

EXHIBIT ROSEVILLE-1e¹

TESTIMONY OF RICHARD PLECKER, P.E.

Background

1. My name is Richard Plecker and I am the City of Roseville's Environmental Utilities Director, having begun in that position in January 2015. In that role, I have responsibility for all matters concerning Roseville's water systems, including management of our water supplies. I have nearly 30 years of experience as a water manager and hold a Bachelor's of Science degree in Civil Engineering from University of Alaska, Fairbanks. Additionally, I am a California registered civil engineer, CE 47727, exp. 12/31/17.
2. **Exhibit Folsom-3e** is a joint PowerPoint presentation that summarizes key points of this testimony. Exhibit Folsom-3e represents the "summary of testimony" requested by the SWRCB.
3. The City of Roseville (City) is located in western Placer County. The City is the retail municipal water supplier for nearly all of the City's residents. The City provides water supplies to almost 130,000 people. Approximately 5,000 City of Roseville residents are served water supply by Placer County Water Agency (PCWA), San Juan Water District (SJWD), or Citrus Heights Water District.
4. In 2015, the last full year of implementing significant water conservation measures in response to the Governor's drought proclamations and the SWRCB's conservation regulations, the City delivered 34,484 acre-feet of water. The City's last 10 years of water deliveries are shown in **Exhibit Roseville-3**. The City projects that its total water demand will be 51,333 acre-feet per year by 2030. Of that amount, 5,259 acre-feet will be met with recycled water, and 46,074 acre-feet of demand for potable water is planned to be met with surface water supplies. This projected future water demand reflects continued implementation of the City's existing water conservation program.
5. The City has invested in diversifying its water supply portfolio and has three sources of water supply: a) surface water, b) groundwater used for dry years or in times of emergency, and c) recycled water used for irrigation and industrial cooling. Each of these supplies is discussed in turn below.

Roseville's Surface Water Supplies

6. The City is highly dependent on surface water diverted directly from Folsom Reservoir, which has been the primary source of water for the City since 1971.

¹ This errata corrects three errors that I identified in my oral testimony. In paragraph 2, references to exhibits have been corrected to Exhibit Folsom-3e. In paragraph 56, the exhibit reference has been corrected to Exhibit Roseville-17. In paragraph 60, the reference the "water rights" has been corrected to "water supplies."

Through the Folsom Lake Municipal and Industrial (M&I) intake, the City receives untreated water under its surface water contracts with the U.S. Bureau of Reclamation (USBR), Placer County Water Agency, and San Juan Water District; the terms of those contracts are discussed in more detail below. (A cross section of the dam at Folsom Reservoir showing the M&I water supply intake and other water intakes and outlets is provided on **Exhibit Folsom-18**.) The City’s three surface water contract entitlements for American River water total 66,000 af/yr. However, as also discussed in more detail below, the City, as part of its purveyor specific agreement developed as part of the Sacramento region’s Water Forum, has agreed to limit its diversions off of the American River to 58,900 af/yr during Normal/Wet Years and to between 54,900 af/yr and 39,800 af/yr in Drier Years. In Driest (Critical Dry) Years, the City has agreed to limit its diversions from the American River to 39,800 af/yr. These hydrologic year types are defined by the Water Forum as follows:

- Normal/Wet Years: When the projected March through November Unimpaired Inflow to Folsom Reservoir is greater than 950,000 AF;
- Drier Years: When the projected March through November Unimpaired Inflow to Folsom Reservoir is between 950,000 AF and 400,000 AF; and,
- Driest Years: When the projected March through November Unimpaired Inflow to Folsom Reservoir is less than 400,000 AF.

7. Roseville’s contractual entitlements to surface water supply from Folsom Reservoir are set forth in Table A below.

Table A

Contracted Water Supply	Contract Amount, af/yr
USBR (Central Valley Project Supply)	32,000
PCWA (Middle Fork Supply)	30,000
SJWD (Middle Fork Supply) ^(b)	4,000
Total Contracted Supplies	66,000
Diversion Limitations Per Water Forum Agreement:	
Normal/Wet Years	58,900
Drier and Driest Years (Critically Dry)	Ranges from 54,900 to 39,800
<small>^(a) American River diversion limitations as outlined in the City's Water Forum Agreement. From City's UWMP Table 4.1.</small>	
<small>^(b) San Juan Water District is only available as a normal/wet year supply, thus it is not available in drier or driest years.</small>	

D-893 and Roseville’s Central Valley Project (CVP) Contract

8. The development of the City of Roseville has been predicated on a consistent and reliable water supply from Folsom Reservoir as provided for under Decision 893, issued by the State Water Resources Control Board’s (SWRCB’s) predecessor, the State Water Rights Board, in 1958. The City's primary water supply is the CVP water for which it contracts from USBR. The amount of the City's CVP contract is

32,000 acre-feet per year. This contract is subject to shortage provisions under USBR's CVP M&I Water Shortage Policy finalized in November 2015.

9. Prior to 1958, Roseville, due to its proximity to the American River, had filed its own water rights application, Application 12295, to appropriate 350 cfs by direct diversion, year-round, from the American River and to impound and store up to 120,000 acre-feet per year between October 1 and June 1. **Exhibit Roseville-4** is a map of the American River watershed.
10. In Decision 893, the State Water Rights Board considered Roseville's water rights application as well as the water rights applications filed by USBR and others to divert water from the American River and store it at Folsom Reservoir. A copy of Decision 893 can be found in **Exhibit Roseville-5**. Roseville and other parties within the watershed of the American River upstream of Nimbus Dam had protested the United States' applications; the State Water Rights Board described these protests as follows: "some assert their own claimed rights and express apprehension that the diversions that the applicants propose, or some of them, will leave insufficient stream flow to satisfy those rights; others, filed by entities who are themselves applicants, set forth reasons why, in their opinion, their own applications should have precedence." D 893, p. 48. The State Water Rights Board found that these protests did not "necessitate denial of any of the applications" filed by the United States. D 893, p. 48. Rather, the State Water Rights Board held that the protestants' objections "focus attention . . . upon the necessity of so conditioning permits in certain instances as to prevent injuries that the protestants apprehend." D 893, p. 48.

Consequently, the State Water Rights Board found that Applications 13370, 13371, 13372, and 14662, by the United States, "are eligible for approval . . . provided that rights acquired thereunder remain subject to reduction by appropriation of water for reasonable, beneficial use within the watershed above Folsom Reservoir, provided that releases past Nimbus Dam are sufficient at all times to satisfy demands under downstream rights and requirements for fish conservation and salinity control, provided that deliveries outside of Placer, Sacramento, and San Joaquin Counties are sufficiently restricted to ensure the satisfaction of such demands as developed within those counties, provided such development is undertaken within a reasonable period, and provided that licenses when issued shall be issued to the public agencies of the State within which the water is found to have been put to beneficial use." D 893, p. 51.

At the same time, the State Water Rights Board found that the City of Roseville, being within the area "naturally dependent" on the American River, would be better served by a contract with the United States and the insertion of terms in the United States' permits requiring fulfillment of local water supply needs prior to any exports of American River water:

The point or points of diversion under each of those applications is Folsom Dam and/or Nimbus Dam to which right of access has not been acquired by the applicants. Accordingly, issuance of permits to those applicants would be meaningless in view of the obvious necessity of contracting with the United

States for a supply of water from the Federal facilities. The service areas which those applicants desire to supply may be supplied equally well and with less administrative confusion by contract with the United States. Permits are being issued to the United States to appropriate enough American River water to adequately supply the applicants naturally dependent on that source and availability of water to such applicants is reasonably assured by the terms to be contained in the permits to be issued to the United States restricting exportation of water under those permits insofar as exportation interferes with fulfillment of needs within Placer, Sacramento and San Joaquin Counties. Other applicants in more remote areas must if necessary seek water from other sources.

D 893, p. 54.

11. After considering these competing interests in the use of the waters of the American River, the State Water Rights Board ordered that Applications 13370, 13371, 13372, and 14662 of the United States be approved, but the permits were to include the following terms and conditions:

11. The amounts which may be diverted under rights acquired or to be acquired under these permits are and shall remain subject to reduction by future appropriation of water for reasonable, beneficial use within the watershed of Folsom Reservoir. D 893, p. 71.

[¶¶]

14. Deliveries of water under permits issued pursuant to Application 13370 and 13371 shall be limited to deliveries for beneficial use within Placer, Sacramento and San Joaquin Counties and shall not be made beyond the westerly or southerly boundaries thereof, except on a temporary basis, until the needs of those counties, present or prospective, are fully met, provided, however, that agreements in accordance with Federal Reclamation laws between permittee and parties desiring such service within said counties are executed by July 1, 1968. D 893, p. 72.

15. The right to divert and store water and apply said water to beneficial use as provided in the permits issued pursuant to Applications 13370 and 13371 is granted to the United States as Trustee for the benefit of the public agencies of the State together with the landowners and water users within such public agencies as shall be supplied with the water appropriated under the permits. D 893, p. 72.

16. Subject to compliance by the public agencies concerned with any and all present and future valid contractual obligations with the United States, such public agencies, on behalf of their landowners and water users, shall, consistent with other terms of the permits, have the permanent right to the use of all water appropriated and beneficially used under permits issued pursuant to Applications 13370 and 13371, which right, except where water is distributed to the general public by a private agency in charge of a public

use, shall be appurtenant to the land to which said water shall be applied, subject to continued beneficial use and the right to change the point of diversion, place of use, and purpose of use, as provided in Chapter 10 of Part 2 of Division 2 of the Water Code of the State of California, and further subject to the right to dispose of a temporary surplus. D 893, pp. 72-73.

17. Upon completion of the appropriation and beneficial use of water under the permits, any license or licenses which may be issued in the matter of Applications 13370 and 13371 pursuant to Chapter 9 of Part 2 of Division 2 of the California Water Code shall be issued to the public agencies of the State within which the water shall have been found by inspection by the Board to have been applied to beneficial use. D 893, p. 73.

That is, the State Water Rights Board determined that Roseville, being within the area “naturally dependent” upon the American River, would be provided a set of assurances, adopted as a set of terms and conditions in Reclamation’s permits, that it would be provided a reliable water supply from Folsom Reservoir. Generally, the City manages its supplies to maximize the CVP contract first before turning to its other contracted sources. Roseville has relied upon those assurances for nearly 60 years.

12. Consistent with the State Water Rights Board’s Decision 893, the City and the United States negotiated a contract to provide the City with water from Folsom Reservoir. The City signed its first contract with Reclamation for CVP supplies in 1967. The City currently is operating under an interim CVP contract. **Exhibit Roseville-6, Roseville-7, Roseville-8 and Roseville-9** are copies of the City's original contract and its first, second and third interim CVP contracts, respectively.
13. Since 1967, Roseville’s contract with Reclamation has been its primary source of water supply. Roseville has a right to receive water under its CVP contract under the terms and conditions set forth in D 893. Roseville’s past and future development as a city has been based on the assurances provided in D 893 and the terms and conditions imposed on Reclamation’s permits for diversions from the American River.

14. The last ten years the City has used the following amounts under its CVP contract:

<u>Water Year</u>	<u>Amount</u>
2006	32,000
2007	32,000
2008	24,000
2009	30,925
2010	31,115
2011	30,727
2012	32,000
2013	23,234
2014	15,640
2015	6,849
2016*	11,316

*2016 reflects demands through July 2016.

The lower amounts in 2008, 2014 and 2015 reflect the fact that, in those years, USBR allocated less than the full amount of the City's CVP contract to the City, reducing the City's CVP supplies to 75%, 50% and 25% of the City's adjusted historical use of water under that contract in those years, respectively. In those years, the City was forced to reschedule water under its PCWA contract (discussed below) to ensure it could meet its customers' water demands.

Roseville's Contract with Placer County Water Agency

15. In addition to the City's CVP supplies, the City also has a water supply from Middle Fork American River Project (MFP) water that the City obtains under its contract with PCWA. Originally signed in 1989, the City's contract with PCWA was updated in 2010 to consolidate and supersede previous other water supply related agreements between the City and PCWA into a single contract. A copy of the City's 2010 PCWA Water Supply Contract is included in **Exhibit Roseville-10**. The maximum entitlement of water available to the City under this contract is 30,000 acre-feet per year. The agreement includes an incremental build-up schedule for increasing water allocations over time. It is a take-or-pay contract, meaning that the City must pay for the water that PCWA makes available to the City, whether or not the City takes delivery of it.
16. The amount of water available to the City under the take-or-pay provisions of the PCWA contract will increase over time as indicated below. The City is currently paying for 15,000 acre-feet of supply and anticipates putting to beneficial use the full contract entitlement of 30,000 AF as the City grows.

<u>Date Available</u>	<u>Amount (acre-feet per year)</u>
Until June 30, 2015	10,000
Until July 1, 2018	15,000
Until July 1, 2021	20,000
Until July 1, 2024	25,000
After July 1, 2024	30,000

17. While this water is appropriated under PCWA's water rights and delivered by PCWA to the City, the only physical means by which the City currently can take this water is through Reclamation's M&I intake in Folsom Dam. The City has a long-term Warren Act contract with Reclamation for the delivery of this PCWA water. A copy of that Warren Act contract is **Exhibit Roseville-11**.
18. The amounts of water under the PCWA contract that the City has used in the last 10 years are as follows:

<u>Year</u>	<u>Amount</u>
2006	1,637
2007	0
2008	9,660
2009	0
2010	0
2011	0
2012	1,028
2013	10,954
2014	12,051
2015	15,993

As these amounts indicate, the City has used the PCWA contract water as a source of secondary supply, with the CVP contract water serving as the City's primary water source. The City's use of significant amounts of PCWA contract water in 2008, 2014 and 2015 was a direct result of USBR allocating reduced amounts of CVP contract to the City in those years, as discussed above.

Roseville's Contracts with San Juan Water District

19. The City has also two agreements for water supply with SJWD. The first agreement, signed in 2001, provides for 800 acre-feet of supply, while the second agreement, signed in 2003, provides of 3,200 acre-feet of water supply. Copies of the agreements are provided in **Exhibits Roseville-12** and **Roseville-13**. The water provided under these agreements is water from SJWD's contract with PCWA for water from PCWA's MFP water rights. The water provided under these agreements is diverted at Folsom Reservoir under SJWD's Warren Act contract with USBR (Warren Act Contract No. 6-07-20-W1315).

20. The 4,000 acre-feet of water supply from SJWD under these agreements is only available to the City in wet and normal years. Thus, the water supply from SJWD generally cannot be used for drought relief.

Management of American River and Sacramento Region Groundwater Supplies through the Water Forum Agreement

21. As indicated above, Roseville and many other Sacramento-area water suppliers have voluntarily agreed to manage their surface water supplies from the American River through the January 2000 Water Forum Agreement. The Sacramento Water Forum is a diverse group of business and agricultural leaders, citizen groups, environmentalists, water managers, and local governments working together to balance two co-equal objectives:

- To provide a reliable and safe water supply for the Sacramento region's long-term growth and economic health; and
- To preserve the fishery, wildlife, recreational, and aesthetic values of the lower American River.

The Water Forum Agreement provides the framework for how water resources, including surface water and groundwater supplies, will be used in the region, through the year 2030.

22. The Water Forum Agreement includes Purveyor Specific Agreements. The City's Purveyor Specific Agreement includes limitations on City surface water diversions from the American River under various hydrologic conditions. The Water Forum categorized water years into three types, all of which are defined in terms of the projected March through November unimpaired flow into Folsom Reservoir. As mentioned above, these hydrologic year types are defined as follows:

- Normal/Wet Years: When the projected unimpaired flow into Folsom Reservoir is greater than or equal to 950,000 af
- Drier Years: When the projected unimpaired flow into Folsom Reservoir is between 400,000 af and 950,000 af
- Driest Years (also known as Critical Dry Years): When the projected unimpaired flow into Folsom Reservoir is less than 400,000 af

23. Although Roseville's water contracts entitle it to divert a total of 66,000 af/yr from the American River, the Water Forum Agreement limits the City's diversions. In Normal/Wet Years, the City has agreed to limit surface water diversions from the American River to 58,900 af/yr. In Drier Years, the City may divert an amount between 39,800 and 54,900 af/yr from the American River, depending on the unimpaired flow into Folsom Lake. In Driest Years (also called Critically Dry Years), the maximum diversion from the American River is limited to 39,800 af/yr.

24. It is important to note that during the Drier Years and Driest Years, the City agreed, as part of its Purveyor Specific Agreement, to have PCWA release an additional 20,000 af/yr of water down the American River on the City's behalf through re-operation of PCWA's American River Middle Fork Project (MFP). This

20,000 af/yr of water is not part of the City's contracted supply of 66,000 af/yr. The intent of MFP re-operational releases during Drier Years and Driest Years is to mitigate environmental impacts resulting from increased diversions above 1995 baseline levels.

Roseville's Access to Groundwater Supplies

25. Presently, groundwater is used only as a back-up to surface water supplies as needed during drought or emergency conditions.
26. In August 2007, the Cities of Roseville and Lincoln, along with PCWA and the California American Water Company, completed the Western Placer Groundwater Management Plan (GMP). The GMP was prepared in an effort to maintain a safe, sustainable and high-quality groundwater resource to meet backup, emergency and peak demands within a zone of the North American River Groundwater sub-basin.
27. While Roseville has some ability to pump natural groundwater, under both the GMP and the Water Forum Agreement, the City has assumed obligations to help manage the basin at a sustainable level. With the cooperation of many Sacramento regional water agencies, the basin is currently operating at a sustainable yield.

Roseville's Aquifer Storage and Recovery Program

28. Roseville has been actively working to augment available groundwater supplies through an Aquifer Storage and Recovery (ASR) program. In 2012, the SWRCB adopted Water Quality Order No. 2012-0010 as the statewide ASR water quality permit. Because of the importance of ASR for securing the future of this region's water supplies, the City of Roseville and Sacramento Suburban Water District worked closely with the Central Valley Regional Water Quality Control Board to develop the language for the statewide ASR permit that the SWRCB adopted.
29. Shortly afterwards, the City started an ASR program. Under the City's ASR program, treated surface water can be injected into the aquifer during wet times (normal / wet years or during the rainy season) and withdrawn when the City needs additional water supplies. Uses include augmenting surface water supplies during droughts or shaving peak water demand periods, like those that occur during summer months.
30. Since issuance of the permit, the City has only banked a small volume of water into the basin due to statewide drought conditions. The City currently operates six-groundwater wells, all of which are capable of delivering approximately 15,970 af/yr (1,650 gpm per well) if run continuously, though a more realistic production amount is 40 af/day (1,500 gpm per well) over limited time frames to augment the water supply. The City's wells have been built with ASR capability to improve the reliability of the City's overall water supply through the storage of available treated surface water in the groundwater basin for use during drought or other emergencies. The wells are primarily used as a backup water supply, thus improving water supply reliability. Since issuance of the City's ASR permit, the City has only banked a small

volume of water into the basin due to limited water supplies as a result of drought conditions.

31. The City has plans to expand its ASR groundwater well network. Ten additional groundwater well sites have been identified for constructing future ASR wells. Once constructed, the City's groundwater facilities (16 wells) could deliver up to 106.07 af/day (6.63 af/day per well) or 38,715 af/yr, if run on a continuous basis. **Exhibit Roseville-14** is a map showing the locations of the City's existing and future planned ASR wells. The expansion of the City's well system and ASR program will allow the City to expand the volume of water it can store in the groundwater basin and increase its groundwater pumping capacity to ensure adequate back-up water supplies during future droughts or other emergencies as the City grows.
32. The City's ASR program relies on its surface water supplies as the sources of the water it is "banking." Without those sources of surface water, the City would not have water available to inject into the groundwater basin, and it would have to develop other supply strategies to ensure adequate preparation for future long-term droughts or other emergencies while ensuring the long-term health of the groundwater basin.
33. Table B, below, shows City groundwater operations over the past 10 years. The amount of groundwater delivered to City water customers is indicated as a positive value while the amount of treated surface water injected into the groundwater basin through ASR is indicated as a negative value.

Table B

<u>Water Year</u>	<u>Groundwater Used (AF)</u>	<u>Surface Water Stored (AF)(ASR)</u>
2006	0	0
2007	1468	0
2008	392	0
2009	0	0
2010	0	0
2011	0	0
2012	0	-3,248
2013	296	0
2014	0	0
2015	0	0

34. In sum, Roseville has planned to only use groundwater resources in drought or emergency conditions and does not have sufficient groundwater facilities to serve all of its water customers for any significant length of time. Further, if groundwater resources were to be relied on by the City for a sustained period of time, the combination of increased groundwater use by the City and other existing groundwater users would likely result in exceeding the sustainable yield of the groundwater basin. Also, only the western portion of the City overlies water-bearing

aquifers, and the portion of the City that does not is located easterly and uphill of that area. The City's main water source at Folsom Reservoir is located east of the City. As such, the City's water distribution system was designed and constructed to move water from east to west. Without significant investment and modification, the City's water system has limited capacity to move and deliver groundwater water from west to east (in a direction reverse to its standard operational direction).

Roseville's Program to Meet Some Demands Using Recycled Water

35. The City of Roseville has also implemented a water recycling program to help off-set surface water supply needs. In 2000, Roseville, along with the South Placer Municipal Utility District and Placer County, formed the South Placer Wastewater Authority (SPWA) to oversee funding for regional wastewater and recycled water infrastructure. On behalf of SPWA, the City owns and operates two regional wastewater treatment facilities for the regional partners. These treatment facilities are the Dry Creek Wastewater Treatment Plant and the Pleasant Grove Wastewater Treatment Plant. Both plants produce Title 22 quality effluent that is available for recycled water applications.
36. The regional recycled water system currently serves approximately 3,000 acre-feet per year of recycled water to commercial, parks, streetscapes and golf course customers for irrigation purposes both inside and outside of the City limits. Of this amount, approximately 2,040 acre-feet per year is used for irrigation and industrial customers within the City of Roseville. System expansion is planned for more intensive use of recycled water in the western portion of the City as new development occurs, but at this time, Roseville has limited ability to use recycled water to serve non-potable water demands.

Risks of Injury to Roseville's Water Supply by Proposed Cal Water Fix Project

37. As discussed in detail above, Roseville has contract rights to receive surface water supplies that are delivered from Folsom Reservoir, and Roseville is highly dependent on those supplies. Normally, raw water is diverted through the Folsom Lake M&I intake and delivered to Roseville, SJWD, the City of Folsom and Folsom Prison via Folsom Dam's Pumping Plant. Refer to Exhibit Folsom-18, a cross section of the dam at Folsom Reservoir showing the M&I water supply intake and other facilities. Depending on the elevation of the water in Folsom Reservoir, water diverted through the M&I intake is either gravity fed or pumped to the City's Barton Road Water Treatment Plant for purification prior to delivery to City water customers.
38. The M&I intake is the only existing physical means by which the City can access its surface water supplies.
39. Folsom Reservoir's maximum storage volume is approximately 977,000 acre-feet of water. As shown on Exhibit Folsom-18, the center line of the M&I water intake is at elevation 317 feet above mean sea level (msl), at which point the reservoir holds approximately 65,000 acre-feet. If the lake were to drop to this level, the M&I water intake would be exposed (partially out of the water).

40. However, even before the M&I intake pipe is exposed, the City and others who depend on the M&I intake pipe would have water supply problems because the intake pipe becomes unsafe to use when there is not enough water in the reservoir above it. When the lake level is at 330 ft msl, or about 89,000 acre-feet of water in storage, the existing pumping plant could incur damaging vortices because too little water would be present above the dam's M&I raw water intake. When there is not enough water above the intake to take the place of the water that is being pumped out, pumping through the intake causes a vortex of air to form, which has a cyclone-like shape and depth. Because of the vortex, air could be carried into the pipe and ultimately reach the pumps themselves. Air in the pumps causes cavitation, which in turn causes destructive shock waves to the pump impellers. Because of these risks, the M&I raw water intake pipe at Folsom Lake becomes unusable when the reservoir level drops too low, even if the intake is still submerged. **Exhibit Folsom-19** is "Increasing Water Supply Pumping Capacity at Folsom Dam, January 1996, ESA Consultants, Inc."
41. Operational levels at Folsom Reservoir during the 2014-2015 drought have proven that these risks to the City's surface water supplies are real. Calendar year 2013 was historically dry, and dry conditions persisted through January 2014. Folsom Reservoir dropped to 162,617 acre-feet by early February 2014, according to information available from the California Data Exchange Center (CDEC).
42. During November and December 2013, according to the City's review of information from CDEC, Reclamation was releasing between approximately 1,100 and 1,500 cubic feet per second (cfs) from the reservoir to the lower American River. At that release rate, without additional precipitation, City staff estimated that the water level in Folsom Reservoir would have dropped below the top of the M&I intake by the end of March 2014.
43. Fortunately, Reclamation and the State Water Resources Control Board recognized the need to ensure adequate carryover storage for the City and other municipal water suppliers to be able to meet minimum health and safety requirements, and the rate of release from Folsom Reservoir was reduced to preserve reservoir storage elevations. Reclamation informed the City and the other Folsom direct diverters that its goal was to try to manage the remaining supplies to attain an end-of-September storage at Folsom Reservoir of 293,000 – 297,000 acre-feet, under the 90% exceedance forecasts, as contemplated by the Drought Operations Plan Reclamation and the California Department of Water Resources (DWR) submitted to the SWRCB in April 2014.
44. Because of the dry conditions experienced in 2013 and continuing in 2014, the City of Roseville conducted a Critical Dry Year Water Supply and Infrastructure Assessment to identify alternative water supplies, required infrastructure improvements and revised operational protocols to meet both existing and future water demands. The study summarizes the infrastructure required to meet City water customer demands under various alternative dry-year water supply and water source scenarios. A copy of the Critical Dry Year Water Supply and Infrastructure Needs Assessment is included as **Exhibit Roseville-15**.

45. The risk to the City's water supplies was even more serious in 2015, though the water year progressed differently. With very little snowpack, Folsom Reservoir's storage peaked at 574,885 AF on March 15, 2015. Storage then declined steadily throughout nearly the entire remainder of 2015 to a historic low level of 135,561 on December 4, 2015. This water level information is based on the City's review of information from the California Data Exchange Center.
46. Throughout 2014 and 2015, the City's representatives engaged in frequent communications with Reclamation representatives concerning planned operations of the Central Valley Project and Folsom Reservoir. Based on those conversations, I understand that Reclamation made relatively high releases from Folsom Reservoir in the spring and summer of 2015 to contribute to the implementation of Delta water quality requirements while attempting to maintain cold-water storage in Lake Shasta to support winter-run Chinook salmon spawning in the Sacramento River. These releases depleted available storage in Folsom Reservoir.
47. Throughout 2015, there was serious concern that continued dry conditions could result in Folsom Reservoir's water level dropping below the level where the dam's M&I intake would be rendered unsafe to use. A repeat of the extremely dry conditions in late 2013 and early 2014 could have created that situation. Reclamation's planning to avoid this condition was a major topic of discussion between the City and Reclamation throughout 2015.
48. To avoid the safety problems posed by the creation of a vortex and to assure delivery of needed public health and safety water supplies, when the lake level was approaching 340 feet above msl, the water agencies that take water from Folsom Reservoir worked closely with Reclamation's Central California Area Office Manager Drew Lessard and his staff to develop emergency measures. For Roseville and SJWD supplies, the emergency measures consisted of an emergency pump (E-Pump) located at a lower elevation than the M&I intake that would pump raw water from one of the dam's hydropower penstocks. The E-Pump would allow continued delivery of water supplies to Roseville and SJWD if the lake dropped to 330 feet above msl. If the level of the reservoir continued to drop and was reduced below the level where the E-Pump could be safely operated, the plan was to float a temporary pumping system in the reservoir to supply the City and SJWD. As noted above, the M&I intake pipe from Folsom Reservoir is the only existing physical means Roseville has to access its surface water supplies. If reduced reservoir levels render it unsafe to use the M&I intake, Roseville would not be able to access surface water under any of its contracts without the emergency measures being implemented successfully.
49. In 2015, Reclamation staff, including Central California Area Office Manager Drew Lessard, indicated that, if Folsom Reservoir's level were projected to drop below elevation 340 ft msl, or 111,945 acre-feet of storage, at any time, Reclamation would plan to serve limited supplies to the City and SJWD through the dam's E-Pump.
50. According to Reclamation, the E-pump cannot be utilized to deliver water from the hydropower penstock when Folsom Reservoir's level is below elevation 309 ft msl, or 53,858 acre-feet. Reclamation indicated that, if the reservoir's water level were to be projected to decline below 309 ft msl, then Reclamation would procure, and install a

floating pump station on Folsom Dam’s right-wing dam, a 30-40 CFS floating pumping system similar to the system Reclamation installed on the left wing dam in October 2015 to potentially serve the City of Folsom and Folsom Prison. Reclamation further indicated that submersible pumps for the proposed arrangement on the right-wing dam could be specified to draw water from as low as elevation 280 ft msl or 22,932 acre-feet to deliver water to the City and SJWD.

51. Reclamation staff provided to the City the information below in Table C for storage, elevations and pumping capacities associated with use of the existing E-Pump for the City and SJWD and the use of a floating pumping system for the City of Folsom. The information in the table concerning the “North Fork Line” is for capacity for deliveries to the City and SJWD on the north side of Folsom Dam. The information in the table concerning the “Natoma Line” concerns capacity for deliveries to the City of Folsom and Folsom Prison on the south side of Folsom Dam. Refer to **Exhibit Roseville-16**, “Folsom Reservoir Drought Emergency Action Plan.”

Table C

Procure/Rent 30 CFS Pumping System and Utilize E-Pump (Stay above El=309')				
Storage (TAF)	Elevation (FT)	Temporary/Rental System Natoma Line (CFS)	E-Pump in series with Main Pumping Plant - North Fork Line (CFS)	Total Pumping (CFS)
112	340	N/A	N/A	
89	330	N/A	N/A	
70	320	30	70	100
62	315	30	70	100
55	310	30	70	100
	<309	30	0	30

52. The hydrologic modeling on which the Bay-Delta Conservation Plan draft environmental impact report/environmental impact statement (DEIR/EIS) and the California WaterFix recirculated draft EIR/supplemental draft EIS (RDEIR/SDEIS) indicates that, with operation of the proposed California WaterFix project under the one modeled climate change scenario and with demand growth, Folsom Reservoir would be drained to approximately 100,000 acre-feet at the end of September during 10% of all years in the future. These results are shown, in among other places, Figure 8 of the RDEIR/SDEIS's hydrologic modeling Appendix B. A copy of that figure is **Exhibit Roseville-17**. It is not clear if this is the lowest possible level to which Folsom Reservoir would be drawn with the California Water Fix project because 100,000 acre-feet appears to be the lowest level for the reservoir depicted in the modeling.

53. In addition, the modeling does not appear to reflect realistic CVP/State Water Project (SWP) operations. For example, I understand that the H4 scenario that is part of the DEIR/EIS's Alternative 4 and the RDEIR/SDEIS's Alternative 4A involves higher Delta outflows than the H3 scenario that is part of those Alternatives. Figure 8 in the RDEIR/SDEIS's hydrologic modeling Appendix B, however, shows that end-of-September Folsom Reservoir storage would be significantly higher in the driest of years under the H4 scenario than under the H3 scenario. As noted above, a copy of that figure is Exhibit Roseville-17.
54. In spring 2016, in preparation for this hearing, Reclamation and DWR released new modeling of the project; this modeling had not previously been included in the RDEIR/SDEIS. DWR-514 summarizes the results of the Spring 2016 modeling. Figure 14 of DWR-514 shows Simulated End of September Folsom Storage under the Spring 2016 modeling. According to Figure 14, with the proposed project, in 5% of the years, Folsom Reservoir storage will be drawn down to 90,000 acre-feet or less – slightly above 330 feet above mean sea level – at the end of September. This is just at the level where the effects of the vortex could be encountered and the M&I intake becomes unsafe to use. (Again, it is not clear whether the actual lake level would be less than 90,000 acre-feet because 90,000 acre-feet is the lowest value that can be obtained under the Spring 2016 version of the model; the actual lake level could be even lower than 90,000 acre-feet.) Through the Cal Water Fix project, Reclamation proposes to make voluntary, discretionary changes to the CVP, which will, in one out of every 20 years, draw Folsom Reservoir down to a level where Reclamation has deemed it would be unsafe to divert water through the M&I intake. Obviously, this poses a serious risk of injury to Roseville and the other agencies that rely on that intake for their water supplies.
55. Even if the more generous lake level projection of the RDEIR/SDEIS modeling is accepted, the end-of-September storage for Folsom Reservoir with the project would be 100,000 acre-feet (or less) in 10% of the years. At this level, Folsom Reservoir would be only 10,000 acre-feet away from potentially encountering the vortex – and this level is more than 11,000 acre-feet below the margin of safety established in 2015 when Reclamation announced it would implement emergency measures if the lake dropped below 111,945 acre-feet (or 340 feet above msl).
56. Moreover, neither the modeling results depicted in Figure 8 of the RDEIR/SDEIS (Exhibit Roseville-17) nor the modeling results depicted in Exhibit 14 of DWR-514 are consistent with the City's experience during the drought conditions in 2014 and 2015, when I understand from our extensive communications with Reclamation staff that Reclamation was releasing water from Folsom Reservoir in the spring and summer specifically to maintain Delta outflows in light of the Coordinated Operations Agreement and because Reclamation believed it needed to try to hold water in Lake Shasta to maintain a cold-water pool to support later winter-run Chinook salmon spawning. Under the dry conditions experienced in 2014 and 2015, end of September Folsom Reservoir storage levels were significantly lower than would be expected under normal operations.
57. With CalWaterFix, as proposed, there is a great deal of uncertainty as to how the project will be operated. The DEIR/EIS, the RDEIR/SDEIS, the draft and final

Biological Assessments, and the evidence submitted at this hearing do not contain any CVP/SWP operations plan that demonstrates how the CVP and SWP would operate with the proposed Delta tunnels in place. It therefore is possible that, with the tunnels in operation, Folsom Reservoir could be drawn down at least as far as stated in Figure 14 of DWR-514, that is, to 90,000 acre-feet of storage, or less, at the end-of-September. While Reclamation and DWR's operators, Ron Milligan and John Leahigh, testified that the projects would not actually be operated as depicted in the modeling, without an operations plan or other enforceable criteria in place, the City of Roseville and the other agencies dependent on Folsom Reservoir water supplies do not have any assurance that the operations shown in the modeling will not be carried out.

58. If Folsom Reservoir were drawn down as far and as often as projected in either the RDEIR/SDEIS modeling or the Spring 2016 modeling, these drawdowns would create recurring serious risks to Roseville's primary water supplies.
59. During those projected conditions, the City of Roseville's ability to divert water through Folsom Reservoir's M&I intake and the other facilities used for normal operations would be compromised in 5% of all years (according to the Spring 2016 modeling as depicted in DWR-514) to 10% of all years (according to the RDEIR/SDEIS modeling).
60. Even if the (untested) emergency E-Pump were used once the M&I intake was shut off, as Reclamation proposed to do in 2015, the limited physical capacity of these facilities would interfere with the City's ability to receive its water supplies under its water supply contracts. According to Reclamation's "Folsom Drought Emergency Action Plan" (Exhibit Roseville-16), the E-Pump can divert only 70 cfs of water to serve both Roseville and SJWD. This 70 cfs would have to be split between Roseville and SJWD, and it is not clear what the split would be. Even if the water diverted through the E-Pump were split evenly between Roseville and SJWD, each agency would receive no more than 35 cfs. Of course, the extent to which Cal Water Fix would interfere with Roseville's water supplies depends on the number and duration of times that the M&I intake would be rendered unusable as a result of the Cal Water Fix project. Since Reclamation and DWR have not produced an operations plan, it is not possible to quantify these impacts precisely at this time. However, if Cal Water Fix drew Folsom Reservoir down to the point where the M&I intake were deemed unsafe and Roseville diversions had to be taken through the E-Pump at a rate of 35 cfs, the maximum volume of water that could be delivered in one year would be 25,355 acre-feet. (This assumes inflow sufficient to keep Folsom Reservoir's level at or above 309 ft msl, or 53,858 acre-feet of storage; as noted above, the E-Pump itself cannot be used if the Reservoir drops below that level, and additional emergency measures would have to be implemented to ensure continued deliveries to Roseville and SJWD.)
61. If the E-Pump were in service for a full year, Roseville's diversions would be limited to 25,355 acre-feet, which represents only 38% of the 66,000 acre-feet per year that the City is entitled to receive under its water supply contracts. Even with the diversion reductions that Roseville has voluntarily assumed under the Water Forum Agreement, which range from 39,800 to 54,900 acre-feet, depending on hydrologic

conditions, the City would be physically unable to take the full amount of its surface water supplies in those 5 – 10% of years that Cal Water Fix draws Folsom Reservoir down below the point where the M&I intake is safe to use.

62. The City's groundwater supplies also could be significantly impacted if Cal Water Fix draws Folsom Reservoir down as projected in the RDEIR/SEIS and the Spring 2016 modeling reflected in Figure 14 of DWR-514.
63. Much of the area and population north of the American River is served by water diverted from Folsom Reservoir or through the City of Sacramento's and Carmichael Water District's lower American River diversions. For example, SJWD delivers a significant amount of water north of the American River to Citrus Heights Water District, Fair Oaks Water District and Orangevale Water Company, and they serve approximately 160,000 people in addition to the 31,000 people to whom SJWD directly provides water service. Hundreds of thousands of people within the Sacramento region depend on the availability of these surface water supplies from Folsom Reservoir.
64. If Folsom Reservoir's storage were to be significantly reduced in many years as a result of the Cal Water Fix project, then those surface water diversions could be significantly reduced because either the amount of stored water itself was reduced or because the reduced storage would result in lower streamflows in the lower American River. When lower American River streamflows fall to 500 cfs or less, the City of Sacramento may not be able to exercise its diversion.
65. If deliveries of water from Folsom Reservoir or the lower American River north of the river were significantly reduced as a result of reduced storage in the reservoir, then a significant amount of demand that currently is served by that water presumably would have to be met through increased groundwater pumping in the region. The fact that this probably would occur is demonstrated by the fact, before Sacramento Suburban Water District (SSWD) and its predecessors began taking surface water from Folsom Reservoir and reduced their reliance on pumped groundwater, the groundwater levels under that district north of the river were significantly lower. Effectively requiring SSWD and the other water suppliers north of the American River to use more groundwater presumably would affect the availability of groundwater from that area, which is part of the North American Subbasin as defined by DWR's Bulletin 118. **Exhibit Roseville-18** is a figure showing the North American Subbasin and the City's location overlying part of that subbasin.
66. The City of Roseville's groundwater wells are located in the North American Subbasin. If groundwater in that subbasin were to decline as a result of reduced storage in Folsom Reservoir or reduced diversions from the lower American River, then the City of Roseville's groundwater supplies would be impacted. With the increased demand on the basin that would likely result from reduction in surface water supplies from the American River, it would be more difficult for Sacramento region groundwater agencies to continue to manage the basin at a sustainable level and to comply with their obligations under the Sustainable Groundwater

Management Act. Pumping costs could also be increased if the depth to the groundwater table increased significantly.

67. As discussed above, CVP operations under Cal WaterFix are uncertain, and Roseville would be injured if Folsom Reservoir is frequently operated to the low lake levels projected by the Cal Water Fix project proponents. To assure continued reliability of its municipal and industrial water supplies, Roseville needs further assurances and protections that the CalWaterFix project will not injure Roseville's ability to appropriate water supplies from Folsom Reservoir as was assured in Decision 893.