

Janis Eckard
15417 De La Cruz Drive
Rancho Murieta, Ca. 95683

February 15, 2010

Rancho Murieta Community Services District
Board of Directors and Mr. Michael Fritschi, Interim General Manager
15160 Jackson Road
Rancho Murieta, Ca. 95683

Dear Board Members and Mr. Fritschi,

The Rancho Murieta CSD decision makers have a critical question to answer. In light of the fact that the most recent survey of Rancho Murieta's reservoirs disclose less water storage than originally believed, "Does Rancho Murieta's water supply system have sufficient capacity to sustain the existing community and also accommodate currently approved and proposed residential and commercial development which are dependent on Rancho Murieta as their only water source?"

Adding to the complexity of the matter is the need to plan for any impact of state regulations that may further restrict CSD's future water extractions from the Consumes River at a time when no viable alternative water supply has been identified to support the Rancho Murieta community.

Making the matter even more challenging, based on public information, including documents obtained under the Freedom of Information Act, I have discovered numerous water studies completed by the CSD that contain findings that are unduly questionable and are not supported by subject expert peer review.

From 1990 to present, the CSD has incorporated predetermined developer assumptions into their studies and those assumptions have been challenged as not being realistic. Further, it gives the appearance that CSD's use of these assumptions were influenced by threats of developer litigation. (Documents from experts supporting this position are attached.)

This pertinent information is being presented to the Rancho Murieta CSD Board and the public it serves, because it is imperative that the CSD produce an objective Integrated Water Master Plan based on concrete scientific facts and realistic assumptions. Rancho Murieta residents have a right to expect nothing less and need to be assured that there is and will continue to be an adequate water supply for our community.

Sincerely,

Janis Eckard

Cc: RMA Board of Directors and General Manager
Murieta Village Association, Board of Directors and Association Manager
Murieta Townhouses, Inc., Board of Directors and Association Manager
Country Club Villas Homeowners Association, Board of Directors and Association Manager
John Merchant, former CSD Board President
Director Dr. Tomas Aragon, California Department of Public Health
Chairman E. Joaquin Esquivel - State Water Resources Control Board
Chairman Karla Nemeth - California Department of Water Resources
Leighann Moffitt, AICP, Director - Sacramento County Planning and Environmental Review

Photographs taken of Lake Calero and Lake Chesbro in January 2010. At the time these pictures were taken, I e-mailed Ed Crouse and asked how much water had been pumped from The Cosumnes River since November 1, 2009. His answer was 206 acre feet. During the 1976-1977 drought, Rancho Murieta diverted 277 acre feet (slightly more than the level shown in these pictures.) Additional houses equal increased water demand and lower lake levels.



This picture of Lake Calero was taken while standing on the dry lake bed.

Lake Chesbro Photographs, taken January 2010.



Lower Photo taken while standing on the dry lake bed.

This photograph of the Cosumnes River (dry riverbed) was taken while standing on the Dillard Road bridge, located near Jackson Highway. Rancho Murieta's water permit contains the following restriction: Rancho Murieta cannot pump water unless there is a continuous visible surface flow in the bed of the Cosumnes River from the Rancho Murieta pumping station to the gaging station at Highway 99 known as "Cosumnes River at McConnell." During the 1976-1977 drought years total available river water supply was reduced to 277 acre-feet. As a point of comparison the 2006 IWMP states that Rancho Murieta's total estimated water supply need is 2,633 acre-feet per year. The Cosumnes River is Rancho Murieta's only source of water and yet none of the past CSD water studies have addressed river flow changes that could impact the community's ability to pump water, in the future.



Per the Nature Conservancy: "One of the findings of research on the Cosumnes over the past decade is that the Cosumnes River has been significantly impacted by ground water withdrawal over the past century. Reports of conditions at the beginning of the last century show that the Cosumnes was at that time a "gaining" river, or one that received input of water from ground water. With the creation of the Elk Grove and Galt area "cones of depression," the Cosumnes has increasingly become a "losing" river or one that loses surface flow to groundwater. A consequent of this change is the the river ceases flowing earlier in the year, stays dry longer into the Fall, and drier over an increasingly long reach, compared to historic conditions. Because the number of days that the river is dry each year has increased over time, it takes significantly more surface flow from the upper watershed to connect the Cosumnes River to the Delta."

3.1.2 Historical Flow Patterns

Cosumnes River flows are primarily the result of winter storms, with limited seasonal snow melt. Only about 16% of the watershed lies above the typical snow-level elevation of 5,000 feet. Consequently, only a small portion of the upper reaches of the watershed receive significant snowfall, and the flow regime of the river is influenced primarily by rainfall.

Historically, below Highway 16 (river mile [RM] 33), the Cosumnes was hydraulically connected to the regional groundwater aquifer, making this segment of the river a “gaining river.” The lack of precipitation during the summer reduced flows in the valley segment to near zero. However, the input of groundwater to the river channel historically kept the channel and associated wetland areas wet throughout the summer for the entire length of the river. Over the past 60 years, groundwater pumping has reduced groundwater levels in the valley segment, leading to a decline of groundwater input to the river and eventually making the river a “losing river.” The groundwater table underlying the Cosumnes has fallen as much as 60 feet in some areas and has become disconnected from the river channel in this valley segment. Mount et al. (2001) estimated that the seepage loss from the Cosumnes River on the valley floor is on the order of 1–2 cubic feet per second (cfs) per river mile

Declining groundwater levels have caused the Cosumnes River to become completely dewatered from Highway 16 downstream to the tidally influenced reach of the river, below Twin Cities Road, during the summer and fall in all but the wettest years. A comparison of historical data from the USGS gauges at Michigan Bar (RM 36) and McConnell (RM 11) from 1941 to 1982 suggest that flow volumes in the valley segment of the Cosumnes have steadily decreased, despite no appreciable change in precipitation. Mount et al. (2001) showed that the number of days per year with average daily flows below 10 cfs at McConnell (downstream) has increased more than at Michigan Bar (upstream) from 1941 to 1982, indicating that flows losses between these two gauges has increased. Mount linked these losses to declining groundwater levels, which decreased and ultimately eliminated baseflow contribution from the regional groundwater aquifer to the Cosumnes River channel.

The historical average daily flow of the Cosumnes River at Michigan Bar is shown in Figure 3-3 for water years 1960–2004. The Michigan Bar gauge is located at river mile 33, where the river transitions from a bedrock-confined channel of the foothills to a broader channel on the low gradient alluvial floodplain. The average monthly flow pattern of the Cosumnes River is shown in Figure 3-4 and Table 3-1 provides the average monthly flow by water year type for the 1960–2004 period of record. The information presented in these figures and table shows that flows in August through October are typically below 30 cfs. When flows fall below 30 cfs at Michigan Bar, the Cosumnes River is generally dry below Highway 16 because of groundwater seepage and evaporation.

Managing Surface Water-Groundwater to Restore Fall Flows in the Cosumnes River

Jan Fleckenstein¹; Michael Anderson²; Graham Fogg³; and Jeffrey Mount⁴

Abstract: Declining fall flows are limiting the ability of the Cosumnes River to support large fall runs of Chinook salmon. Management scenarios linking surface water and groundwater alternatives to provide sufficient fall flows are examined using groundwater flow and channel routing models. Results show that groundwater overdraft in the basin has converted the river to a predominantly losing stream, practically eliminating base flows. Management alternatives to increase net recharge (for example, pumping reductions) were examined along with surface water augmentation options. Using a minimum depth standard for fish passage, average surface water flow deficits were computed for the migration period of Chinook salmon. Groundwater deficits were evaluated by comparing simulated current groundwater conditions with conditions under various scenarios. Increases in net recharge on the order of 200 to 300 million m³/year would be required to reconnect the regional aquifer with the channel and in turn reestablish perennial base flows. Options that combine surface water augmentation with groundwater management are most likely to ensure sufficient river flows in the short term and to support long-term restoration of regional groundwater levels.

DOI: 10.1061/(ASCE)0733-9496(2004)130:4(301)

CE Database subject headings: Surface waters; Ground water; Restoration; California; Rivers; Base flow.

Introduction

The Cosumnes River in Sacramento County, California, has historically supported a large fall run of Chinook salmon (the word "Cosumnes" derives from the Miwok word for salmon). An early study by the California Department of Fish and Game (CDFG) [1957, cited in USFWS (1995)], estimated that the river could support up to 17,000 returning salmon under suitable flow conditions. Over the past 40 years fall runs ranged from 0 to 5,000 fish according to fish counts by the CDFG (USFWS 1995). In recent years, estimated fall runs have consistently been below 600 fish (Keith Whitener, researcher, Nature Conservancy of California, personal communication). Declines in fall flows have been identified as a major inhibitor of successful Chinook salmon spawning in the Cosumnes (TNC 1997) and in other California rivers (Drake et al. 2000). Fall flows in the Cosumnes have been so low in recent years that the entire lower river has frequently been completely dry throughout most of the salmon migration period (October to December). Previous investigations of stream-aquifer interactions along the lower Cosumnes River (river-km 0–58)

suggest that loss of base flow support as a result of groundwater overdraft is at least partly responsible for the decline in fall flows (Fleckenstein et al. 2001). Increased groundwater withdrawals in the Sacramento basin since the 1950s have substantially lowered groundwater levels throughout the county. Major cones of depression in the water table have formed north and south of the Cosumnes River with groundwater levels as low as 24 m below mean sea level at their center. Management strategies that address existing groundwater and surface water deficits are needed to promote Chinook salmon fall runs. This study quantifies these deficits by means of numerical simulations of groundwater and surface water flow, investigates potential remedies for extended low flow conditions in the Cosumnes River, and identifies, additional analysis needs.

Related Work on Groundwater–Surface-Water Interactions

Although early work in hydrology emphasized the linkages between surface water and groundwater (Theis 1941; Rorabaugh 1964), water managers have long looked at groundwater and surface water as two separate entities. With increasing development of land and water resources, however, the understanding that development of either of these resources will affect the quantity and quality of the other has gained importance (Winter et al. 1999). This understanding has resulted in a large body of literature on groundwater-surface water interactions and their ecological, economic, and legal implications. Comprehensive reviews of that literature are given by Winter (1995), Woessner (2000), and Sophocleous (2002). Bouwer and Maddock (1997) outline some of the legal ramifications of groundwater-surface water interactions; Glennon (2002) describes a series of case studies where groundwater use has negatively affected surface water; and theoretical considerations of river-aquifer interactions and their mathematical formulation are discussed in Kaleris (1998) and Rushton and Tomlinson (1979).

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Note. Discussion open until December 1, 2004. Separate discussions must be submitted for individual papers. To extend the closing date by one month, a written request must be filed with the ASCE Managing Editor. The manuscript for this paper was submitted for review and possible publication on January 24, 2003; approved on July 3, 2003. This paper is part of the *Journal of Water Resources Planning and Management*, Vol. 130, No. 4, July 1, 2004. ©ASCE, ISSN 0733-9496/2004/4-301-310/\$18.00.

**1989 - 2010 Rancho Murieta Community Service District
Water Studies
Assumptions and Capacity Conclusions:**

1) Analysis of Rancho Murieta Water Supply, May 22, 1989, Giberson & Associates.
The existing raw water supply could safely serve **1800 Dwelling Units**

2) Draft Rancho Murieta Community Services District Policy Statement 89-____,
District Water Supply
The existing raw water supply has the capacity of serving only approximately
2400 Dwelling Units.

3) Rancho Murieta Water Supply: Planning for Future Droughts, Giberson &
Associates, February 1990 - The raw water supply capacity is **3,951 EDU.**
(Equivalent Dwelling Units are established for planning purposes, to estimate the number
of gallons per day water usage of the average home.)

**Assumptions agreed upon between the Developers and CSD, used in this and
future studies.**

- A) Assumes a 50% usage reduction, during sever drought conditions (states
significant financial loss, to the community, will occur under these restrictions).
- B) Assumes a reduces water allocation for future lots over 12,000 sq. ft.
- C) Assigns a preset water usage allocation (EDU Factor), to all lots based on size
(rather than using the industry standard EDU).
- D) The water supply system would meet 100% of the standard water consumption
requirement during a water year equivalent to the 1923-24 water year

4) April 27, 1990, Supplemental Report, Rancho Murieta Water Supply: Planning for
Future Droughts, Giberson & Associates

Page 6 of the report states: "It is interesting to note that the projected total
number of EDU that can be safely supported by the District's existing water
supply is significantly larger using the **Developer Assumptions (4,730 EDU vs
3,951 EDU)**. This may seem a bit unusual since the only way to increase the
number of EDU that can be safely supported is by increasing the capacity of the
system."

The developer assumptions referred to are:

- 1) Reliance on the flashboard capacity of the reservoirs - added storage capacity to
serve additional EDU.
- 2) Elimination of park irrigation during severe droughts - this frees up some capacity to
serve additional EDU.
- 3) Reduction in the allowance for system losses - this frees up some capacity to serve
additional EDU.

**(Note: All three developer assumptions Mr. Giberson referred to that give
the appearance of increased capacity, without safely increasing the water
supply, are utilized in the 2010 Integrated Water Master Plan Update.**

- 5) Rancho Murieta South Projects, Response to Request for Information Regarding Availability of Water, Prepared by Giberson & Associates, April 27, 1992.

This study states the capacity of the water supply is **4206 EDU's** and refers to the **Developer preset water usage allocation as a "Hybrid" EDU and not a TRUE equivalent EDU. (TRUE EDU's are based on actual usage numbers and not preassigned developer figures.)**

- 6) **Rancho Murieta Community Services District Integrated Water Master Plan - Administrative Draft Version 2 for Review only, July 2006.**

(I did not review the Final Report, but believe there were no alterations.)

Assumptions:

- A) 50% usage reduction (mandatory shut off of all exterior water for 15 months, Including elimination of park irrigation during severe droughts.)
- B) All prior studies assumed a 25% evaporation/seepage rate (water that is lost to evaporation and that seeps out of the lakes, into the ground). The 2006 Draft IWMP applies a 20% rate (and uses the Folsom gauging station evaporation pan, rather than the DWR recommended Davis pan.)
- C) Study uses a 9% system loss rate (water lost through broken pipes, etc.) The 1990 Giberson study specifically states a low 10% system loss rate was utilized, due to the system's relatively new age. Thirty-three years have passed since that report was created. Would an older system be more prone to leakage, rather than less?
- D) All future lots over 12,000 sq. ft. are assumed to have a reduced water allocation.
- G) Study states that dramatic lake level fluctuations would occur and recreational lake usage would be eliminated. (It should be noted that Lake Clementia's capacity is used in the study but has not been permitted for drinking water purposes.)
- I) Water augmentation (emergency water) trigger point is missing from the report.

Note: Rancho Murieta has been without an emergency backup water supply ever since the original plan failed during the 1976-77 drought.

*** It should also be noted that discrepancies appear to be present in the report:

- 1) Heavy rainfall year totals were used when estimating normal precipitation conditions.
- 2) Actual Golf course recycled water usage numbers (found in RMCC invoices) are different than the numbers used in the report.
- 3) Study water usage numbers include vacant lots and vacant homes.
- 4) Actual water usage is underestimated (when comparing actual RMA and RMCC invoices to the study numbers).

- 7) **Draft 2010 Integrated Water Master Plan Update**

(I did not review the final report, but believe it was approved without alterations)

- A) **Assumes a 20% reduced water allocation by the year 2020 (in compliance with the state mandate), in addition to the 50% conservation level** (which includes eliminating park irrigation during drought conditions, mandatory shut off of all landscape water in addition to reduced household usage.) Study does not quantify estimated losses associated with this consumption level.

- B) The analysis uses a reduced 20% evaporation/seepage rate and the Folsom gauging station evaporation pan, verses the Department of Water Resources recommended Davis pan.
- C) The study used a reduced 9% system loss rate. The 1990 Giberson analysis states a 10% loss rate was used because the system was relatively new, and less prone to leakage. Years have passed and the RMCS D is using a REDUCED loss rate for an aging system.
- C) The study does not include the capacity of the system.
- D) Report relies on the reservoir flash board/stop log capacity (temporary boards installed at the spillways to raise lake levels).

The flashboard capacity of all three lakes is approximately 1,000 acre feet of water, nearly half of RM's annual water consumption. When you combine the reservoir flashboard restrictions and water permit pumping restrictions, that capacity can only be filled between April 16th and May 31st. Just six weeks to pump almost half of RM's annual water usage. Lake Clementia's flashboard capacity is included, even though Lake Clementia is not permitted for drinking water purposes.

- E) The study lacks a trigger point when extreme conservation levels must be administered.
- F) Heavy rainfall year usage totals were used when calculating normal precipitation conditions.
- G) On-site wells are identified as the only possible solution for added supply. However, wells have been studied and deemed unfeasible, in Rancho Murieta.

The CSD Public Review Draft 2020 Compliance Plan - August 4, 2010

Assumes all future developer lots will use recycled water for irrigation purposes.

The Rancho Murieta Country Club recycled water needs exceed the current supply during normal and dry conditions, and must be supplemented with river water or water drawn from Lake Clementia.

- 1) The California Department of Public Health letters, to the CSD, dated October 5, 2010 and November 16, 2012 list problems associated with this assumption: a) the numbers utilized in the study do not meet Title 22 regulations and b) there are logistical environmental/safety issues and significant costs associated with this assumption, that must be addressed before recycled water could be used in a residential setting.

Several years ago, expanding the treatment plant to accommodate the developer homes was projected to cost 11.5 million dollars (75% of this expense would be paid by existing residents). Since that estimate was established, costs have increased dramatically.

Compliance with 2020 requirements are expected to reduce treated water supply by 8%.

It takes the waste water from two homes to generate enough treated waste water to supply the irrigation needs of one home. Can the CSD ensure there will be enough recycled water to supply "ALL future developer lots," in addition to meeting the Rancho Murieta Country Club needs?

2010 Integrated Water Master Plan (IWMP) Assumptions that are a concern and the experts who support those concerns.

A) The 2010 Integrated Water Master Plan (IWMP)

Assumes a 20% reduced water allocation by the year 2020 (in Compliance with the state mandate SB7), IN ADDITION TO the 50% conservation level, during drought conditions. This assumption is the mandatory shut off of all exterior water, in addition to reduced household usage and assumes that all park irrigation will be eliminated during drought conditions.

(The 50% conservation level and eliminating of park irrigation were established by agreement with the developers in 1990.)

There is a significant difference between responding to an existing drought (with drastic measures) and actually planning to create a community water deficit.

It should also be noted that the 2010 study does not quantify the financial losses the community would incur if subjected to the above mentioned conservation measures.

Supporting Expert Opinions:

1) January 4, 2010 West Yost Associates - Technical Memorandum (Attached)

This is a Sacramento County ordered peer review of the CSD studies, after concerns were presented to the Board of Supervisors regarding aggressive assumptions found in the CSD studies. It should be noted that \$200,000.00 was allocated for this review, which was conducted in the Spring of 2009, prior to completion of the 2010 IWMP. Even though the CSD had a copy of the peer review concerns, they are not addressed in the 2010 IWMP and the 2010 IWMP assumptions are even more aggressive, than those mentioned in this analysis.)

- a) Quote: "Drought Planning assumes an aggressive drought rationing target of 50% percent. If this program is not achieved there may not be enough supply to serve the community during a severe drought scenario."

2) The October 5, 2010 letter to the RMCSO, from the California Department of Public Health: (Attached)

Quote: "The IWMPU concludes that Calero and Chesboro reservoirs are capable of meeting the community's water supply needs under severe drought conditions; with the caveat *"provided the water use in the community is reduced 50 percent AND (emphasis added) and the 2020 compliance targets are achieved."* SB7 requires 20% reduction in water use by 2020 in urban areas. **It is not reasonable to assume that the community will be able to achieve both a 20% and then an additional 50% reduction."**

3) Richard Brandt (CSD's former attorney and former CSD Board President)

Letter dated May 13, 2009 and letter dated August 12, 2010, written to the Board Members and Ed Crouse. (Attached)

Quote: "... I believe it is a mistake to use the 50% conservation rate to determine the size of the water supply needed for Rancho Murieta, as the last IWMP appears to do. Using the 50% for that purpose is the equivalent of planning to subject Rancho Murieta residents to the economic damage that the 50% rate will inevitably cause ..."

Richard Brandt's Aug. 12, 2010 letter explains that he was the CSD Board President who signed the CSD/Developer agreement requiring a 50% drought usage reduction rate. Mr. Brandt made several critical statements in that letter. First, he states that the 50% drought usage reduction rate was established to settle a dispute between the developers and the CSD to determine who would bear the expense of expanding the water supply. Second, the 50% usage reduction rate was never intended to set water policy, for future development. Third, and most important, the agreement expired in 2006 and is no longer binding on the CSD or the Developers.

Mr. Brandt also states that Rancho Murieta has been without an emergency back up water supply since the original emergency plan failed during the 1976-77 drought.

NOTE: The West Yost Associates analysis and letters from Richard Brandt, do not address the additional 20% conservation rate, because their analysis and letters were completed prior to the finalization of the 2010 IWMP.

B) Report relies on the reservoir flash board/stop log capacity (Permits attached)

Per the report, the flashboard capacity of all three lakes is approximately 1,000 acre feet of water, nearly half of RM's annual water consumption.

When you combine the reservoir flashboard restrictions and water permit pumping restrictions, the flashboard capacity can only be filled between April 16th and May 31st. Just six weeks to pump nearly half of RM's current annual water usage.

Supported by:

- 1) Page 6 of the April 27, 1990, Supplemental Report, Rancho Murieta Water Supply: Planning for Future Droughts, Giberson & Associates, (Attached) addresses three developer assumptions (including use of the reservoir's flashboard capacity) that only give the appearance of additional water supply. Quote: "This may seem a bit unusual since the only way to increase the number of EDU that can be safely supported is by increasing the capacity of the system."

NOTE: All three developer assumptions that give the appearance of increased water availability without actually increasing the capacity of the system were used in the 2006 and 2010 IWMPs.

- 2) Although it is common practice for water districts to utilize flashboards/stop logs (temporary boards placed in the spillways to raise lake levels) in the course of normal business, an email - dated July 16, 2010 - sent to me from

the California Department of Public Health, states, (Quote) "Using flashboard capacity is not an acceptable practice to use when planning any community or development." It was explained that this practice is not acceptable because flashboards are temporary in nature and there is a narrow pumping window to fill that capacity.

It should also be noted that since the 2010 study was completed, there have been years when the flashboards capacity could not be filled, as a result of insufficient river water flow and pumping equipment problems. In March of 2015 a variance was required (and pumping was started prior to receipt of that variance) to fill this capacity. (See attached photos.)

C) The study does not address changes in the Cosumnes River (Rancho Murieta's only source of water) that could impact future pumping.

Rancho Murieta's water permit contains minimum Cosumnes River flow requirements and prohibits pumping unless there is a continual, visible above-ground flow from the Michigan Bar pumping station - located near Rancho Murieta - to the McConnell pumping station, located near Highway 99. Ground water depletion is forcing the river to flow underground in at least two locations between these two stations. Additional, future downstream development will exacerbate this problem.

Supporting Cosumnes River flows studies can be found online, including:

- 1) UC Davis Study - Managing Surface Water-Groundwater to restore fall Flows in the Cosumnes River - August 2004
- 2) Nature Conservancy Study, Page 12 of the December 2006, Lower Cosumnes River Watershed Assessment - Attached - Quote: "The Cosumnes River has been significantly impacted by ground water withdrawal over the past century. Reports of conditions at the beginning of the last century show that the Cosumnes was at that time a "gaining" river, or one that received input of water from groundwater. Development downstream from Rancho Murieta has created "cones of depression," causing the Cosumnes to become a "losing" river, or one that loses surface flow to groundwater. Because of the number of days that the river is dry each year has increased over time, it takes Cosumnes River to the Delta."

D) On-site wells are identified as the only possible solution for added supply
Wells have been studied and deemed unfeasible, in Rancho Murieta.

- 1) A RM CSD 1988 well study states, (Quote:) "Rancho Murieta is underlain by Mesozoic metamorphic rocks which have little to no potential for ground water development." The study goes on to say, "Based upon the noted geologic setting in the vicinity of Rancho Murieta, and the lack of deep alluvium in the region, it is recommended that ground water development be restricted to the shallow alluvium along the Cosumnes River." However, the Department of Public Health has stated that if a well is located close to the river and found to contain river water, those findings could violate RM's Cosumnes River surface water pumping permit.

E) The study utilizes Lake Clementia's storage capacity - Lake Clementia is a recreational lake and not permitted for drinking water purposes.

- 1) California Department of Public Health, letter dated October 5, 2010.
Quote: "The IWMPU also appears to include all three reservoirs as

permitted sources of drinking water. This is incorrect. Clementia is not presently authorized to be used as a source of public drinking water. If the RMCS D wishes to have it considered as such, the body contact recreation would most likely have to be prohibited.

- 2) Richard Brandt's May 13, 2009 letter to the CSD Board states, (Quote) "Lake Clementia is a Recreational Water Lake and May Not Be Includable In The Domestic Water Supply. Of all the assumptions that affect the calculation of the water supply shortfall, the one that has the greatest impact is the assumption that Clementia is a domestic water supply lake."

The CSD Public Review Draft 2020 Compliance Plan - August 4, 2010

Assumes ALL future developer lots will use recycled water for irrigation purposes.

The Rancho Murieta Country Club recycled water needs exceed the current supply during normal and dry conditions, and must be supplemented with river water or water drawn from Lake Clementia.

- 1) The California Department of Public Health letters, to the CSD, dated October 5, 2010 and November 16, 2012 list problems associated with this assumption: a) the numbers utilized in the study do not meet Title 22 regulations and b) there are logistical environmental/safety issues and significant costs associated with this assumption, that must be addressed before recycled water could be used in a residential setting.

Several years ago, expanding the treatment plant to accommodate the developer homes was projected to cost 11.5 million dollars (75% of this expense would be paid by existing residents). Since that estimate was established, costs have increased dramatically.

Compliance with 2020 requirements are expected to reduce treated water supply by 8%.

It takes the waste water from two homes to generate enough treated waste water to supply the irrigation needs of one home. Can the CSD provide sufficient recycled water for ALL future developer lots, addition to meeting RMCC needs?

Additional assumptions that should to be incorporated into the 2023 IWMP:

- 1) Address the new law, Senate Bill 9 or "Duplex Bill" that allows Accessory Dwellings on single family lots, and how this change will impact the existing water supply capacity.
- 2) Modify the reservoir storage capacity figures to reflect recent survey findings and determine how much building future homes around the lakes will diminish runoff water capacity.
- 3) Have study address ALL omissions and concerns raised in the January 4, 2010 West Yost Technical Memorandum, the Oct. 5, 2010 and Nov.16, 2012 letters from the California Department of Public Health and comply with Title 22 requirements.
- 4) The 2006 and 2010 IWMPs both use a reduced evaporation/seepage rate and a reduced systems loss rate, compared to all prior RM CSD studies. Make sure that these rates are supported by actual numbers and that the evaporation/seepage pan utilized is the one recommended by the Department of Water Resources.
- 5) Use an industry standard EDU Factor when calculating the daily water usage numbers, rather than the "Hybrid" developer EDU.

SUPPLEMENTAL REPORT

RANCHO MURIETA WATER SUPPLY:
PLANNING FOR FUTURE DROUGHTS

APRIL 27, 1990

Prepared By:

GIBERSON & ASSOCIATES
Planning Engineering Project Management
11246 Gold Express Drive, Suite 101
Sacramento, CA 95670
(916) 638-4060

It is interesting to note that the projected total number of EDU that can be safely supported by the District's existing water supply system is significantly larger using the Developer Assumptions than the Report Assumptions (4,730 EDU vs. 3,951 EDU). This may seem a bit unusual since the only way to increase the number of EDU that can be safely supported is by increasing the capacity of the system.

Several of the Developer Assumptions have the effect of increasing the capacity of the system. The significant assumptions are as follows:

1. Reliance on the flashboard capacity of the reservoirs - added storage capacity to serve additional EDU.
2. Elimination of park irrigation during severe droughts - this frees up some capacity to serve additional EDU.
3. Reduction in the allowance for system losses - this frees up some capacity to serve additional EDU.

In addition, the minimum volume of water left in storage in the 4,730 EDU water budget calculation was approximately 80 AF less than the volume left in storage in the 3,951 AF water budget calculation. This had the minor effect of increasing the number of EDU that can be safely supported by the existing system.

Marion, one significant question remains unanswered at this time...

What binding restriction exists to assure that the level of development within the Rancho Murieta Planned Development will not exceed the 5,340 EDU ceiling sometime in the future?

While none exists at this time, perhaps such a restriction will be forth coming from the development community prior to the District's final action on the proposed District Water Policy. In the absence of such a restriction, it is only prudent and proper that the District's water supply system be designed to meet the maximum level development authorized by the County of Sacramento approved P.D. Ordinance for Rancho Murieta (approximately 5,968 EDU).

Richard E. Brandt
6330 Agua Vista
Rancho Murieta, CA. 95683

August 12, 2010

Board of Directors
Rancho Murieta Community Services District
Ed Crouse, General Manager
15160 Jackson Highway
Rancho Murieta, CA. 95683

Re: Water Policy

Dear Board Members and Ed,

At the July 21, 2010 meeting of the Rancho Murieta Community Services District (CSD) Board, I expressed my view that I think it would be a mistake for the CSD to adopt a 50% drought conservation standard for the Integrated Water Management Plan (IWMP) currently under review. As I explained, I agree that the CSD needs to plan, as required by state law, for how Rancho Murieta would achieve a 50% conservation rate if forced by circumstances to do so. But I believe it is a mistake to use the 50% conservation rate to determine the size of the water supply needed for Rancho Murieta, as the last IWMP appeared to do. Using the 50% for that purpose is the equivalent of planning to subject Rancho Murieta residents to the economic damage that the 50% rate will inevitably cause in the event of a repeat of the 1977 drought. I realized at the meeting that the issue involved too much history and detail to express my view in a short oral presentation. For that reason, I am sending this letter to explain why I oppose the 50% drought conservation rate.

The 50% conservation rate was first established by CSD Policy 90-2. The policy was adopted by the CSD to make sure that before Rancho Murieta was built-out a solution was found for the inadequacy of the water supply that was disclosed by the 1977 drought. The 1977 drought made clear that the water stored in Rancho Murieta's lakes was not adequate to serve the built-out community if such a drought occurred again and that the planned emergency water supply, the release of water held by the El Dorado Irrigation District (EID) in Sly Park Reservoir to the Cosumnes River, would not work. During the drought, EID did not have the needed water in the Sly Park reservoir, and, if it had, the released water would not have reached Rancho Murieta.

In the context of this problem, Policy 90-2 had three purposes. The first was to establish a limit on the amount of development the CSD could agree to serve before declaring that the remaining water in the Rancho Murieta lakes was required to be kept as

the drought or emergency water supply for existing residents. The second was to determine the amount of additional water that was needed for Rancho Murieta at build-out. The third was to establish the policy that new development, beginning in 1990, would be required to bear the costs and risks of obtaining the supplemental water supply needed to serve the development that had been authorized by the Sacramento County Planned Development Ordinance (PD Ordinance) for Rancho Murieta to the extent it exceeded the limit proposed by the CSD. The report, Rancho Murieta Water Supply: Planning for Future Droughts, by Ken Giberson (the Giberson Report) was prepared at the request of the CSD to answer the two questions noted and to support the imposition of development fees.

CSD Policy 90-2 enraged the developer landowners of Rancho Murieta. The landowners asserted that the additional water was not needed; Rancho Murieta would not build-out to the density allowed by the PD Ordinance because the land designated for residential development was not large enough to hold the development allowed by the ordinance (5,189 dwelling units plus 779 commercial/industrial dwelling unit equivalents (EDU's)). They also claimed that the drought/emergency water supply problem, if there was one, was a problem of the entire Rancho Murieta community problem, not just a problem of future development, and that shifting a community cost to developers violated Government Code 66000, et.seq., the laws that govern imposition of development fees. The landowners argued that placing a limit on development until the water supply was increased contradicted the representations made by the CSD in bond documents provided to purchasers of the \$19 million of Improvement District No. 1 bonds issued by the CSD three years earlier and impaired the value of the bonds. Rancho Murieta Properties, Inc. (RMPI), the owner of the undeveloped land other than Murieta South, asserted that the development limit decreased the value of its property by at least \$46 million. The landowners further asserted that water supply augmentation fees and the development limit proposed by the CSD violated their rights and entitlements under the PD Ordinance and their rights under the Acquisition and Services Agreement (A&S Agreement), the water and sewer infrastructure financing agreement entered between the CSD and RMPI in 1986.

The CSD had responses to these arguments of the landowners. The CSD had acquired the Rancho Murieta water rights as a result of the A & S Agreement and asserted that as owner it had the right to say how the water would be used so long as the use was consistent with the water rights. This gave the CSD the right to say that a reasonable amount of the water in the lakes would be reserved as the emergency supply for existing residents and not made available for future development unless and until an adequate, supplemental emergency water supply was obtained at the expense of the landowners.

While it was true then (as it is today) that the residential EDU's allowed by the PD Ordinance probably would not fit on the land then designated for residential development that did not mean that the landowners would not use all of the 5,968 EDU's authorized by the ordinance. Events since 1990 show how this can happen. Land use designations can be changed. Murieta Gardens is an example of a development that will add residential development in an area that was previously all commercial under the PD

Ordinance. Proposals have been made in the past to build residential development on land in the southwest area of Rancho Murieta that is designated agricultural. Prior to the current Sacramento County General Plan review owners of land adjacent to Rancho Murieta purposed that their land be included within Rancho Murieta. The residential EDU's that appear not to fit on Rancho Murieta land designated for residential development could be used for these or other purposes. The only way to guarantee that authorized EDU's will not become actual demands on the water supply is an amendment of the PD Ordinance to reduce the density of development. This RMPI refused to do in 1990, and landowners have not done so since.

In 1990, the CSD asserted that although the PD Ordinance authorized 5,968 EDU's, the ordinance did not require the CSD to provide water for that much development at the expense of existing residents. The A&S Agreement provided that the landowners were financially responsible for providing the facilities and resources needed to serve their developments. This information was clear in the bond documents that the landowners claimed were misleading. The CSD determination, as owner of the water rights, that a reasonable amount of the water stored in the lakes should be reserved as the drought/emergency water supply for existing residents meant that an increase in the water supply was required to accommodate the water needs of future development beyond the proposed CSD limit. RMPI's claim that the CSD water service limit decreased the value of its property by \$46 million was based on the false premise that RMPI's land was entitled to all of the water needed for its full development at no cost to RMPI.

These issues were debated in late 1989 and throughout 1990. The CSD board was fully aware of these issues when it adopted Policy 90-2, which established the limit on the development that the CSD would serve without augmentation of the water supply. The legal debate is what drove the adoption of the 50% drought conservation rate in Policy 90-2. When all the arguments and counter arguments were made, the landowners' argument that posed the greatest risk to the proposed policy of the CSD was the assertion that the CSD was shifting a cost for the future water supply that should be a burden on the entire community solely on to future development. For this reason, it was critically important to demonstrate that the proposed policy did not unfairly benefit existing residents at the expense of future development.

The determination of the water supply needed for Rancho Murieta in a repeat of the 1977 drought was determined by four numbers: 1) the number of water EDU's of development, 2) the gallons per day used by an EDU, 3) the water available to the CSD in the event of a 1976 drought, and 4) the drought conservation rate. The first three of these numbers were not disputable by the landowners. The landowners were entitled to 5,968 EDU's and refused to reduce the number. The gallons per day per EDU was a number determined by the recorded actual water use by Rancho Murieta residents. The water available in the event of a 1977 was definitively recorded by the measured flows of the Cosumnes in 1976-1977. The only number that could possibly be challenged by the landowners was the conservation rate. A 50% conservation rate was approximately the most severe conservation rate voluntarily imposed by any water district in California in the 1977 drought. That is the reason why the CSD board adopted the 50% drought conservation rate. With a 50% drought conservation rate, landowners could not plausible

contend that the CSD was favoring residents and shifting what should be costs of the entire community to future development.

The 50% drought conservation rate was substantially higher than any rate that had been previously proposed for Rancho Murieta. The 1980 Metcalf & Eddy report on the Rancho Murieta water supply that was prepared for EID examined water conservation in detail and concluded that Rancho Murieta could achieve a conservation rate of 22%. Subsequent studies, analyses, and recommendations, including those of Ken Giberson, recommended conservation rates of 20-25%. The Giberson Report (Executive Summary, p.3), itself, had the following to say on conservation:

“Studies have indicated that customers are responsive to requests for voluntary conservation in the magnitude of 20% - 25% during a drought. Studies have also found that customer hardship is not usually incurred until conservation rates exceed 25% and that customer hardship increases dramatically above 35% conservation rates.”

“Conservation rates in the range of 50% - 60% were recorded in the 1977 drought in several severely impacted water agencies. While significant customer hardship and economic losses occurred, customers seemed to adapt and survive the crisis.”

Despite the acknowledged damage that would be caused to residents by the 50% drought conservation rate, Giberson recommended, and the CSD board accepted, the 50% rate. The CSD board knew that 50 % was not the rate that would prudently protect the residents from damage in the event of another 1977 drought. The 50% conservation rate meant, in essence, that in the event of such a drought the indoor domestic water use would continue but no water, or almost no water, would be allowed for lawns and landscaping. But it was the rate that would give the CSD the best chance of establishing that the CSD was not shifting costs from residents to landowner/ developers and allow the CSD to maintain its positions that: 1) that Rancho Murieta had a water shortage because landowners had development entitlements that exceeded the available water supply, 2) that the CSD, as owner of the water rights, could reserve water in the lakes as an emergency/drought water supply for existing residents, 3) that the water supply shortage was a problem that the owners of undeveloped land were required to solve at their expense and their risk, and 4) that the CSD was entitled by law and under the terms of the A&S Agreement to impose water supply augmentation fees on new development to pay the costs of solving the water shortage problem, and 5) that the water supply shortfall allowed the CSD to set a limit on the amount of development it would serve even though the limit was substantially below the development allowed by Sacramento County's PD ordinance.

The strategy worked. RMPI sued the CSD (unsuccessfully) on the grounds that the environmental review of Policy 90-2 was inadequate. But no landowner filed a lawsuit to challenge the right of the CSD to impose water supply augmentation fees on future development (but not existing residents), the right of the CSD to limit the number of EDU's that the CSD would serve, or the other CSD positions describe in the previous paragraph. The one thing the CSD gave up to obtain all of this was the acceptance of the

unreasonable 50% drought conservation rate. In effect, the 50% conservation rate was a manipulated number, a number that was proposed and accepted to gain a legal advantage on other issues even though it was not the most reasonable conservation rate from the standpoint of prudent water management. The CSD board did this because the 50% drought conservation rate of Policy 90-2 was the number used in calculating the needed water supply that was most within the power of the CSD to later change because Policy 90-2 is a CSD policy, not a legal obligation of the CSD to other parties.

Policy 90-2 itself provides an important mechanism for lowering the 50% drought conservation rate. The water saved by conservation programs, such as the 20/20 compliance program, can go to one of two purposes: it can increase the water available to new development (increase the allowed EDU's) or it can be saved to increase Rancho Murieta drought/emergency water supply (in effect, lowering the required drought conservation rate). Policy 90-2 states "... the beneficial results of water conservations will not be converted into water "will serve" entitlements for new development except as required by contractual and legal obligations." In contrast, the current IWMP appears to make the saved water available to new development. It is the quoted language of Policy 90-2 that best explains why the CSD board today has the opportunity to adopt the more reasonable 20-25% drought conservation rate that the CSD was constrained from adopting in 1990. In 1990, the CSD had contractual and legal obligations and constraints that prevented it from adopting a more reasonable drought conservation rate.

The February 1990 Giberson Report concluded that even with the 50% drought conservation rate, the Rancho Murieta water supply would be completely exhausted in a 1977 drought event by 3,951 EDU's of development, far short of 5,968 EDU's of development allowed by the PD ordinance. The CSD accepted these figures by its July 1990 adoption of Policy 90-2. Negotiations between the CSD and the landowners and developers continued throughout the summer of 1990 and concluded with the parties entering into the Second Amendment to the A&S Agreement (Second Amendment). The Rancho Murieta South landowners executed the Second Amendment in late 1990. RMPI and the developer of the Fairways executed the Second Amendment in early 1991.

The Second Amendment acknowledged and further defined the rights and obligations of the A&S Agreement. The landowners conceded the various rights asserted by the CSD in Policy 90-2 but negotiated the numbers used to determine the needed addition to the water supply. The CSD agreed to apply the 50% conservation rates to parks (*i.e.*, no water available for park irrigation in the event of a 1977 drought) and to add the increase of water storage at Calero by the use of flash boards at the lake outlet to slightly increase the level of lake. The developers agreed to reduce the water use of their EDU's. In effect, water EDU's were separated from the County planning development EDU's. The net effect of these changes was to increase the total development allowed before the CSD would refuse to issue "will serve" letters to 4,975 EDU's. The cost of providing the additional water to reach this number would be borne, of course, by the landowners/developers.

The Second Amendment, by its terms was entered into, "to clarify and define certain rights and obligations that are set forth in (the A&S Agreement)." It is an

agreement that interprets the A&S Agreement, not an agreement that independently stands on its own. Thus, the agreement that counts in determining the the contractual and legal obligations of the CSD to landowners today is the A&S Agreement. I believe that the CSD is no longer bound the A&S Agreement for three reasons. The Pension Trust Fund for Operating Engineers Local No. 3 (PTF), the party that owned and sold Rancho Murieta and subjected the undeveloped land to a deed of trust before the CSD entered into any of the financing agreements, has always taken the position that it is not bound by the A&S Agreement or by the Second Amendment. While I believe that PTF subordinated its deed of trust to the A&S Agreement, I am not aware of any facts that show PTF subordinated its deed of trust interest to Second Amendment. This means that PTF (and its limited liability companies that now own the undeveloped land at Rancho Murieta) cannot require the CSD to abide by the 50% drought conservation rate of the Second Amendment because that rights and obligations of the agreement have been wiped out in the PTF foreclosures actions against RMPI and others. Moreover, the 50% conservation rate in the Second Amendment was not a limitation on the rights to of the CSD to set and enforce a drought conservation policy. It was merely a limit on the on what the owners of undeveloped land could be required to pay to increase the water supply over and above what the Rancho Murieta community as a whole might be required to pay.

But the most fundamental reason why the CSD no longer needs to worry about the legal and contractual obligations to landowners when establishing the drought conservation rate is more simple. The A&S Agreement has expired. Paragraph 7.15 of the Agreement states:

“The term of this Agreement shall commence upon the effective date of the Adopting Resolution approving this Agreement and shall extend for a period of twenty (20) years thereafter, unless the term is terminated, modified or extended by mutual consent to the parties hereto. Following the expiration of said term, this Agreement shall be deemed terminated and of no further force and effect.”

The A & S Agreement was approved in September 1986; the first amendment to the Agreement was approved in October 1986. The Agreement expired, and the Second Amendment expired with it, in September or October 2006. Neither the CSD nor the land owners now have any rights or obligations under the Agreement or the Second Amendment. The bond holders of Improvement District No. 1, who were supposedly misled to believe that the land securing the repayment of their bonds had an adequate water supply, have been paid off in full. The promises of the landowners to reduce their development have terminated as has the promise of the CSD to set a 50% drought conservation rate. The CSD no longer has a contractual commitment to serve 4,975 EDU's. The maximum EDU number is now the 3,951 EDU's of Policy 90-2 or any other reasonable number adopted by the CSD board.

The 50% drought conservation rate is not primarily about water conservation. It is about the adequacy of the Rancho Murieta water supply for planned future development and Rancho Murieta's lack of an emergency water supply. Drought is the commonly



TECHNICAL MEMORANDUM

DATE: January 4, 2010 **Project No.:** 063-02-09-23

TO: Cindy Storelli, Principal Planner

CC: Manual Mejia, Senior Planner

FROM: Polly Boissevain, P.E., R.C.E. No. 36164
Vivian Housen, P.E., R.C.E. No. 46324

SUBJECT: Review of Rancho Murieta Planning Documents – Water Needs, Wastewater Needs and Drought Response Planning

West Yost Associates (West Yost) was retained to provide a peer review of several planning studies prepared for the Rancho Murieta Community Services District (RMCS D). These studies address water and wastewater capacity to meet future development needs, and drought management planning. The following studies were reviewed:

Water and Wastewater Capacity

- Integrated Water Master Plan (HDR, November 2006);
- Wastewater Facilities Expansion and Financing Plan (Hydroscience, 2007).

This review, conducted in Fall 2008, assessed whether these studies adequately assess the ability of existing water and wastewater facilities to serve projected development needs and provided recommendations for additional studies.

Drought Management Planning

- Drought Response Plan (RMCS D, 1991).
- Water Supply Planning for Future Droughts (Giberson & Associates, 1990)
- District Policy Statement 90-2 District Water Supply (RMCS D, 1990)

This follow-on review, conducted in Spring 2009, evaluated whether these studies reflect current drought management practices and provided recommendations for future updates.

This Technical Memorandum (TM) presents findings from both reviews and recommendations for additional studies to improve or update the documents. The TM is organized as follows:

- **Executive Summary:** Provides a summary of the existing planning documents and recommendations for additional studies or refinements to the planning documents.
- **Overview:** Presents an overview of Rancho Murieta community, and the scope of work.
- **Review of RMCS D Planning Documents:** Reviews the water and wastewater capacity studies and the drought management studies in more detail.
- **Studies Completed Since Planning Review.** Summarizes studies completed by RMCS D since this peer review was completed.

1.0 EXECUTIVE SUMMARY

Key findings presented in the planning studies are summarized in this section. This section also lists recommendations proposed by West Yost to improve or update these studies. More detailed information related to document content and findings is provided in Section 3.0 of this TM.

1.1 Summary of Existing Water and Wastewater Planning Documents

Integrated Water Master Plan (WMP)

The purpose of the WMP is to evaluate the community's water and wastewater (recycled water) systems with the goal of identifying additional supply, storage, and/or treatment facilities needed to serve projected buildout demands. The evaluation did not include an assessment of existing distribution pipelines. Assumptions used for the analyses were appropriate and conservative. The WMP used the following criteria:

- Sufficiency of Water Supply was evaluated by comparing the volume of all water entering the system, including rainfall, to the volume of all water leaving the system, including seepage and losses.
- Water Usage (Demand) was based on 750 gallons per day per equivalent dwelling unit (gpd/EDU). EDUs are traditionally used as a basis for water usage calculations. Smaller or multi-family residences are assigned a lower number of EDUs, and are thus projected to use less water than larger residences.

Based on these criteria, WMP findings and recommendations are as follows.

- Water Storage and Treatment Facilities are currently adequate to serve current water demand under normal conditions. However, treatment facilities must be expanded in the future to meet projected buildout demands.
- Drought Planning assumes an aggressive drought rationing target of 50 percent. If this program is not achieved, there may not be enough supply to serve the community during a severe drought scenario.
- Shoreline Aesthetics are an issue to the community – reservoir levels are drawn down every summer, impacting aesthetics. Aesthetics could be maintained by replenishing the reservoirs throughout the summer. This solution would require additional storage and associated water supply. Due to State's current water supply crisis, it is expected that permitting of new water supplies solely to improve shoreline aesthetics would not be approved.

The WMP also provided analyses and findings related to the community's wastewater system. West Yost considered this information primarily as a cross-reference to the following findings from the Wastewater Facilities Expansion and Financing Plan.

Wastewater Facilities Expansion and Financing Plan (WFEFP)

Currently, all wastewater is treated and stored during the winter, and then treated further to recycled water standards in the summer and used for golf course irrigation. The purpose of the

WFEFP is to summarize the community's wastewater treatment facilities, and determine whether sufficient storage, treatment, and irrigation demand is available to handle projected buildout flows. The evaluation did not assess the existing sewer collection system. Assumptions used for the analysis were appropriate and conservative. The WFEFP used the following criteria:

- Wastewater Storage and Recycled Water Availability were evaluated by comparing the volume of water entering the system, including groundwater infiltration and rainfall, to the volume of water leaving the system, including evaporation and seepage.
- Wastewater Flow from Property Owners was calculated based on 210 gallons per day per dwelling unit (gpd/DU). DUs are counted by connection, regardless of property size or density. DUs are traditionally used by RMCS D and throughout industry for wastewater flow calculations (this is different from the water calculation, which is based on EDUs, as described above).
- Recycled Water Usage (Demand) was based on historical golf course irrigation needs. When wastewater supply exceeds community golf course irrigation demands, agreements are in place with adjacent landowners to provide any excess recycled water for irrigation of private pasture lands.

Based on these criteria, WFEFP findings and recommendations are as follows:

- Wastewater Treatment and Disinfection Facilities are currently adequate to handle incoming flows. Treatment capacity is also adequate to handle buildout flows. However, chlorine disinfection facilities must be expanded to address disinfection needs at buildout. In lieu of chlorine disinfection, the WFEFP discussed the option of ultraviolet (UV) disinfection to handle future flows.
- Recycled Water Demand for golf course irrigation is currently greater in a normal irrigation year than available recycled water supply. However, if water is carried over in storage from prior wet years, available recycled water supply may exceed golf course irrigation needs. To address this issue, RMCS D has entered into contracts with adjacent landowners for irrigation of pasture land when recycled water supply exceeds golf course irrigation demands.
- Wastewater Storage facilities are currently large enough to handle current flows. However, additional storage is required in the future to address buildout flows. In lieu of building additional storage, RMCS D is also considering alternatives to storage, including purchasing/leasing additional land for irrigation or implementing seasonal (wet weather) discharge to the Cosumnes River. *It should be noted that regulatory requirements for discharge of water to the Cosumnes River have changed since the WFEFP was completed; these changes are currently being evaluated by RMCS D.*

1.2 Summary of Existing Drought Management Planning Documents

Drought Response Plan

This document, prepared in early 1991, develops drought actions in response to the 1990-91 drought. The report reviews available supply, supply augmentation, priority of demands, water

conservation programs, revenues, and presents a drought management plan, public information program and procedures for compliance, monitoring and enforcement.

While the 1991 document contains content consistent with current drought management practices, many elements of the document are specific to 1991 hydrologic conditions. Also, the document lays out the general framework for a drought management program, but generally lacks sufficient detail to identify the specific steps that would be needed to implement the drought program. Therefore, an updated plan recommended as discussed further in Section 1.3.

Water Supply Planning for Future Droughts

This document compares the community's water supply with projected demand at buildout, evaluates the adequacy of supply, assesses supply alternatives, and identifies elements that should be included in a drought contingency plan. The report projects development buildout demands, using historical consumption data, and evaluates monthly operation of on-site reservoirs under different drought scenarios to assess the adequacy of the water supply, and levels of conservation that would be required to meet demand.

The report documents supply reliability assumptions used to assess supply adequacy. These assumptions provide the basis for the RMCS D's water supply policy statement 90-2, and for subsequent water supply planning studies, such as the Integrated Water Master Plan (HDR, 2006). Therefore, West Yost's review of this document focused on these assumptions.

Supply planning uses two successive dry years based on 1977 hydrology (a 200-year drought event) and 1924 hydrology (a 25-year drought event). These are the two worst hydrologic years of record for the 81-period of record available for the Consumnes River. Supply planning also assumes that temporary demand reductions of up to 50 percent would be implemented during this drought sequence.

The use of two successive dry years based on the worst observed conditions is reasonably conservative. In contrast, the target of 50 percent temporary demand reductions is aggressive and a plan for achieving these reductions has not been developed. To complete the analysis, West Yost recommends development of a drought implementation plan, as summarized in Section 1.3.

An operational model was developed in this study that uses hydrologic inputs and the above planning assumptions to estimate supply shortfalls. The model was re-created and used for the 2006 Integrated Water Master Plan.

District Policy Statement 90-2 District Water Supply

This document adopts a water supply policy based on the recommendations in the 1990 Drought Planning Study. In general, the drought-related policies are reasonable, and sufficiently broad to encompass a wide range of actions.

1.3 Recommendations for Additional Studies and Refinements

West Yost recommends that RMCS D consider the following additional reviews or considerations to enhance, update or supplement the existing planning documents.

Integrated Water Master Plan

- If rainfall and runoff data have not been transferred, HDR should provide this data to RMCS staff for their records.
- Review and update the proposed expansion schedule, and complete an interim capacity analysis, as discussed below.
- Consider establishing the number of EDUs that can be served by existing storage, treatment, and disposal capacity.
- Complete a detailed review and assessment of water supply analysis assumptions with regard to drought planning parameters. For example, how long after the drought begins will drought conditions be identified and rationing implemented; will rationing be phased in up to a maximum program of 50 percent reduction; etc.
- Consider additional discussions with State regulators regarding permitting requirements and concerns related to building additional storage facilities and augmenting water diversions or supply in order to improve summer shoreline aesthetics.
- Compare the two independent water balance models that were developed for the WMP and WFEFP to confirm consistency in assumptions.

Wastewater Facilities Expansion and Financing Plan

- Review the WMP to obtain supplemental information on wastewater treatment facilities and processes. Compare the two independent water balance models that were developed for the WMP and WFEFP to confirm consistency in assumptions.
- Confirm that long-term contracts for land application have been finalized, or identify alternative disposal options, in order to handle existing recycled water flows.
- Seasonal discharge to the Cosumnes River will likely require additional treatment to meet RWQCB nitrate and ammonia effluent limits. The scope and cost of related treatment facilities must be considered and incorporated into the WFEFP. Based on discussions with Hydroscience, these considerations are currently under review.

Drought Contingency Planning

- Review/refine the supply planning operational model and evaluate alternative drought scenarios to better understand supply shortfall sensitivity:
 - Temporary demand reductions: Develop phased implementation schedule and thresholds, more consistent with actual program implementation.
 - Daily diversions: Refine daily diversion estimates to incorporate water rights restrictions on total diversion and storage volumes, and to evaluate different dry years.
- Quantify economic impacts to the community to achieve 50 percent conservation goals and incorporate costs into economic analysis of water supply alternatives for the

Rancho Murieta community, to reflect the true cost of the water supply alternative to the end user.

- Depending on outcome of technical and economic evaluations, consider modifying policy of requiring up to 50 percent conservation (temporary demand reductions) during severe drought. Integrate new recommendation into Policy Statement 90-2.
- Prepare an updated Drought Contingency Plan using current DWR drought planning guidelines. The following should be part of the drought plan:
 - An implementation plan to identify specific measures required to achieve 50 percent (or other target, if adjusted) temporary demand reductions
 - A methodology using hydrologic, demand and operational data to establish reservoir storage 'triggers' that identify temporary demand reductions required to respond to drought conditions. This methodology could be used as a regular drought planning tool.
- RMCSO will soon meet population criteria that would require the District to prepare an Urban Water Management Plan (UWMP). Consider preparing a complete UWMP to maintain eligibility for DWR grant, loan and drought assistance once RMCSO reaches 3,000 service connections.

2.0 OVERVIEW

2.1 Rancho Murieta Overview

Rancho Murieta encompasses approximately 3,500 acres located 25 miles east of Sacramento. This private golf course community was initially developed in the early 1970s; water and wastewater services are provided by RMCS D. A map of the development is shown in Figure 1.

Water is obtained seasonally from the Consumnes River and stored in three local reservoirs: Calero, Chesbro, and Clementia. The reservoirs have a combined total storage volume of 4,700 acre-feet (af), and combined usable storage volume of 4,300 af. Rancho Murieta has both riparian and appropriative water rights and diverts water from the Consumnes River at Granlees Dam. Rancho Murieta's appropriative water rights allow diversion from the Consumnes River from November 1st through May 31st when there is sufficient flow in the river.

Water is used to serve residential and commercial developments within the Rancho Murieta community. Although Consumnes River water is used for some irrigation, and for potable uses after treatment, large demands, such as the community golf courses, are served primarily using recycled water from the RMCS D wastewater treatment plant. In 2004/05 fiscal year, annual potable water use was 1,780 af. The water system had a total of 2,873 connections.

Currently, secondary treated wastewater is stored during wet weather and then all flow is treated further during dry weather to State of California Title 22 Recycled Water Criteria to allow reuse for irrigation of the community's golf courses. Excess water, when available, is also used for spray irrigation of private pasture land.

Additional information about the development, including additional maps showing community facilities, are provided in two planning documents: Integrated Water Master Plan (HDR, 2006) and Wastewater Facilities Expansion and financing Plan (Hydroscience, 2007).

2.2 Scope of Work

West Yost's scope of work consisted of the following tasks:

- Review Background Documents. West Yost met with Sacramento County staff and with the RMCS D General Manager to obtain relevant documents, review CS D issues and concerns, identify potential development areas and review relevant background reports, including environmental documents, planning ordinances, Regional Board orders and land use projections.
- Conduct Peer Review of Water and Wastewater Planning Documents. West Yost reviewed water and wastewater planning documents to assess the adequacy of planning assumptions used in those studies, met with Sacramento County staff to review findings and receive comments.
- Review Drought Management Planning Documents. West Yost reviewed drought planning documents and provided recommendations for supplemental technical evaluations and possible policy changes to be considered by RMCS D.

- Evaluate Shoreline Aesthetics. West Yost evaluated the potential to increase Rancho Murieta raw water storage capacity and supply to alleviate existing issues related to shoreline aesthetics at the community's existing raw water storage reservoirs.
- Present Findings to Sacramento County and RMCS D. In early 2010, West Yost will participate in meetings with RMCS D staff and the Board of Supervisors to present findings from the reviews and obtain input from community stakeholders.

3.0 REVIEW OF RMCS D PLANNING DOCUMENTS

3.1 Integrated Water Master Plan

The Integrated Water Master Plan (WMP) was completed by HDR in November 2006. The WMP provides evaluations and recommendations for both the water and wastewater systems. Regarding wastewater evaluations, the work completed by HDR is consistent with and overlaps similar analyses completed by Hydrosience for the WFEFP. The WFEFP, which addresses wastewater needs only, provides more detailed recommendations for treatment and disposal of recycled water. Therefore, the information in the WMP was used primarily as a cross-reference to the WFEFP.

The WMP utilized a water balance model that includes assumptions and data related to water flow into, and out of water storage and treatment facilities. Specific water model inputs included information on seasonal water diversions from the Cosumnes Reservoir (supply) added to predicted rainfall and runoff, and water usage (demands) combined with system losses (from pipe leaks, hydrant tests, etc.), percolation, and evaporation. The WMP wastewater model considered average dry weather flow, inflow and infiltration, direct rainfall on storage facilities, evaporation, and irrigation demand.

The WMP referenced a number of supporting historical documents; review of these documents was not completed by West Yost as part of this analysis.

Water System Assumptions

In general, assumptions and methodologies described in the WMP to evaluate water supply, storage, and demands, as well as resulting recommendations, are appropriate. The WMP includes sufficient comparisons to actual data to verify water system model outputs. Water demands were calculated using a conservative estimate of 750 gallons per day per equivalent dwelling unit (gpd/EDU); this estimate is conservative when compared to the highest recent five-year average use of 693 gpd/EDU. EDUs are traditionally used as a basis for water usage calculations. Smaller or multi-family residences are assigned a lower number of EDUs, and are thus projected to use less water than larger residences.

The nine percent assumption used for system losses (distribution piping leaks, fire flow testing, etc.) was derived after reviewing water production and sales data. The estimate of 20 percent of current raw water demand for reservoir losses and evaporation is less conservative than the 25 percent estimate used in prior studies. However, the 20 percent estimate is supported by a statistical analysis of treated water produced compared to raw water supply.

In the WMP drought analysis, actual evaporation and monthly seepage rates are applied in lieu of a percentage. Discussions with HDR confirmed that calculated rates used for the drought analysis are consistent with the 20 percent assumption discussed above.

Rainfall and runoff data used in development of the water balance model are not presented in the WMP and were not reviewed by West Yost. This information, if not already submitted to RMCS D as part of the WMP, should be provided to RMCS D staff for inclusion in their historical records.

Water Supply as Compared to Demands

The WMP analysis is based on 2,282 existing EDUs and projected buildout of 4,230 EDUs. Updated EDU information was not specifically defined in the draft memo titled, "Current Assessment of Residential Property in Rancho Murieta" provided by County staff on July 18, 2008. However, based on updated DU information presented in that memo, the WMP estimates appear to be conservative.

The WMP lists estimated current and buildout demands, after considering system losses, as 2,107 and 3,905 acre-feet, respectively. Available water rights of 6,368 acre-feet per year are sufficient to meet buildout demands during non-drought periods. Existing available storage provided by Calero and Chesbro reservoirs of 3,766 acre-feet, allowing for rainfall and reservoir losses, is also sufficient to meet buildout demands. Note that required reservoir storage volume is less than annual buildout demand because at certain times of the year, additional supply is diverted from the Cosumnes River.

During a severe drought event, defined as a 200-year drought event followed by a 25-year drought event, and assuming 50 percent conservation, all reservoirs including Clementia must be fully drawn down to dead storage, which marks the water level below which stored water is not usable. In addition, RMCS D requires 435 acre-feet of new storage to meet water demands during the severe drought event. This additional storage requirement allows for a one-month contingency of water supply, which is appropriate. The report does not describe assumptions used to characterize how water conservation measures would be implemented (e.g., how much time will pass before a drought is recognized, and how conservation requirements would be phased in). These assumptions are critical to the determination of storage requirements and should be reviewed carefully to confirm that sufficient storage is projected to address the severe drought scenario.

Water Treatment Facilities

The WMP recommends increasing capacity in two phases. The first phase will increase capacity from 3.5 to approximately 4.2 million gallons per day (mgd), and the second phase will increase capacity to approximately 7.0 mgd. Because development plans have changed since completion of the WMP in 2006, it is recommended that the County and RMCS D revisit proposed treatment plant upgrade phasing as needed to meet actual development projections. Also, it would be beneficial if the County and RMCS D could understand the number of additional EDUs that can be accommodated by the community without triggering the need to expand existing storage or treatment facilities.

Water Storage Reservoir Aesthetics

In addition to storage and treatment capacity, the WMP briefly discussed shoreline aesthetics at the three storage reservoirs. Calero Reservoir is drawn down by approximately 15 feet under normal conditions, Chesbro Reservoir remains full, and Clementia Reservoir lowers by just over five feet due to evaporation and percolation. The WMP introduced several options for providing additional supply to meet water buildout demands, but did not discuss options to replenish Calero and Clementia reservoirs during normal operations. It is assumed that reservoir shoreline aesthetics will not be critical during a drought event.

Two of the scenarios discussed in the WMP as potential options for additional water supply, additional surface storage and groundwater (conjunctive) supply, could also be considered as options to replenish the reservoirs to maintain shoreline aesthetics. However, the WMP advises that receiving approval for additional facilities solely for the purpose of maintaining aesthetics would likely not be approved due to the limitation of available water supply within the State. This topic is of elevated interest to the community; therefore, follow-up discussions with the State may be warranted to fully explore water supply limitations.

WMP Evaluation of Wastewater Facilities

The wastewater system description included in the WMP is an excellent supplement to the information provided in the WFEFP, which is discussed later in this TM. The WMP wastewater model estimates annual flow using a 365-day 100-year return period storm event (100-year event) as required by the Regional Water Quality Control Board.

Projected total annual flows under existing and buildout conditions for the 100-year event are less conservative than the same values provided in the WFEFP. A comparison of the WMP and WFEFP water balance models is recommended to review and contrast the findings and recommendations presented in each report.

The WMP does not address improvements to the RMCS D chlorine contact disinfection facilities needed to meet buildout disinfection requirements. Also, the WMP does not discuss the potential decrease in storage needs that would result from implementation of covered storage. Therefore, it is recommended that the County reference discussions and recommendations provided in the WFEFP to understand buildout wastewater treatment, storage, and distribution needs. WMP information should be used as resource for cross-referencing certain details related to the wastewater treatment process.

3.2 Wastewater Facilities Expansion and Financing Plan

The WFEFP was completed by Hydrosience in July 2007. The purpose of this document is to summarize the community's wastewater treatment facilities, and determine whether adequate capacity is available to serve projected buildout demands. In order to conduct the analysis, Hydrosience developed a water balance model that included calculated average dry weather flow, projected inflow and infiltration, and accounted for direct rainfall on storage facilities, evaporation, and historical irrigation demand.

West Yost completed a review of the general assumptions and methodologies used to develop and evaluate model results, and reviewed conclusions and recommendations presented in the

WFEFP. For the purpose of this review, it was (assumed) that model outputs were (verified) using actual flow data. West Yost also supplemented information provided in the WFEFP with additional descriptions included in the WMP, as discussed above. It is recommended that the two water balance models that were developed for the WMP and WFEFP be compared for consistency in assumptions and results.

The WFEFP referenced a number of supporting historical documents; review of these documents was not completed by West Yost as part of this analysis.

Wastewater System Assumptions

In general, the assumptions and methodologies described in the WFEFP to evaluate wastewater capacity and demands, and resulting recommendations, seem appropriate. Dry weather flows were calculated conservatively based on an estimated use per dwelling unit (DU) of 210 gallons per day per DU (gpd/DU); this estimate is greater than measured usage of approximately 195 gpd/DU. DUs are counted by connection, regardless of property size or density. DUs are traditionally used by RMCSD and industry to calculate wastewater flows (this is different from the water calculation, which is based on EDUs, as described above).

Wet weather flows used realistic assumptions for infiltration and inflow (I/I), and also assessed facilities under a 365-day 100-year return period storm event (100-year event) as required by the Regional Water Quality Control Board.

Buildout Wastewater Flows

The WFEFP was based on approximately 2,500 existing connections and projected buildout of 4,800 connections¹. The buildout number of connections, and therefore report findings, are conservative.

Estimated current and buildout average dry weather flows were calculated, based on the number of connections or DUs, as 0.51 and 0.99 mgd, respectively. A calculated peaking factor (wet weather flow compared to dry weather flow) of 1.16 that considered the 100-year wet weather event was included to account for groundwater infiltration expected during wet weather.

Wastewater Treatment Capacity

Secondary treatment facilities, comprised of aerated wastewater treatment ponds, have a capacity of 1.55 mgd. Tertiary treatment facilities, comprised of coagulation, dissolved air flotation, and sand filtration, have a capacity of 3.0 mgd. Disinfection facilities are currently sized to handle 2.3 mgd. The RMCSD treatment process produces water that meets California Title 22 Recycled Water Criteria.

The WFEFP determined that existing secondary and tertiary treatment capacity is sufficient to treat current and buildout flows. However, the study recommends augmenting disinfection capacity from 2.3 to 3.0 mgd to match available tertiary treatment capacity. The WFEFP briefly discusses use of UV disinfection in lieu of expanded chlorine disinfection. UV disinfection is

¹ Compare to approximately 4,315 estimated buildout connections provided by County Staff on July 18, 2008

energy-intensive, and associated equipment may require a high level of maintenance. It is recommended that any future UV disinfection cost calculations incorporate a lifecycle cost analysis.

Wastewater Storage and Recycled Water Demand

The WFEFP calculated current total annual wastewater flow during the 100-year event of 601 acre-feet per year. By comparison, RMCS D maintains approximately 720 acre-feet of available treated wastewater storage. Also, historical annual demand for recycled water irrigation during normal irrigation years has been approximately 620 acre-feet per year². Therefore, existing storage capacity is sufficient to handle current wastewater flows, and recycled water demands are sufficient during normal irrigation years to utilize all treated flows.

The WFEFP observes that irrigation demand is expected to decrease in the future as the community replaces existing golf course Rye grasses with Bermuda grasses. Also, sufficiency of storage presumes less than 170 acre-feet of treated wastewater remains in storage from prior wet weather seasons. In recent years, this amount of carryover has been exceeded and excess recycled water has been diverted for irrigation of adjacent pasture land.

Projected total annual wastewater flow at buildout for the 100-year event is 1,169 acre-feet. At buildout, the WFEFP recommends the addition of 330 acre-feet of treated wastewater storage. Incremental storage volume can be reduced to 165 acre-feet if existing and future storage facilities are covered to prevent rainfall from entering the facilities.

Because buildout wastewater flows will exceed recycled water demand, the WFEFP discusses various options for disposal of 519 acre-feet of excess treated water, including spray field irrigation, landscape irrigation, seasonal discharge to the Cosumnes River, and connection to Sacramento Regional County Sanitation District. Following completion of the WFEFP, regulatory requirements for direct discharge have become more stringent; the RWQCB has tightened effluent limitations for ammonia and nitrate. It is likely that RMCS D will require additional treatment prior to any permitted discharge to the Cosumnes River. These added facilities will likely increase estimated costs beyond those presented in the WFEFP. We understand through discussions with Hydrosience that ammonia and nitrate limits are currently under discussion between RMCS D and the Regional Water Quality Control Board.

3.3 RMCS D 1991 Drought Response Plan

This document, dated February 8, 1991, develops drought actions in response to the 1990-91 drought. The report reviews available supply, supply augmentation, priority of demands, water conservation programs, revenues, and presents a drought management plan, public information program and procedures for compliance, monitoring and enforcement.

This report was prepared at the end of what is the defining multi-year drought (1987 through 1991) for many water utilities around the state. At the time this report was prepared, the 1991

² During the 100-year wet weather event, golf course irrigation demand is projected to decrease to 484 acre-feet per year

water year to date was worse than 1977 conditions. Subsequent significant rainfall in March 1991, one month after completion of this document, ended the drought. Many of the elements in the document are specific to 1991 hydrologic conditions.

Report elements are drawn from DWR guidelines available at the time the plan was prepared. DWR, through its Office of Water Use Efficiency, provides technical and financial assistance to water utilities on water conservation and drought management issues. West Yost compared report content with current DWR guidelines, as published in the Urban Drought Guidebook, 2008 Updated Edition (DWR, 2008).

The DWR guidelines were developed to assist urban water suppliers in preparing Drought Contingency Plans, which are an element of Urban Water Management Plans (UWMPs). UWMPs provide information on a water supplier's supply reliability and are required for water suppliers to be eligible for DWR administered State grants, loans and drought assistance. DWR updates UWMP guidelines on an ongoing basis. UWMPs are required for all agencies that serve at least 3,000 connections or provide over 3,000 acre-feet per year (af/yr). The 2006 Integrated Water Master Plan reports that there were 2,873 existing connections at that time. Therefore, it appears the Rancho Murieta either now meets or may soon meet criteria for preparation of a plan. Plans are prepared on a 5-year cycle, due in years divisible by 5. The next cycle of UWMPs will be due December 31, 2010. If an agency reaches the minimum number of connections or water use within a plan cycle, it has one year to prepare and file a plan.

While the 1991 document contains content consistent with current drought management practices, many elements of the document are specific to 1991 hydrologic conditions. Also, the document lays out the general framework for a drought management program, but generally lacks sufficient detail to identify the specific implementation steps that would be needed for drought programs.

An updated Drought Contingency Plan should be prepared using current DWR drought planning guidelines. RMCSD may want to consider preparing a complete UWMP, even if RMCSD does not yet meet criteria that would make the plan a requirement. The plan would be useful to RMCSD for long-term water supply planning. It would be relatively easy to compile necessary information from other recent documents, such as the Integrated Water Master Plan. The document could also be submitted to DWR, so that once RMCSD reaches 3,000 connections RMCSD would be positioned for immediate compliance with UWMP preparation requirements and remain eligible for DWR grant, loan and drought assistance. RMCSD is currently eligible for DWR grant, loan, and drought assistance, but would become ineligible once 3,000 connections are reached, until an UWMP is filed and accepted by DWR. The DWR acceptance process can sometimes be lengthy.

Specific plan elements are reviewed below.

Available Supply

The available supply analysis projects reservoir storage volumes on January 1st 1992 and January 1st 1993, assuming no diversions to storage due to continued drought conditions. The analysis also assumes demands would continue to increase, based on historical trends. A 20 percent conservation cutback (temporary demand reduction) is recommended, based on 1991 conditions.

Note that a more conservative conservation cutback of 50 percent was adopted as the basis for supply planning, following recommendations from the 1990 Giberson study that is described further in Section 3.4.

While this analysis is specific to the 1991 drought, the methodology of projecting reservoir levels based on current conditions and assumed minimal future runoff conditions is appropriate.

An updated plan should identify several drought stages (i.e. Stage 1 through 4), with each stage indicating the specific trigger that initiates the drought stage, the severity of drought conditions, target demand reduction goals for that stage, and measures that could be implemented to achieve demand reductions. Stages would range from voluntary measures to more stringent requirements and enforcement procedures including rationing. Review of case studies to quantify savings associated with particular measures would also help determine if goals are achievable.

Supply Augmentation

The plan notes that available supply options are limited due to the remoteness of the community and the time line required to implement new supply options. Developing on-site wells is identified as the only possible solution for added supply. Temporary measures, such as installation of a floating pump and pipeline to tap into dead storage reserves could also be considered.

Water Conservation Program

The plan outlines a water conservation (temporary demand reduction) program with a 20 percent conservation goal. The plan includes 21 specific measures to achieve a 20 percent demand reduction goal. Conservation measures target reduction of water waste, with measures such as implementing alternate day irrigation scheduling, and prohibition of many water-using practices, such as pavement and car washing.

The measures that are identified are reasonable. Since the plan is specific to 1991 conditions, it identifies the single conservation goal and specific measures to be implemented to attain that goal.

Revenue Program

The plan estimates total costs for the District program, including lost revenues, and conservation program expenses. Conservation program expenses are estimated at \$25,000, with no detail on how the estimate was developed. The plan identifies a one-time drought surcharge to cover drought-related costs, implemented in a multi-tiered rate structure, based on use.

Conservation program expenses should be evaluated further, using quantitative information from case studies and RMCSD specific programs. Also, increased labor costs due to program implementation should be considered. Multiple methods to pass costs along to end users could be compared.

Drought Management Plan

The plan recommends establishing a Drought Management Team to manage drought response. The plan identifies the need for a public information campaign to educate the public about the drought and the drought response plan. The plan includes elements such as ongoing distribution of supply and conservation information, potential notification avenues, such as printed media, TV, signs and banners, distribution of water conservation kits and implementing leak detection and water audits.

The plan identifies the initial demand reduction program as voluntary, indicating that if necessary, the program could be made mandatory, with specific enforcement authority through Section 10 of the District Water Code. For initial implementation, the plan calls for compliance through peer group pressure and observation by District staff in the course of their regular duties.

Program effectiveness would be evaluated by monitoring daily or weekly water production and comparing it with projected demand.

Similar elements should be incorporated into the plan update. More detail should be provided for each of the plan elements. In particular, the roles and responsibilities of the Drought Management Team need to be delineated, and specific procedures and protocols established. This program could be incorporated into the Drought Management Plan, or prepared as a separate internal planning document, provided that it has not already been developed. It is important to have this framework already in place when a drought occurs.

3.4 Rancho Murieta Water Supply: Planning for Future Droughts

This document, completed by Giberson & Associates in February 1990, compares the community's water supply with projected demand at buildout, evaluates the adequacy of supply, assesses supply alternatives, and identifies elements that should be included in a drought contingency plan. The report projects development buildout demands, using historical consumption data, and evaluates monthly operation of on-site reservoirs under different drought scenarios to assess the adequacy of the water supply, and levels of conservation that would be required to meet demand.

Key drought-related elements in this report are:

- A review of temporary demand reductions experienced by other California water utilities during the 1976-77 drought. This review provides the basis for establishing temporary demand reductions of up to 50 percent as part of the supply planning framework.
- A statistical analysis of Consumnes River annual flows, to establish drought frequency and severity, and correlation with daily water supply diversions to Rancho Murieta to determine supply availability for different drought years. The statistical analysis is the basis for establishing use of a 200-year drought event, followed by a 25-year drought event for water supply planning. The 200-year event is based on 1977 hydrology, and the 25-year event is based on 1924 hydrology. These two years are the worst annual flow years of the 81-years of record.

PRIOR TO
SIGNIFICANT
DOWNSTREAM
DEVELOPMENT

- Use of a monthly reservoir operational model, developed in the study, to evaluate drought water supply adequacy. The model uses a 200-year drought event followed by a 25-year drought event, along with projected demands at buildout and 50 percent conservation, to evaluate supply adequacy.

These assumptions provide the basis for the RMCS D's water supply policy statement 90-2, and for subsequent water supply planning studies, such as the Integrated Water Master Plan (HDR, 2006). Therefore, the review of this document focused on the three elements identified above, as well as the drought contingency plan.

Dry-Year Supply Reliability

The report has a recommended water supply reliability standard of providing annual water demands: a) during a 25-year drought without conservation; b) during a 100-year drought with a maximum conservation rate of 25 percent; and c) during a 200-year drought with a maximum conservation rate of 50 percent.

Conservation (Temporary Drought Demand Reduction) Rates

Selection of the 25 percent and 50 percent conservation thresholds was based on a review of 7 large urban and 9 smaller local purveyors' drought reductions to balance demand with supply during the 1976-1977 drought, and a review of DWR conclusions about drought impacts. Of the agencies reviewed, the average cutbacks for the two groups ranged from 30 to 35 percent, with four agencies' cutbacks ranging from 50 to 60 percent. The report notes that demand reductions of up to 25 percent can generally be implemented with voluntary measures, but reductions above this level cause hardship, with severe hardship at 50 percent.

West Yost reviewed drought planning documents for Marin Municipal Water District (MMWD), El Dorado Irrigation District (EID) and Placer County Water Agency (PCWA), all agencies cited in the Giberson study as having demand cutbacks of 50 to 60 percent in the 1976-77 drought. Of the three agencies, MMWD plans for 10 percent demand reduction in 10 percent of all years, and 25 percent reduction in 2 percent of all years. PCWA plans for up to 25 percent demand cutback for a single or multiple dry-year event. EID has a three-tier drought action plan with a 15 percent supply reduction calling for 15 percent demand cutback, 30 percent supply reduction calling for 30 percent cutback and 50 percent supply reduction calling for 50 percent cutback.

It is not clear whether a 50 percent demand reduction during a severe drought would be achievable for RMCS D, or what specific measures would be required and the cost to the end user. The 2006 Integrated Water Master Plan indicates that outdoor irrigation for commercial and residential uses is about 50 percent of total water use. Rancho Murieta has a significant number of estate-style homes. The MMWD study found that water users with larger estate-style homes are most resistant to reducing water use, though the focus of that study was long-term conservation, rather than temporary drought reductions.

RMCS D should develop an implementation plan to identify specific measures required to achieve 50 percent demand reductions during severe drought. The economic impacts to the community to achieve 50 percent reductions should also be evaluated and incorporated into cost analysis of water supply alternatives for the Rancho Murieta community. These costs should be

estimated for any water supply alternative that incorporates significant temporary demand reductions to reflect the true cost of the water supply alternative to the end user.

Drought Frequency and Duration

Drought frequencies are based on a statistical analysis of annual yields in the 81-year historical record for the Consumnes River stream flow records at Michigan Bar. The 25-year drought is defined based on annual runoff in 1924, and the 200-year drought is defined based on annual runoff in 1977. Drought frequencies were calculated by fitting a statistical distribution to the annual data.

The statistical methods for determining drought frequency appear reasonable. As discussed below, a monthly operational model developed to assess supply adequacy evaluates two dry years in succession, which is appropriate, given the community's sole reliance on surface water supply.

Operational Model

As part of the study, a monthly reservoir operational model was developed and used to estimate supplemental supply needed to meet water needs during droughts.

The model is a mass balance model that uses inflows (Consumnes River water diversions, direct rainfall, and runoff), and outflows (seepage, evaporation, and demand) to track monthly storage volumes and levels in the Rancho Murieta community's three on-site storage reservoirs. For supply planning, the model uses monthly hydrology for a 200-year drought event (1977 hydrology) followed by a 25-year drought event (1924 hydrology). The model evaluates a 2-year period, starting and ending in June. The model imposes normal year demand from June through February of the first year, 50 percent demand (essentially eliminating all outdoor use) from March through February of the following year, and normal year demand in March through June of the second year.

As part of the Integrated Water Master Plan (HDR, 2006), this model was re-created to evaluate supply shortfall. The model was verified using historical demand and supply data to confirm model assumptions for estimated inflows and outflows (evaporation, seepage, direct rainfall and runoff). Three demand scenarios were developed to evaluate supply needs to meet future demand. The high demand scenario in the HDR study has a projected treated water demand of 4,870 af/yr, compared with a demand of 4,830 af/yr from the 1990 study. The projected shortfall in the HDR study is 1,830 af, compared with a shortfall of 1,870 af in the earlier study. Computed shortfalls are similar, which is expected, since the later analysis used many of the same assumptions as the earlier study. Both shortfalls are net deficits. If supplemental supply were used to augment the existing surface water supply, additional water would be needed to compensate for additional evaporative losses.

The model is a reasonable planning tool that uses conservative assumptions for hydrology to evaluate supply needs. The 50 percent conservation target and timing of demand reductions are hypothetical. Sensitivity analyses should be used to assess different thresholds and more realistic demand reduction schedules to determine how supply shortfall is impacted.

West Yost provided a focused review of assumptions pertaining to the basis for supply planning (drought period and conservation reductions used), and hydrologic methods to estimate diversions to storage, which were used without adjustment in the 2006 study. Other estimated parameters, such as evaporation, seepage and direct rainfall and runoff were not reviewed since the model verification in the 2006 demonstrated that these estimates are reasonable.

Use of Two Year Drought Sequence

The model uses hydrology from 1977 and 1924, the two worst years on record to assess diversions to on-site reservoirs, assuming that these dry years occur sequentially. DWR drought planning documents recommend evaluating supplies for single dry years and multiple dry years (3 years or more) based on sequential dry years from available stream gage records.

Review of Consumnes River historical records indicates that use of two driest years in succession is conservative and that evaluation of longer drought sequences does not appear warranted, based on the historical record. The average annual flow for 1977 and 1924 is 27,000 af. In comparison, the lowest two-year flow sequences are 1976-77 (average annual flow of 35,000 af) and 1987-1988 (63,000 af). The lowest three-year flow sequence is 1987-1989 (average annual flow of 96,000 af).

Water Demand Patterns and Conservation Reductions

The model uses a demand pattern assuming normal year demand from June through February of the first year, 50 percent demand from March through February of the following year, and normal year demand in March through June of the second year.

More realistic conservation implementation schedules should be evaluated to determine the impact on required supply. This should be done for different dry years, in addition to 1977 and 1924.

Diversions to Storage

Diversions to storage were calculated using daily flow records to calculate potential diversions to storage under the terms of the water rights permit. The analysis did not consider water rights restrictions pertaining to maximum annual diversions, and maximum storage volumes. Thus, as noted in the report, diversions computed in the study represent an upper threshold, and may not be attainable. *

The overall methodology used is reasonable. West Yost recommends recreating daily diversion estimates and evaluating how annual restrictions would affect diversion amounts. This analysis should be completed for different dry years in addition to 1977 and 1924.

Drought Contingency Planning

The report recommends adoption of a drought contingency plan and outlines the elements that a plan should contain. The report uses DWR guidelines to identify the elements of the drought plan. Elements identified in this section were incorporated into the 1991 Drought Response Plan, discussed in Section 3.3.

RMCS D should prepare an updated Drought Contingency Plan, using the most recent available DWR guidelines.

3.5 Supplemental Report, Rancho Murieta Water Supply: Planning for Future Droughts

This document, completed by Giberson & Associates in April 1990, updates the supply analysis for Rancho Murieta using developer-supplied assumptions with a total level of development of 5,340 EDU's (compared with the County-approved 5,968 EDUs assumed in the original report). The analysis also reviews the impact of installation of flashboards on storage reservoirs, and elimination of park irrigation on projected water supply deficits. The methodology is the same as that used in the original study.

3.6 Rancho Murieta Community Services District Policy Statement 90-2 District Water Supply

This document, dated July 18, 1990, adopts a water supply policy based on the recommendations in the Giberson & Associates February 1990 report. The document includes 13 policy statements, six of which relate directly or indirectly to drought management:

- Policy 3: The District will give first priority to domestic water needs within the community in the event of a water shortage;
- Policy 4: In the event of a water shortage, the District will give lowest priority water uses such as to: a) Customers that waste water; b) maintenance of the level of water in the community's lakes for aesthetic purposes; c) irrigation of landscaped areas; d) irrigation of agricultural lands, golf courses, etc.
- Policy 5: The District will enforce water conservation measures during a water shortage to reduce customer demands as follows: 1924: 0 percent conservation; 1977: 50 percent conservation
- Policy 7: The District will encourage water conservation programs, including the use of efficient landscape irrigation practices.
- Policy 8: The District will develop a Drought Contingency Plan to be instituted by the District during a water shortage.
- Policy 9: In order to preserve the District's water supply, the District may implement other reasonable and prudent measures as deemed necessary by the District Board from time to time.

As a policy document, the document provides general policy direction, and not the specific mechanisms of how policies would be achieved. In general, the drought-related policies are reasonable, and sufficiently broad to encompass a wide range of actions.

RMCS D should consider developing a modified policy for water conservation (i.e. temporary demand reductions) during shortages. The policy should be informed by the cost of implementing significant reductions compared with other supply alternatives, as well as the ability to achieve 50 percent conservation reductions.

4.0 RECENT RMCSO PLANNING STUDIES

As part of RMCSO's ongoing water related planning, the District has completed the following studies since initiation of this peer review:

- **Tiered Pricing Implementation Study (HDR, 2009).** This study was initiated based on recommendations in the WMP to implement demand management pricing. The study evaluates the use of potential inverted block water rate structures that could be used to promote water use efficiency. Inverted block rate structures establish tiers or blocks for water usage and incorporate increasing prices as a customer progresses into higher tiers of water use.
- **Recycled Water Feasibility Study (HDR, 2009).** This study was initiated based on recommendations in the WMP to increase residential water recycling. The study identifies \$15.1 million in improvements to implement recycling for future residential customers.
- **IWMP and 20X2020 Update.** The District recently contracted with Brown and Caldwell to complete an update of the IWMP. The update will be expanded to address climate change, 20X20 demand reduction, residential and commercial recycled water irrigation, and reduced density development.

Figure 1 – Rancho Murieta Development Map



Master Plan

JUNE 1983 MAP

Legend

EXISTENTIAL/EXISTING DENSITIES

- ESTATE LOTS 3 PER ACRE MAXIMUM
- CIRCLE LOTS 3 PER ACRE MAXIMUM
- COTTAGE LOTS 6 PER ACRE MAXIMUM
- TOWNHOUSES 10 PER ACRE MAXIMUM
- APARTMENTS 25 PER ACRE MAXIMUM

RESIDENTIAL/PROPOSED DENSITIES

- 3 3 PER ACRE MAXIMUM
- 6 6 PER ACRE MAXIMUM
- 10 10 PER ACRE MAXIMUM
- 25 25 PER ACRE MAXIMUM

- PARKS
- OPEN SPACE
- COMMERCIAL
- SCHOOL SITES
- MOBILE HOME PARK
- GOLF COURSE

- EXISTING STREETS
- PROPOSED STREETS
- RESERVOIRS
- RESOURCE PROTECTION LINE
- RANCHO MURIETA BOUNDARY
- UNIT BOUNDARIES

PR. 1/83

SCHIRCE, RAYMOND VAIL AND ASSOCIATES



RVA



MARK B HORTON, MD, MSPH
Director

State of California—Health and Human Services Agency
California Department of Public Health



ARNOLD SCHWARZENEGGER
Governor

October 5, 2010

PWS No. 3410005

Mr. Ed Crouse, P.E.
Rancho Murieta Community Services District
P.O. Box 1050
Rancho Murieta, CA 95683

**REVIEW OF RANCHO MURIETA CSD'S DRAFT 2010 INTEGRATED WATER
MASTER PLAN UPDATE**

Dear Mr. Crouse:

We recently became aware of the Rancho Murieta Community Services District (RMCS D) Public Review Draft of the 2010 Integrated Water Master Plan Update (IWMPU). We apologize for the tardiness of these comments. We have very quickly reviewed the IWMPU. We have some major reservations about the assumptions used in the report and the long term adequacy of the RMCS D drinking water source capacity.

The IWMPU concludes that Calero and Chesboro reservoirs are capable of meeting the community's water supply needs under severe drought conditions; with the caveat "*provided the water use in the community is reduced 50 percent AND [emphasis added] and the 2020 compliance targets are achieved*". SB7 requires 20% reduction in water use by 2020 in urban areas. It is not reasonable to assume that the community will be able to achieve both a 20% and then an additional 50% reduction.

The above calculation is further compromised by the fact that the treated water production projection starts using 1710 ac-ft per year for 2010. This is an additional 8% less than the average production for the last 5 years. NOTE: Title 22 regulations require that for other calculations, such as the Maximum Day Demand and Peak Hour Demand, the highest usage is used as a baseline rather than the average or latest number.

In reviewing the usage information on page 3-3 which explains the decision to use 1710 ac-ft per year as a baseline, the Report states: "*This [higher 5 year average demand] can be partially explained by higher demands due to dry year conditions in 2007, 2008 and 2009 that increased irrigation demands*". The fact that demand increased during low rainfall years does not support the presumption that 20% plus 50% reductions will be achievable.

The IWMPU also appears to include all three reservoirs as permitted sources of drinking water. This is incorrect. Clementia is not presently authorized to be used as a source of public drinking

Mr. Ed Crouse, P.E.
October 5, 2010
Page 2

water. If RMCS D wishes to have it considered as such, then body contact recreation would most likely have to be prohibited.

On page ES-6, the 4th bullet concludes that under the medium build-out scenario: *"If the community demand is only reduced to 25% drought curtailment under this scenario [in addition to the 20% SB7 reduction], all three reservoirs reach dead storage and 690 ac-ft per year of shortfall is estimated that would need to be added to supplemental supply options."* We believe that the 25% reduction, in addition to the 20% reduction, is a much more plausible scenario. That said, RMCS D appears to have a significant capacity shortfall even using the non-permitted Clementia reservoir (957 acre-ft of usable storage).

We concur and support your findings that the existing water treatment facilities need to be expanded. We recommend that the upgrades be timed so that additional capacity is on-line prior to a significant number of new service connections being added.

If you have any questions or we may be of assistance, please feel free to me at (916) 327-8302 or Michael Tolin by at (916) 552-9995 or by email at Michael.Tolin@cdph.ca.gov.

Sincerely,



Kim Wilhelm, P.E.
Chief, Northern California Drinking Water Section
Field Operations Branch

cc: Joyce Horizumi
via email
HorizumiJ@saccounty.net

Trish Stevens
via email
StevensT@saccounty.net

Janis Eckard

From: "Tolin, Michael (CDPH-DDWEM)" <Michael.Tolin@cdph.ca.gov>
To: <janiseckard@ranchomurieta.org>
Sent: Friday, July 16, 2010 3:43 PM
Subject: FW: Question

Hello Janis,
Thanks for having the confidence in me, but, I had to pass this one along. Your answer is below. I hope this helps.
MTT

Michael Tolin
(916) 552-9995

From: Malloy, Veronica (CDPH-DDWEM)
Sent: Friday, July 16, 2010 3:40 PM
To: Tolin, Michael (CDPH-DDWEM)
Subject: RE: Question

Using flashboard capacity is not an acceptable practice to use when planning any community or new development.

From: Tolin, Michael (CDPH-DDWEM)
Sent: Friday, July 16, 2010 1:13 PM
To: Malloy, Veronica (CDPH-DDWEM)
Subject: FW: Question

Hi V,
Are you able to answer this person's question?
Thanks,
MTT

Michael Tolin
(916) 552-9995

From: Janis Eckard [mailto:janiseckard@ranchomurieta.org]
Sent: Thursday, July 15, 2010 5:29 PM
To: Tolin, Michael (CDPH-DDWEM)
Subject: Question

Dear Mr. Tolin,

Your name was referred to me, as the man with the answers. Smile.

Can you tell me if using reservoir flash board capacity is normal for community planning purposes?

Sincerely,

Janis Eckard

7/16/2010

These photos were taken March 17, 2015, approximately one month prior to the date the flashboards/stoplogs can be legally installed, per the attached dams and reservoirs Certificate of Approval. A variance was needed to fill the lakes at this early date. Please note that Lake Calero and Lake Chesbro are at their flashboard capacity and Lake Clementia is close to its capacity. The CSD received written permission to install the boards, on March 16, 2015, just one day prior to the date these pictures were taken. Due to the fact that almost 1000 acre feet of water cannot be pumped in one day, the flashboard installation and pumping began before the written permission was received. On March 7, 2015, while walking around Lake Chesbro, I noticed that the lake level was unusually high and that the flashboards had already been installed, but don't know the actual date installation occurred. Although I believe that the CSD had verbal permission to proceed, why were these extreme measures, including the variance, needed for our current population, if there's plenty of water to supply the already approved and proposed development? How can CSD rely on the lakes flashboard capacity when planning for future development, if there's no guarantee that capacity will be available every year? What will happen, in the future, if there are drought conditions and CSD's request for a variance is denied?



Lake Calero - March 17, 2015, at flashboard capacity. The written permission to install the flashboards and begin pumping this capacity was received March 16, 2015.

Lake Chesbro at flashboard capacity, March 17, 2015. Without a written variance the flashboards cannot be installed until April 16th. CSD received the written variance March 16, 2015.



Lake Clementia close to flashboard capacity - March 17, 2015 - Without a written variance the flashboards cannot be installed prior to April 16th. CSD received the written variance March 16, 2015.

State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES
Division of Safety of Dams


Certificate of Approval

This Is To Certify That, pursuant to Part I of Division 3 of the California Water Code, the Department of Water Resources of the State of California has found that the Calero Dam and Reservoir, State Application Number 1450-3, located in Sec. 35, Tp. 8 N., R. 8 E., MDB. & M., Sacramento County, State of California, are safe to impound water; and the use of said dam and reservoir to impound water in accordance with and subject to the following terms and conditions is hereby authorized:

1. Water may be impounded to Elevation 280.00, USGS datum, the top of stoplogs.
2. Stoplogs shall be removed from the spillway every season between October 1 and April 15, both dates inclusive.

This certificate of approval supersedes every previous certificate of approval or written consent for use issued by the State of California relative to said dam and reservoir.

Witness my hand and the Seal of the Department of Water Resources of the State of California this 17th day of March 1989


Division Engineer, Reg. C. E. No. REG. C.E. NO. 12372

File, No. 1450-3

PH 3/17 2004 3/17/89 CB 3/17 DWTB 3/17

State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES
Division of Safety of Dams

Certificate of Approval

This Is To Certify That, pursuant to Part 1 of Division 3 of the California Water Code, the Department of Water Resources of the State of California has found that the Chesbro Dam and Reservoir, State Application Number 1450-2, located in Sec. 35, T.P. 8 N., R. 8 E., MD. B. & M., Sacramento County, State of California, are safe to impound water, and the use of said dam and reservoir to impound water in accordance with and subject to the following terms and conditions is hereby authorized:

1. Water may be impounded to Elevation 262.86, USGS datum, the top of stoplogs.
2. Stoplogs shall be removed from the spillway every season between October 1 and April 15, both dates inclusive.

This certificate of approval supersedes every previous certificate of approval or written consent for use issued by the State of California relative to said dam and reservoir.

Witness my hand and the Seal of the Department of Water Resources of the State of California this 17th day of March 1989


Dennis J. Quinn
Division Engineer, Reg. C. E. No. REG. C.E. NO. 12972

File No. 1450-2

10 H 3/17 Staff 3/17 by [Signature] 3/17 018B3/17

State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES
Division of Safety of Dams

Certificate of Approval

This Is To Certify That, pursuant to Part 1 of Division 3 of the California Water Code, the Department of Water Resources of the State of California has found that the Clementia Dam and Reservoir, State Application Number 1450-4 located in Sec. 35 Tp. 8 N., R. 8 E. MDB. & M., Sacramento County, State of California, are safe to impound water; and the use of said dam and reservoir to impound water in accordance with and subject to the following terms and conditions is hereby authorized:

1. Water may be impounded to Elevation 187.00, USGS datum, the top of stoplogs.
2. Stoplogs shall be removed from the spillway every season between October 1 and April 15, both dates inclusive.

This certificate of approval supersedes every previous certificate of approval or written consent for use issued by the State of California relative to said dam and reservoir.

Witness my hand and the Seal of the Department of Water Resources of the State of California this 17th day of March 1989.


Division Engineer, Reg. C. E. No. _____

REG. C.E. NO. 12372

File No. 1450-4

1450 3/17 1989 3/17 1989

DEPARTMENT OF WATER RESOURCES

1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791



RECEIVED

MAR 10 2015

RECEIVED
CERTIFICATE SECTION

MAR 11 2015

Ms. Darlene Gillum, General Manager
Rancho Murieta Community Services District
Post Office Box 1050
Rancho Murieta, California 95683

Chesbro Dam, No. 1450-2
Calero Dam, No. 1450-3
Clementia Dam, No. 1450-4
Sacramento County

Dear Ms. Gillum:

This is in reply to Mr. Paul Siebensohn's letter dated March 6, 2015, requesting a variance from the Certificates of Approval to install the stoplogs in the spillways of the subject dams before April 16, 2015. The Certificates of Approval require the two feet of boards be left out of the spillways every season between October 1 and April 15, both dates inclusive.

In view of the severe drought conditions, the request for a variance is granted for this year only. The reservoirs must be closely monitored and the stoplogs must be removed in advance of a major flood to prevent overtopping of the dams.

If you have any questions or need additional information, you may contact Area Engineer Aspet Ordoubigian at (916) 227-4635 or Regional Engineer Andrew Mangney at (916) 227-4631.

Sincerely,

Handwritten signature of Michael Wagner, with the initials "FW" written below it.

David A. Gutierrez, Chief
Division of Safety of Dams

AOrdoubigian:TGlorioso
Rancho Murieta Ltr.doc
Spell Check 3/10/15



RON CHAPMAN, MD, MPH
Director & State Health Officer

State of California—Health and Human Services Agency
California Department of Public Health



EDMUND G. BROWN JR.
Governor

November 16, 2012

PWS No. 3410005

Mr. Ed Crouse, P.E.
Rancho Murieta Community Services District
P.O. Box 1050
Rancho Murieta, CA 95683

Dear Mr. Crouse:

**RANCHO MURIETA COMMUNITY SERVICES DISTRICT PROPOSAL TO USE
RECYCLED WATER FOR RESIDENTIAL LANDSCAPE IRRIGATION**

We have reviewed Rancho Murieta Community Services District's proposal discussed during the meeting held on October 25, 2012, to use tertiary treated wastewater for landscape irrigation at proposed new residential developments. While there are other future residential areas where tertiary treated wastewater may be used, our discussions focused primarily on the proposed subdivisions known as Riverview and Lakeview.

It is our understanding that tertiary treated recycled water currently flows from the treatment plant via a 12-inch pipeline to an open body of water known as Lake 16 which is connected to adjacent Lake 17. At Lake 17, the impounded tertiary treated wastewater is pumped via an 8-inch line to two additional impoundments (Lake 11 and adjacent Lake 10) where the water is, from time to time, blended with surface water from the Consumnes River. The comingled water in Lakes 10 and 11 is currently used for golf course irrigation. The proposal is to construct a pump station and pump water from Lake 11 to the proposed Riverview and Lakeview developments where it would be used for residential landscape irrigation.

With appropriate safeguards in place, the use of tertiary treated recycled water for residential irrigation is practiced in many locations in California. The issue in this case is the comingling of the tertiary treatment recycled water with surface water and local runoff and the health risks associated with the use of surface water. It is our opinion that the use of the comingled water on the use site where the comingled occurs (the golf course) does not present a significant health risk, but the use of this water on other use areas is problematic. The comingling with surface water and local runoff could introduce pathogens that would not be properly removed (no filtration) or properly inactivated (some disinfection would occur – but it would be uncontrolled). Moreover, at residential use sites, the opportunity for incidental contact and the potential for unintended usage due to misuse or "misplumbings" are greater than at the current golf course use site.

This office contends that the quality of the waters in Lakes 10, 11, 16, and 17 are not equivalent to the original tertiary treated wastewater as it was discharged from the treatment plant. Therefore, this proposed project is not consistent with the recycled water regulations. For this project, the District may wish to consider implementation of one of the following options in order to provide recycled irrigation water to residents of the proposed development(s):

- Route water directly from the recycled water treatment plant into the 8-inch line and use water from this line for residential landscape irrigation. If the capacity of this line is insufficient and higher head/flow capacity pumps cannot be installed or are not feasible, a recycled water storage tank could be constructed near the new use sites to receive and provide this water for the landscape irrigation.
- Treat the comingled tertiary recycled water and surface water with a small package plant that meets Title 22 filtration and disinfection requirements and use the finished water for landscape irrigation.
- To "free up" the existing tertiary treated recycled water for residential landscape irrigation, divert additional surface water into Lakes 11 and 12 and fill these lakes as possible with tertiary treated recycled water through a proper air gap structure.

We support the District's intent of using recycled water to the extent possible, but the usage will need to be in a manner consistent with Title 22 requirements and that does not pose an undue risk to public health.

If you have any questions, please contact Michael Tolin by telephone at (916) 552-9995, or by email at Michael.Tolin@cdph.ca.gov. Or, feel free to contact me at (530) 224-4867.

Sincerely,



Richard Hinrichs, P.E., Chief
Northern California Section
Drinking Water Field Operations Branch

cc: Randy Bernard, P.E., CDPH Recycled Water Unit
Anne Olsen, Central Valley RWQCB