDROXIDE ALKALINITY	< 3	MG/L
BCVWD - W23	12/21/2012	IRON	< 100	UG/L
BCVWD - W23	12/4/2015	IRON	< 100	UG/L
BCVWD - W23	12/8/2015	IRON	< 100	UG/L
BCVWD - W23	12/21/2012	LEAD	< 5	UG/L
BCVWD - W23	12/7/2015	LEAD	< 5	UG/L
BCVWD - W23	12/7/2015	LEAD	< 5	UG/L
BCVWD - W23	12/21/2012	MAGNESIUM	17	MG/L
BCVWD - W23	12/4/2015	MAGNESIUM	14	MG/L
BCVWD - W23	12/8/2015	MAGNESIUM	15	MG/L
BCVWD - W23	12/21/2012	MANGANESE	< 20	UG/L
BCVWD - W23	12/4/2015	MANGANESE	< 20	UG/L
BCVWD - W23	12/8/2015	MANGANESE	< 20	UG/L
BCVWD - W23	12/9/2016	NITRATE (AS N)	2.8	MG/L
BCVWD - W23	5/24/2017	NITRATE (AS N)	2.4	MG/L

Well_Name	Sample Date	Analyte	Concent.	Unit
YVWD - W48	7/14/2017	FLUORIDE (F) (NATURAL-SOURCE)	0.63	MG/L
YVWD - W48	5/22/2014	HARDNESS (TOTAL) AS CACO3	96	MG/L
YVWD - W48	7/21/2017	HARDNESS (TOTAL) AS CACO3	38	MG/L
YVWD - W48	5/22/2014	HYDROXIDE ALKALINITY	< 0	MG/L
YVWD - W48	7/27/2017	HYDROXIDE ALKALINITY	< 0	MG/L
YVWD - W48	5/22/2014	IRON	< 0	UG/L
YVWD - W48	7/19/2017	IRON	< 0	UG/L
YVWD - W48	5/22/2014	LEAD	< 0	UG/L
YVWD - W48	7/25/2017	LEAD	< 0	UG/L
YVWD - W48	5/22/2014	MAGNESIUM	4.5	MG/L
YVWD - W48	7/21/2017	MAGNESIUM	2.8	MG/L
YVWD - W48	5/22/2014	MANGANESE	< 0	UG/L
YVWD - W48	7/19/2017	MANGANESE	< 0	UG/L
YVWD - W48	9/23/2016	NITRATE (AS N)	1.8	MG/L
YVWD - W48	7/14/2017	NITRATE (AS N)	1.6	MG/L
YVWD - W48	8/21/2012	NITRATE (AS NO3)	7.3	MG/L
YVWD - W48	2/27/2013	NITRATE (AS NO3)	11	MG/L
YVWD - W48	8/15/2013	NITRATE (AS NO3)	9.6	MG/L
YVWD - W48	5/22/2014	NITRATE (AS NO3)	9.9	MG/L
YVWD - W48	8/15/2014	NITRATE (AS NO3)	10	MG/L
YVWD - W48	8/26/2015	NITRATE (AS NO3)	9.9	MG/L
YVWD - W48	5/22/2014	NITRITE (AS N)	< 0	MG/L
YVWD - W48	7/14/2017	NITRITE (AS N)	< 0	MG/L
YVWD - W48	5/22/2014	POTASSIUM	2	MG/L
YVWD - W48	7/21/2017	POTASSIUM	1.5	MG/L
YVWD - W48	5/22/2014	SODIUM	36	MG/L
YVWD - W48	7/21/2017	SODIUM	43	MG/L
YVWD - W48	5/22/2014	SPECIFIC CONDUCTANCE	340	US
YVWD - W48	7/27/2017	SPECIFIC CONDUCTANCE	260	US
YVWD - W48	5/22/2014	SULFATE	16	MG/L
YVWD - W48	7/14/2017	SULFATE	14	MG/L
YVWD - W48	8/21/2012	TETRACHLOROETHYLENE	< 0	UG/L
YVWD - W48	12/13/2015	TETRACHLOROETHYLENE	< 0	UG/L
YVWD - W48	6/26/2016	TETRACHLOROETHYLENE	< 0	UG/L
YVWD - W48	4/23/2012	TOTAL DISSOLVED SOLIDS	170	MG/L
YVWD - W48	8/21/2012	TOTAL DISSOLVED SOLIDS	210	MG/L
YVWD - W48	2/27/2013	TOTAL DISSOLVED SOLIDS	230	MG/L
YVWD - W48	8/15/2013	TOTAL DISSOLVED SOLIDS	200	MG/L
YVWD - W48	5/22/2014	TOTAL DISSOLVED SOLIDS	220	MG/L
YVWD - W48	8/15/2014	TOTAL DISSOLVED SOLIDS	210	MG/L
YVWD - W48	8/27/2015	TOTAL DISSOLVED SOLIDS	210	MG/L
YVWD - W48	9/29/2016	TOTAL DISSOLVED SOLIDS	130	MG/L
YVWD - W48	7/21/2017	TOTAL DISSOLVED SOLIDS	130	MG/L
YVWD - W48	8/21/2012	TRICHLOROETHYLENE	< 0	UG/L
YVWD - W48	12/13/2015	TRICHLOROETHYLENE	< 0	UG/L
YVWD - W48	6/26/2016	TRICHLOROETHYLENE	< 0	UG/L
YVWD - W48	5/22/2014	TURBIDITY, LABORATORY	< 0	NTU

Well_Name	Sample Date	Analyte	Concent.	Unit
BCVWD - W23	6/20/2017	NITRATE (AS N)	2.4	MG/L
BCVWD - W23	7/19/2017	NITRATE (AS N)	2.3	MG/L
BCVWD - W23	8/14/2017	NITRATE (AS N)	2.4	MG/L
BCVWD - W23	9/12/2017	NITRATE (AS N)	2.4	MG/L
BCVWD - W23	11/22/2017	NITRATE (AS N)	2.9	MG/L
BCVWD - W23	12/11/2017	NITRATE (AS N)	2.4	MG/L
BCVWD - W23	12/21/2012	NITRATE (AS NO3)	16	MG/L
BCVWD - W23	6/25/2014	NITRATE (AS NO3)	15	MG/L
BCVWD - W23	12/3/2015	NITRATE (AS NO3)	10	MG/L
BCVWD - W23	12/4/2015	NITRATE (AS NO3)	10	MG/L
BCVWD - W23	12/21/2012	NITRITE (AS N)	< 100	MG/L
BCVWD - W23	12/2/2015	NITRITE (AS N)	< 100	MG/L
BCVWD - W23	12/3/2015	NITRITE (AS N)	< 100	MG/L
BCVWD - W23	12/4/2015	POTASSIUM	1.6	MG/L
BCVWD - W23	12/8/2015	POTASSIUM	1.7	MG/L
BCVWD - W23	12/21/2012	SODIUM	18	MG/L
BCVWD - W23	12/4/2015	SODIUM	24	MG/L
BCVWD - W23	12/8/2015	SODIUM	19	MG/L
BCVWD - W23	12/21/2012	SPECIFIC CONDUCTANCE	420	US
BCVWD - W23	12/4/2015	SPECIFIC CONDUCTANCE	410	US
BCVWD - W23	12/4/2015	SPECIFIC CONDUCTANCE	390	US
BCVWD - W23	12/21/2012	SULFATE	19	MG/L
BCVWD - W23	12/3/2015	SULFATE	16	MG/L
BCVWD - W23	12/4/2015	SULFATE	13	MG/L
BCVWD - W23	12/21/2012	TETRACHLOROETHYLENE	< 0.5	UG/L
BCVWD - W23	12/4/2015	TETRACHLOROETHYLENE	< 0.5	UG/L
BCVWD - W23	12/4/2015	TETRACHLOROETHYLENE	< 0.5	UG/L
BCVWD - W23	12/21/2012	TOTAL DISSOLVED SOLIDS	300	MG/L
BCVWD - W23	12/4/2015	TOTAL DISSOLVED SOLIDS	180	MG/L
BCVWD - W23	12/8/2015	TOTAL DISSOLVED SOLIDS	250	MG/L
BCVWD - W23	12/21/2012	TRICHLOROETHYLENE	< 0.5	UG/L
BCVWD - W23	12/4/2015	TRICHLOROETHYLENE	< 0.5	UG/L
BCVWD - W23	12/4/2015	TRICHLOROETHYLENE	< 0.5	UG/L
BCVWD - W23	12/21/2012	TURBIDITY, LABORATORY	0.44	NTU
BCVWD - W23	12/3/2015	TURBIDITY, LABORATORY	< 0.1	NTU
BCVWD - W23	12/4/2015	TURBIDITY, LABORATORY	< 0.1	NTU
BCVWD - W23	12/21/2012	ZINC	< 50	UG/L
BCVWD - W23	12/4/2015	ZINC	< 50	UG/L
BCVWD - W23	12/8/2015	ZINC	< 50	UG/L

Well_Name	Sample Date	Analyte	Concent.	Unit
YVWD - W48	7/13/2017	TURBIDITY, LABORATORY	0.4	NTU
YVWD - W48	5/22/2014	VANADIUM	25	UG/L
YVWD - W48	7/26/2017	VANADIUM	90	UG/L
YVWD - W48	5/22/2014	ZINC	< 0	UG/L
YVWD - W48	7/19/2017	ZINC	< 0	UG/L

Director Comments

Yucaipa Valley Water District

Adjournment

Yucaipa Valley Water District

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
62 full time employees

Operating Budget:
Water Division - $13,397,500
Sewer Division - $11,820,000
Recycled Water Division - $537,250
Total Annual Budget - $25,754,750

Number of Services:
12,434 water connections serving 17,179 units
13,559 sewer connections serving 20,519 units
64 recycled water connections

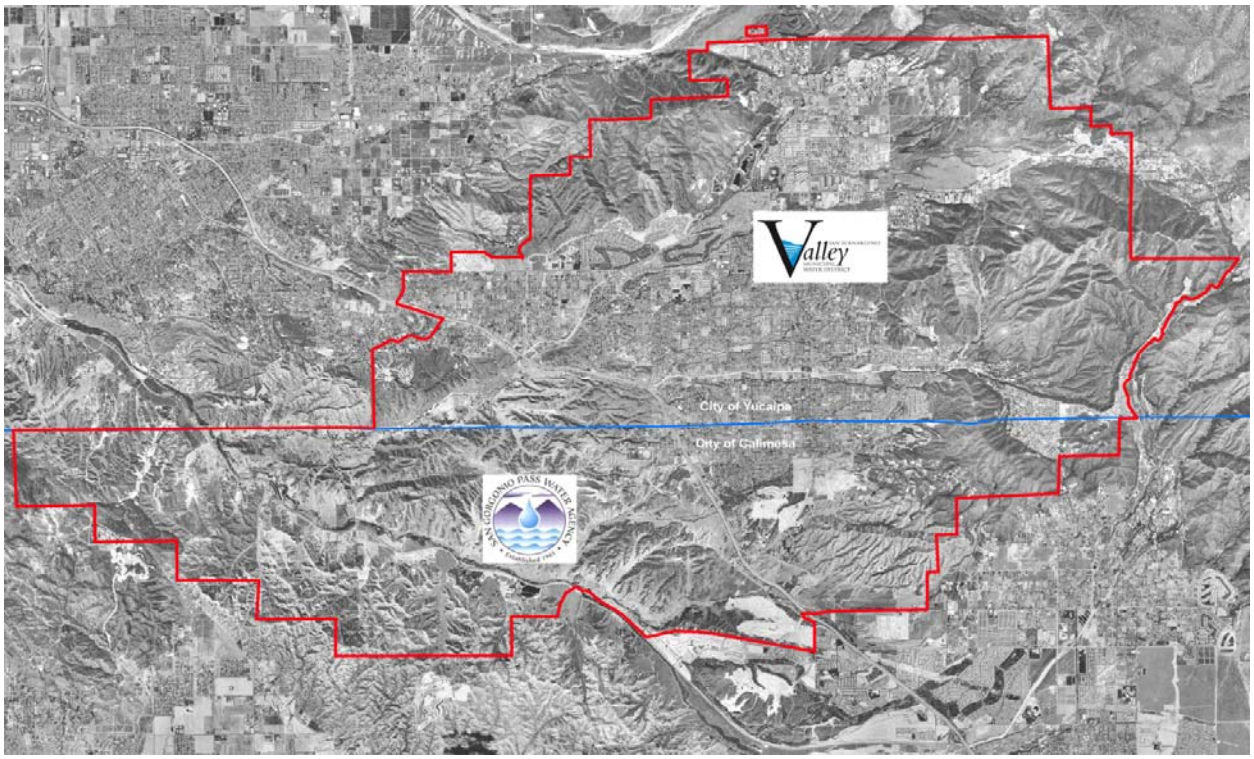
Water System:
215 miles of drinking water pipelines
27 reservoirs - 34 million gallons of storage capacity
18 pressure zones
12,000 ac-ft annual water demand (3.9 billion gallons)
Two water filtration facilities:
- 1 mgd at Oak Glen Surface Water Filtration Facility
- 12 mgd at Yucaipa Valley Regional 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)

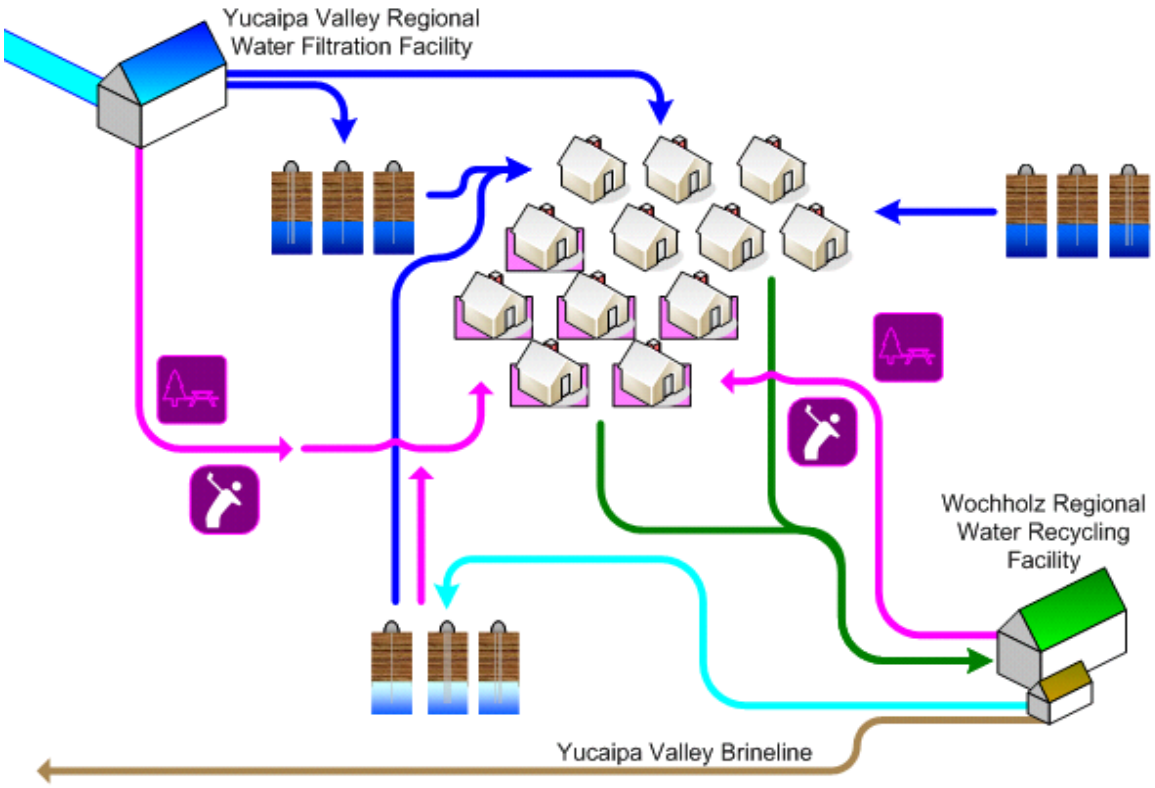
Recycled Water:
22 miles of recycled water pipelines
5 reservoirs - 12 million gallons of storage
1,200 ac-ft annual recycled demand (0.4 billion gallons)

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

State Water Contractors: San Bernardino Valley Municipal Water District
San Gorgonio Pass Water Agency



Sustainability Plan: A Strategic Plan for a Sustainable Future: The Integration and Preservation of Resources, adopted on August 20, 2008.



Yucaipa Valley Water District

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).

Yucaipa Valley Water District

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.

Yucaipa Valley Water District

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