# CITY AND COUNTY OF SAN FRANCISCO



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March 16, 2017

Via Hand Delivery

Jeanine Townsend Clerk to the Board State Water Resources Control Board 1001 "I" Street, 24th Floor Sacramento, CA 95814-0100



# Re: Comments by the City and County of San Francisco to the State Water Resources Control Board's Draft Substitute Environmental Document in Support of Potential Changes to the Bay-Delta Plan.

Dear Ms. Townsend:

The San Francisco City Attorney's Office submits the enclosed comments on the State Water Resources Control Board's proposed amendment of the Bay-Delta Water Quality Control Plan ("Bay-Delta Plan") and the Draft Substitute Environmental Document on behalf of the San Francisco Public Utilities Commission ("SFPUC" or "San Francisco").

Our submission consists of a cover letter from Harlan L. Kelly, Jr., General Manager, SFPUC and the following two attachments to the SFPUC Cover Letter:

- (1) Legal Comments by the City and County of San Francisco to the Draft Substitute Environmental Document in Support of Potential Changes to the Bay-Delta Plan ("Legal Comments"). San Francisco's Legal Comments include exhibits and appendices that are provided on the attached CD, along with electronic copies of our complete submission.
- (2) SFPUC Alternative to promote the expansion of fall-run Chinook salmon and Oncorhynchus mykiss populations in the lower Tuolumne River while maintaining water supply reliability.

Very truly yours,

DENNIS J. HERRERA City Attorney

/s/

Jonathan P. Knapp Deputy City Attorney

Enclosures



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Chair Felicia Marcus and Board Members State Water Resources Control Board P.O. Box 100 Sacramento, CA 95812-0100 Jeanine Townsend Clerk to the Board State Water Resources Control Board P.O. Box 100 Sacramento, CA 95812-0100

March 16, 2017

Re: Comment Letter – Bay Delta Plan Revised SED

Dear Ms. Townsend:

The SFPUC appreciates the opportunity to comment on the revised Substitute Environmental Document (SED) prepared for analyzing the potential changes to the water quality control plan for the San Francisco Bay-Sacramento/San Joaquin Delta Estuary (Bay-Delta Plan), and in particular, the proposed revised San Joaquin River (SJR) flow objectives which apply to the Tuolumne River. The SFPUC is a department of the City and County of San Francisco responsible for managing and operating the City's water, clean water and power utilities. We have numerous concerns about the proposal as described below, but at the same time we are submitting a proposal to promote the expansion and maintenance of fisheries on the Tuolumne River. We believe this proposal has significant merit.

The SFPUC believes the State Water Board's revised SED analysis prepared in compliance with the California Environmental Quality Act is deficient. The City and County of San Francisco's City Attorney Office have prepared comments detailing these deficiencies. They are included as an attachment to this letter (Attachment 1). As identified in these comments, contrary to the State Board's analysis, a 40% unimpaired flow proposal would mean a significant impact on San Francisco's water supply, and alternatives to make up that supply are enormously expensive and have potential significant impacts that make their implementability uncertain.

We have serious doubts about the Tuolumne River ecosystem benefits of the State Water Board's proposal. Over 200 studies have been performed on the Tuolumne River since the early 1990s and the SFPUC and Turlock and Modesto Irrigation Districts have spent \$25 million on studies on the Tuolumne River fishery in the last 5 years. The State Board neglected to use these siteEdwin M. Lee Mayor

Anson Moran President

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Harian L. Kelly, Jr. General Manager



specific available data. All of these studies provide significant information about the state of the fishery on the Tuolumne River and what should be done to improve the fishery. These studies are included in detail in the comments of the Modesto and Turlock Irrigation Districts. We are incorporating their comments by reference, specifically the following technical comments, attachments and appendices:

#### SED Technical Comments

- 1.0 Summary of Findings Related to SWB's Revised Draft Substitute Environmental Document
- 2.0 Comments on the SED's Description of the Tuolumne River Basin
- 3.0 Comments on Hydrology, Unimpaired Flow, and Related Adverse Impacts on Fry and Juvenile Fall-Run Chinook Salmon
- 4.0 Comments on the SED's Assessment of Temperature Benefits
- 5.0 Comments on the SED's Assessment of Floodplain Benefits
- 6.0 Comments of the SED's SalSim Model and Analyses
- 7.0 Comments of the SED's Adaptive Implementation Plan
- 9.0 The Missing Science and How It Would Change the SED
- 10.0 Other Material Errors or Misrepresentations Contained within the Draft SED
- 11.0 References

#### Attachments

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Appendix B	Detailed Comments on SalSim Model
Appendix D	Response to the Resource Agencies' Presentations at the
	January 3, 2017 Public Hearing
Appendix E	Final Swim Tunnel Study Report
Appendix F	Final Tuolumne River Floodplain Hydraulic and Habitat
	Assessment Study Report
Appendix G	Final License Application (FLA), Don Pedro Project
Appendix H	Final Otolith Study Report, e-filed with FERC post-FLA
	filing

Most importantly, we have a better proposal for Tuolumne River ecosystem improvements that have significant technical support. This proposal meets the fishery protection goals on the Tuolumne River without the significant impacts to San Francisco that would result from the State Board's proposal. Attached to this letter is a description of the SFPUC's alternative (Attachment 2). Finally, we cannot support a proposal that hurts our water supply while benefitting other users. Increased flow releases from the San Joaquin tributaries will increase Delta inflow. Increased Delta inflow could be used as the basis for increased diversions from the South Delta by the State Water Project and the Central Valley Project. Benefits for the Projects at the expense of San Francisco's water supply are not acceptable.

In closing, negotiated settlements among water users, NGOs and the State and Federal agencies are a better solution than the State Water Board's regulatory proposal if they can be developed and implemented. They need to be jointly developed for the San Joaquin River, the Sacramento River and the Delta. The State-sponsored settlement discussions are off to a slow, but promising, start. There is much work to be done in building trust among the parties. However, we do not believe the State Water Board's regulatory proposal provides a framework that is sufficiently flexible or robust to support settlements. Please feel free to contact Michael Carlin at (415) 934-5787 or Steve Ritchie at (415) 934-5736 with any concerns or requests for additional information.

Sincerely,

arlan L. Kelly, Jr. General Manager

Attachments

cc: SFPUC Commissioners Michael P. Carlin, Deputy General Manager Steven R. Ritchie, Assistant General Manager, Water Nicole Sandkulla, BAWSCA CEO and Executive Director

## ATTACHMENT 1:

COMMENTS BY THE CITY AND COUNTY OF SAN FRANCISCO TO THE DRAFT SUBSTITUTE ENVIRONMENTAL DOCUMENT IN SUPPORT OF POTENTIAL CHANGES TO THE BAY-DELTA PLAN

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10	BEFORE THE CALIFORNIA
11	STATE WATER RESOURCES CONTROL BOARD
12	DRAFT SUBSTITUTE ENVIRONMENTAL COMMENTS BY THE CITY AND COUNTY OF
13	CHANGES TO THE WATER QUALITY CHANGES TO THE WATER QUALITY
14	CONTROL PLAN FOR THE SANIN SUPPORT OF POTENTIAL CHANGES TOFRANCISCO BAY-SACRAMENTO/SANTHE BAY-DELTA PLAN
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	n Deliveries throughout the RWS service territory for the current and projected population through 2040
	A. The SFPUC currently faces water supply shortages in sequential-year droughts and hardened water supply demands throughout the RWS service territory, as compared to prior drought periods
	3 Implementation of LSIR Alternatives 3 or 4 would exponentially
	increase existing water shortages in the RWS service territory during sequential-year droughts
	C. It is reasonable to assume that San Francisco would require increased levels of rationing if LSJR Alternatives 3 or 4 were implemented and a sequential-year drought occurred based on San Francisco's drought planning policies, and the history of its actions during past droughts21
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3	Francisco to impose unsustainable levels of mandatory rationing during sequential-year droughts
4 5	4. Implementation of LSJR Alternatives 3 or 4 may jeopardize current deliveries from the RWS to San Jose and Santa Clara and constrain the SFPUC's ability to provide these cities with
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19	3. Increased risk of urban wildfires
20	4. Adverse impacts to habitat
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27	rationing in the RWS service territory may be inconsistent with state and
20	local plans promoting green infrastructure
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1	H.	If water supplies were insufficient to serve new customers in the Bay Area, water suppliers throughout the RWS service territory may adopt
2		policies that force new development to go elsewhere, and businesses may choose to locate in areas with more reliable dry-year and future water supplies
3		1 California law requires that prior to approving a proposed large-
4 5		scale development, a local government agency must consider, as part of its environmental review, whether water supplies are available to meet the projected future demand of the project for
6		multiple dry years
7		2. When water supplies are insufficient to serve new customers, cities, counties, special districts, and other water suppliers may
8		rely on various sources of authority to adopt policies that limit or prohibit growth
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10		policies to limit or prohibit growth when there was insufficient water available to serve new customers 41
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25		Area 2013 and other State plans designed to avoid adverse environmental effects
26	J.	The SED fails to analyze the significant environmental impacts that
27		would result if the pattern of growth called for in Plan Bay Area is displaced
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10	Valley
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14	The SED's economic analysis of a large_scale water transfer
14	improperly relies on an assumed purchase price for the water without any reasonable basis for determining such a purchase
16	price
17	4. The assumption that potential water transfers would simply make up for reduced water supply is not reasonable or logical because
18	delivery reliability in dry years and to meet projected future
19	demand
20	that San Francisco would be able to obtain replacement water through
21	the development of a large-scale desalination plant located at Mallard Slough is not supported by substantial evidence and the analysis of
22	environmental and economic impacts is inadequate
23	1.The State Water Board's assumption that a desalination-plant at Mallard Slough with more than twice the capacity of any prior
24	proposal for a facility at that location would be feasible is not supported by substantial evidence
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26	conclusion that the envisioned large-scale desalination plant located at Mallard Slough would be feasible based
27	on the SED's misplaced reliance on two disparate
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1 2					i.	The State Water Board's reliance on prior analyses of the BARDP is misplaced because the site specific analyses contemplated a facility that
3						address numerous unresolved potential feasibility concerns
4 5					ii.	The State Water Board's reliance on analyses of the Carlsbad Desalination Project is misplaced
6						in a disparate geographic area with a distinct source water intake
7					iii.	The State Water Board's reliance on prior
8						analyses of the BARDP and Carlsbad
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12				0.	factors	s that may render their envisioned 56,000 AF/year nation plant at Mallard Slough infeasible
13			2.	The S	tate Wa	ter Board's environmental analysis of the
14				envisi Sloug	oned 56 h is woe	5,000 AF/year desalination plant located at Mallard efully inadequate
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19				it fails yield f	s to take from the	into account that the SFPUC already relies on e BARDP to meet projected future demand
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21			that S the de	an Fran velopm	cisco wo ent of th	ould be able to obtain replacement water through ne identified in-Delta diversion project is not
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21 22	Preserve Poway v. City of Poway
23	(2016) 245 Cal.App.4th 560, <i>reh'g denied</i> (Apr. 4, 2016), <i>renimu denied</i> (June 22, 2016)
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25	(2003) 106 Cal.App.4th 715
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25	Porter-Cologne Act,
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27 28	Title 23, California Code of Regulations §3779(b)1
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4	Water Code
5	§555
6	Water Code         §356
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#### **INTRODUCTION**

On September 15, 2016, the State Water Resources Control Board ("State Water Board") issued the Draft Substitute Environmental Document ("SED") for proposed amendments to the water quality control plan for the San Francisco Bay-Sacramento/San Joaquin Delta Estuary ("Bay-Delta Plan"). The amendments propose new unimpaired flow objectives for the Lower San Joaquin River ("LSJR"), and a new flow compliance location on the Tuolumne River ("Plan Amendment"). The San Francisco City Attorney's Office submits these comments on the Plan Amendment and the SED on behalf of the San Francisco Public Utilities Commission ("SFPUC" or "San Francisco"), the city department with jurisdiction over San Francisco's water, wastewater, and energy facilities. San Francisco submits these comments in accordance with Title 23, California Code of Regulations sections 3779(b) of the State Water Board's regulations.

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I.

A.

#### BACKGROUND

### San Francisco's Water Supply Operations.

### The Hetch Hetchy Regional Water System.

The SFPUC operates the Hetch Hetchy Water and Power System ("HHWPS"), which is comprised of numerous facilities that provide water directly to San Francisco's residents and 26 wholesale customers in San Mateo, Santa Clara and Alameda counties from the Tuolumne River.1 Collectively, these wholesale customers receive over 66 percent of the water delivered by the RWS. Of these wholesale customers, which are represented in matters related to the Hetch Hetchy Regional Water System ("RWS") by the Bay Area Water Supply and Conservation Agency ("BAWSCA"),2 13 rely on the SFPUC for 95 percent or more of their total supply, and 8 rely on the SFPUC for 100 percent of their total supply. The RWS is the third largest supplier of water for domestic and municipal purposes in California, providing water service to 2.6 million people in Tuolumne,

<sup>The RWS also provides water on a wholesale basis to Cordilleras Mutual Water Company ("MWC") and
Groveland Community Service District ("CSD") in Tuolumne County, as well as retail customers in the Town of Sunol and Lawrence Livermore National Laboratory in Alameda County. Cordilleras MWC relies entirely on the SFPUC for its supply, and Groveland CSD relies on the SFPUC for the majority of its supply.</sup> 

 <sup>2</sup> Annual Survey, April 2016, Fiscal Year 2014-15, Bay Area Water Supply & Conservation Agency, *available* at <u>http://bawsca.org/uploads/userfiles/files/BAWSCA\_AnnualSurvey\_FY2014-15.pdf</u> (referred to below as "BAWSCA 2015 Annual Survey"), at ES-1. San Francisco incorporates the BAWSCA 2015 Annual Survey herein by reference.

Alameda, Santa Clara, San Mateo, and San Francisco counties. Water diverted from the Tuolumne River watershed makes up approximately 85 percent of the water used to supply the RWS, and the 2 remaining 15 percent is diverted from the combined Alameda and Peninsula watersheds (referred to 3 collectively as the "local" watersheds). 4

The RWS begins with Hetch Hetchy Reservoir and O'Shaughnessy Dam, located in Yosemite National Park on the main stem of the Tuolumne River. Hetch Hetchy Reservoir collects drainage primarily in the form of snowmelt from the surrounding 459 square miles of the Tuolumne River watershed. Two additional reservoirs in the Hetch Hetchy Region - Lake Eleanor and Lake Lloyd (also called Cherry Reservoir) - collect water from the watersheds northwest of Hetch Hetchy Reservoir on tributaries to the Tuolumne River.

Under normal operating conditions, Hetch Hetchy is the only reservoir that directly supplies 11 Tuolumne River water to the RWS. San Francisco delivers water from Hetch Hetchy Reservoir to 12 customers without filtration because the high quality of this water supply warrants a filtration 13 exemption from the United States Environmental Protection Agency ("U.S. EPA") and the State Water 14 Board's Division of Drinking Water ("DDW"). Hetch Hetchy Reservoir can store up to 360,400 acre-15 feet ("AF") of water. San Francisco primarily uses Lake Eleanor and Lake Lloyd to satisfy 16 downstream senior water rights of the Modesto Irrigation District ("MID") and Turlock Irrigation 17 District ("TID," collectively referred to as the "Districts") and to produce hydroelectric power. 18

The Districts are co-licensees of the Don Pedro Hydroelectric Project located on the Tuolumne 19 20 River, approximately 39 miles downstream from Hetch Hetchy Reservoir. Don Pedro Reservoir formed by Don Pedro Dam – can store 2,030,000 AF of water. The Districts also own the La Grange 21 Hydroelectric Project, which consists of a dam and reservoir located on the Tuolumne River 22 23 downstream of Don Pedro Dam.

In the 1913 Raker Act (38 Stat. 242), Congress granted San Francisco rights-of-way across 24 25 federal lands for the Hetch Hetchy Project, and required San Francisco to bypass certain flows to the Districts in recognition of their senior water rights -2,350 cubic feet per second ("cfs") or natural 26 27 flow, whichever is less, year-round, and 4,000 cfs from April 15 to June 13, as measured at La Grange Dam. (Raker Act, §§ 9(b))-(c).) San Francisco also bypasses an additional 66 cfs of flow in 28

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recognition of other pre-1914 water rights held by MID. These bypasses are collectively referred to here as the Districts' "water entitlements." Thus, the Raker Act only allows San Francisco to divert water from the Tuolumne River during high flow periods, and requires that San Francisco bypass all flow to the Districts during dry periods when flows do not exceed quantities specified in the Raker Act.3

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# B. San Francisco's Water Bank in Don Pedro Reservoir.

7 The 1966 Fourth Agreement between San Francisco and the Districts ("Fourth Agreement") involved the construction and operation of the Don Pedro Reservoir, and established a physical 8 9 solution that maximizes the beneficial use of water from the Tuolumne River while accommodating 10 the Districts' senior water rights. "The phrase 'physical solution' describes an agreed upon or judicially imposed resolution of conflicting claims in a manner that advances the constitutional rule of 11 reasonable and beneficial use of the state's water supply." (City of Santa Maria v. Adam (2012) 211 12 Cal. App. 4th 266, 287, as modified on denial of reh'g (Dec. 21, 2012), review denied (Feb. 13, 2013), 13 cert. denied, 134 S. Ct. 98 (U.S. 2013). The physical solution embodied in the Fourth Agreement 14 ensures that San Francisco's diversions under its pre-1914 appropriative water rights will not harm the 15 Districts' senior pre-1914 appropriative water rights by creating a water bank in Don Pedro Reservoir 16 that allows San Francisco to "pre-pay" water released from upstream to satisfy the Districts' senior 17 water rights. 18

Consistent with the requirements of the Raker Act and the Fourth Agreement, operation of the Don Pedro Reservoir "water bank" includes up to 570,000 AF of storage that San Francisco can use to manage its operation of the HHWPS more efficiently. The SFPUC has the right to a maximum water bank credit of 570,000 AF at any time, and has the right to an additional credit in the water bank of up

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 <sup>3</sup> See Comment Letter – Bay Delta Plan SED, City and County of San Francisco, March 29, 2013, available at <a href="http://www.waterboards.ca.gov/waterrights/water-issues/programs/hearings/baydelta-pdsed/docs/comments032">http://www.waterboards.ca.gov/waterrights/water-issues/programs/hearings/baydelta-pdsed/docs/comments032</a>
 913/dennis herrera.pdf (referred to below as "2013 CCSF Comment Letter"), at 26 (unnumbered), Chart

<sup>25 913/</sup>dennis herrera.pdf (referred to below as "2013 CCSF Comment Letter"), at 26 (unnumbered), Chart entitled "Daily Allocation of Tuolumne River Runoff" [depicting the amount of runoff that San Francisco was

entitled to divert during the period from 1986-1993].) San Francisco's ability to divert water from the Tuolumne River was similarly restricted during the recent drought, *e.g.*, in 2014 the City was only able to divert

<sup>27 22,000</sup> AF. *See* Declaration of Steven R. Ritchie in Support of Comments by the City and County of San Francisco to the Draft Substitute Environmental Document in Support of Potential Changes to the Bay-Delta

<sup>28 ||</sup> Plan ("Ritchie Decl."), attached hereto as Appendix 1, at  $\P$  4.

to 170,000 AF when storage in Don Pedro Reservoir physically encroaches into space reserved for 2 flood control.4 The United States Army Corps of Engineers flood control manual requires the Districts to maintain 340,000 AF of available flood control capacity in Don Pedro Reservoir from 3 October 7th to April 27th of the following year, unless additional space and time are required by 4 5 snowmelt parameters. The SFPUC does not include the 170,000 AF in its operational planning for the RWS because the additional credit occurs infrequently, is intermittent, and the SFPUC cannot carry it 6 7 forward past October 6th of each year.

San Francisco and the Districts incorporated the Raker Act's flow bypass requirements into the 8 9 terms of the Fourth Agreement. In return for San Francisco paying over half of the capital costs for 10 the new Don Pedro Dam, the Districts agreed not to require San Francisco to bypass flow to meet the Districts' water entitlements whenever San Francisco has a positive balance in the water bank account. 11 12 If San Francisco's balance in the water bank account goes to zero, the Fourth Agreement requires San Francisco to release or bypass sufficient water to satisfy the Districts' water entitlements at La Grange 13 Dam. When releases from San Francisco's three reservoirs on the Tuolumne River and its tributaries 14 exceed the Districts' water entitlements or the natural river flow, whichever is less, the excess water 15 can be credited to San Francisco's water bank account, allowing the SFPUC to more flexibly store 16 water in Hetch Hetchy Reservoir for delivery to its customers at other times of the year or over the 17 course of successive dry years using carryover storage.5 18

Article 8 of the Fourth Agreement provides "[t]hat at any time Districts demonstrate that their 19 20 water entitlements, as they are presently recognized by the parties, are being adversely affected by making water releases that are made to comply with Federal Power Commission license requirements, and that the Federal Power Commission has not relieved them of such burdens, City and Districts 22 23 agree that there will be a re-allocation of storage credits so as to apportion such burdens on the following basis: 51.7121% to City and 48.2879% to Districts." The SED explains that "[b]y 2022, the 24 25 State Water Board will fully implement the February through June LSJR flow objectives through

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<sup>4</sup> See Fourth Agreement, Article 5.

<sup>5</sup> See 2015 Urban Water Management Plan for the City and County of San Francisco, San Francisco Public 27 Utilities Commission, June 2016 (referred to below as "SFPUC 2015 UWMP"), available at http://www.sfwater.org/modules/showdocument.aspx?documentid=9301, at Appendix L, at 6. 28

water right actions or water quality actions, *such as Federal Energy Regulatory Commission (FERC) hydropower licensing processes.*" (SED, at K-28 [emphasis added].) Pursuant to Article 8 of the
 Fourth Agreement, revised water release requirements for the Don Pedro Hydroelectric Project
 ordered by FERC could result in San Francisco being responsible to bypass approximately 51.7
 percent of the required flows.6

# C. San Francisco's Current Contractual Obligations Regarding Instream Flow Release Requirements at Don Pedro Dam.

8 In 1994 FERC initiated mediation among 12 parties, including San Francisco and the Districts, 9 on flow schedules and other matters related to instream flow releases from Don Pedro Dam in support of fisheries in the lower Tuolumne River.<sup>7</sup> In February 1996, the Districts filed an uncontested 10 settlement agreement with FERC that included minimum flow schedules that were greater than the 11 12 previous flow schedules (1996 Settlement Agreement).8 In July 1996, FERC amended the Don Pedro Hydroelectric Project license to incorporate the flow schedules in the 1996 Settlement Agreement.9 13 Prior to execution of the 1996 Settlement Agreement, on April 21, 1995, San Francisco and the 14 Districts entered into an agreement that required San Francisco to make annual payments to the 15 Districts in return for the Districts meeting all the minimum flow requirements provided for in the 16

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<sup>&</sup>lt;sup>18</sup>
<sup>6</sup> The analysis in these comments assumes a 51.7 percent flow contribution by San Francisco. As a water supply provider to approximately 2.6 million people throughout the Bay Area, San Francisco must utilize worst-case scenarios for water supply planning purposes. In presenting the potential water supply, environmental, and socioeconomic effects from certain interpretations of the Raker Act and the Fourth Agreement San Francisco does not waive arguments it may have about how the Raker Act or Fourth Agreement should or will be interpreted in future proceedings before the State Water Board, FERC, courts of competent jurisdiction, or in any other context.

 <sup>7</sup> Water System Improvement Program Programmatic Environmental Impact Report ("WSIP PEIR" or "PEIR"), *available at* <u>http://sf-planning.org/sfpuc-negative-declarations-eirs</u>, at 2-42. San Francisco incorporates the
 WSIP PEIR by reference herein.

<sup>24 8</sup> *Id*.

 <sup>9</sup> Id.; see also Turlock Irrigation Dist. & Modesto Irrigation Dist., Order Amending License and Dismissing Rehearing Requests (July 31, 1996) 76 FERC ¶ 61117 ("1996 FERC Decision"), at 61614; Submission by Turlock Irrigation District and Modesto Irrigation District of Settlement Agreement and Request for License

Amendments Pursuant to Settlement Agreement, February 5, 1996 ("1996 Settlement Agreement"), attached hereto as Exhibit 1. It is not clear from the SED whether, or why, the fishery and water quality standards analyzed in the SED were not comprehensively addressed in the 1996 Settlement Agreement and the

proceedings leading up to it, or how the new information developed since 1996 would inform the dramatically

<sup>28</sup> different flow schedule called for in the SED.

1996 Settlement Agreement ("1995 Side Agreement").10 The 1996 Settlement Agreement extends through the remainder of the FERC license and any annual licenses issued for the project.11

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# Water System Improvement Program.

The Water System Improvement Program ("WSIP") is a \$4.8 billion, multi-year, capital program to upgrade the RWS and is approximately 90 percent complete.12 The SFPUC undertook the WSIP to ensure that the RWS would be able to meet the Level of Service ("LOS") goals for water quality, seismic reliability, delivery reliability, and water supply. (*Id.*) The WSIP identifies a number of projects that San Francisco could potentially rely on to achieve the stated Water Supply LOS goal of meeting customer water needs in non-drought and drought periods throughout the RWS service territory. (*Id.*)

As required under CEQA, the San Francisco Planning Department prepared a Programmatic
Environmental Impact Report ("WSIP PEIR" or "PEIR") for the WSIP, that analyzed facility projects
at a program level and implementation of a water supply option at a project level. (*Id.*) The PEIR
evaluated the potential environmental impacts of the proposed WSIP projects and identified potential
mitigations for those impacts. (*Id.*) As recognized in the SED, the WSIP PEIR rejected the concept of
San Francisco relying on a new in-Delta diversion as infeasible.13 The San Francisco Planning
Commission certified the PEIR on October 30, 2008. (*Id.*)

18 On the same day, the SFPUC adopted the Phased WSIP Variant option in Resolution
19 No. 08-200. (*Id.*) The Phased WSIP Variant approved by the SFPUC included a 2 mgd water transfer
20 from the Districts as a potential water supply source for meeting current demands in the RWS service
21 territory during dry years.14

- 10 WSIP PEIR, *supra* note 7, at 2-42.
- 23 || 11 *Id.* at 2-42—2-43.
  - <sup>12</sup> SFPUC 2015 UWMP, *supra* note 5, at 6-2.

<sup>12</sup> SITUC 2015 OWNM, *supra* note 3, at 0-2.
<sup>13</sup> WSIP PEIR, *supra* note 7, at 9-126 (stating that "since this alternative would have uncertain water supply reliability and an unknown ability to reduce impacts on Tuolumne River resources, as well as significant additional environmental impacts, it was eliminated from further consideration."). *See also* SED, at 16-68 (where the State Water Board acknowledges the "SFPUC concluded that the in-Delta diversion option was infeasible, in part, because it would not achieve consistent year-round diversions due to uncertainties regarding

27 || the availability of water supplies and pumping capacities.").

28 14 Public Utilities Commission, City and County of San Francisco, Resolution 08-0202 (adopting WSIP CEQA findings), *see* Attachment A, Water System Improvement Program, California Environmental Quality Act

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The Phased WSIP Variant establishes a mid-term planning milestone in 2018, when the SFPUC will reevaluate water demands through 2030 in the context of then-current information, analysis, and available water resources. (Id.) The SFPUC has historically made annual average deliveries ranging from 285 million gallons per day ("mgd") in 1987 to 265 mgd in 2005 from the RWS. (Id.) The Phased WSIP Variant would meet the projected 2018 purchase requests of 285 mgd from the RWS by capping purchases at 265 mgd, the Interim Supply Limitation ("ISL") established by the SFPUC to limit water sales from the RWS through December 31, 2018. (Id. at 4-9, 6-2.) The remaining 20 mgd would be met through increased water efficiency and conservation, water recycling and local groundwater use: 10 mgd by the SFPUC's wholesale customers in Alameda, Santa Clara, and San Mateo Counties, and 10 mgd within San Francisco. (Id. at 1-1, 6-2.) By December 31, 2018, the SFPUC will reevaluate water system demands and supply options and conduct additional studies and environmental reviews necessary to address water supply needs after 2018. (Id. at 6-2.) As part of this process, the SFPUC will consider whether the Bay Area Regional Desalination Project ("BARDP") could serve as a future "source of supplemental water supply during droughts."15 E.

# The SFPUC's Contractual Obligations to its Wholesale Customers.

The 1984 Settlement Agreement and Master Water Sales Contract (collectively referred to as

the "1984 Agreement") established the "Supply Assurance" of 184 million gallons per day ("mgd") to

Findings, Findings of Fact, Evaluation of Mitigation Measures and Alternatives, and Statement of Overriding Considerations (referred to below as "WSIP CEQA Findings"), attached hereto as Exhibit 2, at 4 (explaining that the Phased WSIP Variant includes a "[d]ry year transfer from MID and/or TID of about 2 mgd," among other key program elements); see also SFPUC 2015 UWMP, supra note 5, at 7-6 (explaining that "[t]he proposed WSIP evaluated in the PEIR included a drought year water transfer with MID and/or TID of 25 mgd on an average annual basis during the design drought to meet drought year water delivery under the scenario in which demand was expected to be 300 mgd. The Phased WSIP that the SFPUC approved, however, only included a 2 mgd dry year transfer as that was the dry year need associated with meeting a demand of 265 mgd.").

<sup>15</sup> WSIP CEQA Findings, supra note 14, at 60 (emphasis added) ("After balancing competing policy considerations and the extent to which the Regional Desalination for Drought Alternative would add a great deal of complexity and uncertainty to the satisfaction of the SFPUC's long-term water supply objective, the

Commission presently rejects the Regional Desalination for Drought Alternative as infeasible within the meaning of CEQA. In doing so, however, the SFPUC is by no means closing the door permanently on eventual

participation in a regional desalination facility. As part of its assessment in 2018 as to whether to increase Tuolumne River diversions to meet anticipated 2030 demand in its service area, the SFPUC will assess any

progress the region has made towards putting in place, on a timely basis and under acceptable environmental conditions, a facility for desalinating seawater as a source of supplemental water supply during droughts. Any

such facility is simply too ill-defined and uncertain at present to be adopted at this time.").

the SFPUC's wholesale customers. (SFPUC 2015 UWMP, at 4-8.) Following the expiration of the 1984 Agreement on June 30, 2009, in July 2009, the SFPUC entered into the WSA, a 25-year agreement that describes the current contractual relationship between the SFPUC and its wholesale customers. (*Id.*) The 184 mgd Supply Assurance is a perpetual obligation carried forward in the WSA that survived expiration of the 1984 Agreement. (*Id.*) The Supply Assurance includes the demands of the City of Hayward and 23 additional wholesale customers (representing 24 of the 26 wholesale customers). (*Id.* at 4-9.) The cities of Santa Clara and San Jose do not have an allocated share of the Supply Assurance due to their temporary, interruptible status under the 1984 Agreement and the WSA. (*Id.*)

The WSA describes the temporary limitation on water sales through 2018 established by the Phased WSIP Variant, as noted. (*Id.*) As set forth in the WSA, the distribution of the Interim Supply Limitation ("ISL") is allocated as follows between wholesale customers and retail customers: the wholesale supply allocation is 184 mgd, and the retail supply allocation is 81 mgd. (*Id.*) If the SFPUC projects that the ISL will not be met by June 30, 2018 because of wholesale customers' projected use exceeding 184 mgd, the SFPUC may issue a conditional 5-year notice of interruption or reduction in supply of water to Santa Clara and San Jose. (*Id.*)

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### 2015 Urban Water Management Plan.

The SFPUC prepared the 2015 Urban Water Management Plan ("SFPUC 2015 UWMP") for San Francisco in accordance with the requirements of the 1983 California Urban Water Management Act ("Act"), Water Code sections 10610 through 10656. (*Id.* at 2-1.) The purpose of the Act is to assure that water suppliers plan for long-term reliability, conservation, and efficient use of California's water supplies to meet existing and future demands. (*Id.*) The Act requires that planning projections extend at least 20 years beyond the year of the UWMP, *e.g.*, through 2035 for the 2015 UWMP cycle. (*Id.*) The planning horizon for the SFPUC 2015 UWMP is 25 years, through 2040. (*Id.*) The SFPUC adopted the 2015 UWMP on June 14, 2016. (SFPUC 2015 UWMP, Appendix P.)

# G. 2040 WaterMAP.

To establish a water supply planning framework for the planning period of 2019 through 2040, the SFPUC developed the *Draft May 2016 2040 WaterMAP: A Water Management Action Plan for the SFPUC* ("WaterMAP"). (SFPUC 2015 UWMP, at 4-11.) The WaterMAP identifies a shortfall in supplies of 19.5 million gallons per day ("mgd") over the 2040 planning horizon. As required by the terms of the WSA, the WaterMAP addresses the following water supply decisions associated with the shortfall: (1) whether to provide permanent individual supply guarantees totaling 14.5 mgd to the cities of Santa Clara and San Jose; (2) whether to expand the 184 mgd wholesale Supply Assurance by adding 1.5 mgd to East Palo Alto's existing individual supply guarantee and the increment of supply made available to Santa Clara and San Jose; and (3) the recovery of net losses in yield of 3.5 mgd resulting from instream flow requirements prescribed in permits authorizing construction of local watershed WSIP projects. Significantly, the WaterMAP states that the RWS will experience a 5.3 mgd deficit by 2040 during drought years, assuming the SFPUC maintains a consistent level of 10 percent rationing in all years.16

H.

# San Francisco's Contribution to the Sacramento-San Joaquin Delta.

As explained in the WSIP, "[t]he Sacramento-San Joaquin Delta is a 600-square-mile area of channels and islands at the confluence of the Sacramento and San Joaquin Rivers." (WSIP, at 5.3.1-16.) Freshwater from a 41,300-square-mile watershed drains into the Delta from the Sacramento and San Joaquin Rivers and several smaller rivers. (*Id.*) "Some of the freshwater is diverted from the Delta channels for municipal and agricultural purposes. The remainder flows through the Delta to the San Francisco Bay Estuary." (*Id.*) Although on average about 21 million AF of natural flow reaches the Delta annually, actual inflow varies widely from year to year and within the year. (*Id.*) For example, in 1977, a year of extraordinary drought, Delta inflow totaled 5.9 million AF. By contrast, in 1983, an exceptionally wet year, Delta inflow was about 70 million AF. (*Id.*) "On a seasonal basis, average monthly flow into the Delta varies by more than a factor of 10 between the highest month in

In Draft May 2016 2040 WaterMAP: A Water Management Action Plan for the SFPUC, *available at* http://sfwater.org/Modules/ShowDocument.aspx?documentid=9750 ("WaterMAP"), at 24. San Francisco
 incorporates the WaterMAP herein by reference.

the winter or spring and the lowest month in the fall." (*Id.* (citation omitted).) The California Department of Water Resources ("DWR") estimates that over the historical hydrological record of water years 1922- 2014, on average, the natural flow into the Delta has equaled 21,533,000 AF, and the unimpaired flow has equaled 29,003,000 AF.17

Significantly, "[t]he Sacramento River, which enters the Delta from the north, contributes an 5 average of 77 percent of the inflow to the Delta. The San Joaquin River, which enters the Delta from 6 7 the south, contributes about 15 percent of the inflow. The remainder is contributed by the 8 Mokelumne, Consumnes, and Calaveras Rivers, which enter the Delta from the east." (WSIP, at 9 5.3.1-16 (citation omitted).) The percentage of average reduction in unimpaired flow into the Delta that is attributable to San Francisco's use of water from the Tuolumne River (which, in turn, reduces 10 flow into the San Joaquin River) may be determined by dividing San Francisco's average annual water 11 12 supply exported from the Tuolumne River, as described in the WSIP, *i.e.*, 218 million gallons per day ("mgd"), or 244,000 AF/year, (WSIP, at 5.3.1-5), by the total average unimpaired inflow into the 13 Delta, as computed by DWR, of 29,003,000 AF.18 Thus, San Francisco's exports from the Tuolumne 14 River account for approximately 0.8 percent of total unimpaired Delta inflow per year. (244,000 15 AF/29.003.000 AF = 0.8 percent unimpaired flow.)19 16

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hydropower purposes and (2) stream diversions for agricultural and municipal uses. Unimpaired flow estimates are theoretical in that such conditions have not occurred historically. In pristine watersheds that have undergone little land use change, unimpaired flow estimates provide a fixed frame of reference to develop relationships

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<sup>18</sup> I<sup>17</sup> Estimates of Natural and Unimpaired Flows for the Central Valley of California: Water Years 1922-2014, March 2016 (DRAFT), Department of Water Resources, Bay-Delta Office, *available at* 

https://msb.water.ca.gov/documents/86728/a702a57f-ae7a-41a3-8bff-722e144059d6, at 5-4; *id.* at ES-1, ES-2 (explaining that "[i]n this report, the term 'unimpaired' flow is used to describe a theoretically available water supply assuming existing river channel conditions in the absence of (1) storage regulation for water supply and

between precipitation, runoff, and water supply based on long-term hydrologic records. For many years these relationships were based on the assumption of stationarity, *i.e.* that the past is a good indicator of the future. However, global warming now requires hydrologists and water resources managers to analyze non-stationary

processes, requiring more sophisticated tools and techniques to quantify future water supplies."); *id.* at ES-1
 (emphasis added) (distinguishing between "unimpaired flows" and "natural flow" and concluding, "[i]n sum, the findings of this report *show that unimpaired flow estimates are poor surrogates for natural flow conditions.*").

<sup>26</sup> Ritchie Decl., *supra* note 3, at  $\P$  5.

<sup>&</sup>lt;sup>19</sup> *Id.* (wherein Mr. Ritchie further explains that "[i]n fact, in recent years, San Francisco has exported less water from the Tuolumne River than the WSIP average, *i.e.*, San Francisco delivered 205 mgd from the Tuolumne River to the Bay Area, or 230,000 AF/year, in fiscal year ("FY") 2012-2013, and delivered 150 mgd from the

<sup>28</sup> Tuolumne River, or 168,000 AF/year, in FY 2015-2016.").

I.

#### Lower San Joaquin River Alternatives Proposed in Plan Amendment

2 The Plan Amendment proposes new February–June Lower San Joaquin River ("LSJR") flow objectives "for the protection of fish and wildlife beneficial uses and an associated program of 3 implementation." (SED, at 3-1.) The SED evaluates four alternatives for LSJR flow requirements 4 5 during the February–June time frame, including LSJR Alternative 1 (No Project Alternative) and three other LSJR alternatives (LSJR Alternatives 2, 3, and 4). (Id. at 3-8.) The proposed objectives would 6 require flows below New Melones Dam on the Stanislaus River, below Don Pedro Dam on the 7 Tuolumne River, and below New Exchequer Dam on the Merced River. (Id.) The objectives would 8 also require flows on the "mainstem of the LSJR between its confluence with the Merced River and 9 10 downstream to Vernalis," *i.e.*, a minimum base flow of between 800-1,200 cubic feet per second ("cfs") at Vernalis at all times of the year. (Id. at 3-8, 3-9) There is both a narrative and a numeric 11 12 component to the objectives. (Id. at 3-8) Specifically, the SED explains that "[a] percent of unimpaired flow between a lower and upper limit from each of the Merced, Tuolumne, and Stanislaus 13 Rivers shall be maintained from February through June." (Id. [internal quotation omitted].) The SED 14 defines "[u]nimpaired flow" as "the flow that would accumulate in surface waters in response to 15 rainfall and snowmelt, and flow downstream if there were no reservoirs or diversions to change the 16 quantity, timing, and magnitude of flows." (Id. at 3-5.) Each LSJR Alternative evaluates a different 17 range of flows: "LSJR Alternative 2 evaluates a range between 20 and 30 percent, with 20 percent as 18 the starting percentage of unimpaired flow in the program of implementation;" "LSJR Alternative 3 19 20 evaluates a range between 30 and 50 percent, with 40 percent as the starting percentage of unimpaired flow in the program of implementation;" and "LSJR Alternative 4 evaluates a range between 50 and 21 60 percent, with 60 percent as the starting percentage of unimpaired flow in the program of 22 23 implementation." (Id. at 3-9.)

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I.

#### LEGAL STANDARD

California Environmental Quality Act and Certified Regulatory Programs. California Environmental Quality Act. A.

The California Environmental Quality Act, Pub. Res. Code, § 21000 et seq. ("CEQA"), 27 requires a governmental agency to prepare an Environmental Impact Report ("EIR") whenever it 28

considers approval of a proposed project that may have a significant effect on the environment. 1 2 (California Sportfishing Protection Alliance v. State Water Resources Control Bd) (2008) 160 Cal.App.4th 1625, 1642). "The EIR has been aptly described as the 'heart of CEQA.' Its purpose is to 3 inform the public and its responsible officials of the environmental consequences of their decisions 4 5 before they are made. Thus, the EIR 'protects not only the environment but also informed selfgovernment."" (Napa Citizens for Honest Government v. Napa County Bd. of Supervisors (2001) 91 6 Cal.App.4th 342, 355, as modified (Aug. 7, 2001), as modified on denial of reh'g (Sept. 4, 2001) 7 (citation omitted).) "An accurate, stable and finite project description is the [s]ine qua non of an 8 9 informative and legally sufficient EIR." (County of Inyo v. City of Los Angeles (1977) 71 Cal.App.3d 185, 193.) "[O]nly through an accurate view of the project may the public and interested parties and 10 public agencies balance the proposed project's benefits against its environmental cost, consider 11 12 appropriate mitigation measures, assess the advantages of terminating the proposal and properly weigh other alternatives." (City of Santee v. County of San Diego (1989) 214 Cal.App.3d 1438, 1454, reh'g 13 denied and opinion modified (Nov. 21, 1989).) 14

If there is no substantial evidence a project may have a significant effect on the environment or the initial study identifies potential significant effects, but provides for mitigation measures that make such effects insignificant, "a public agency must adopt a negative declaration to such effect and, as a result, no EIR is required." (California Sportfishing Protection Alliance, 160 Cal.App.4th at 1642 (internal quotations omitted).)

Judicial review of decisions involving application of the California Environmental Quality Act, Pub. Res. Code, § 21000 et seq. ("CEQA") to quasi-legislative acts extends only to whether there was a prejudicial abuse of discretion: "an agency may abuse its discretion under CEQA either by failing to proceed in the manner CEQA provides or by reaching factual conclusions unsupported by substantial evidence." (Save Tara v. City of West Hollywood (2008) 45 Cal.4th 116, 131, as modified (Dec. 10, 2008) (citing Pub. Res. Code, § 21168.5.) The adoption of water quality objectives is a quasilegislative act. (United States v. State Water Resources Control Bd. (1986) 182 Cal.App.3d 82, 170 26 (citations omitted); California Sportfishing Protection Alliance, 160 Cal.App.4th at 1639).

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"[T]he ultimate decision of whether to approve a project, be that decision right or wrong, is a nullity if based upon an EIR that does not provide the decision-makers, and the public, with the information about the project that is required by CEQA. The error is prejudicial if the failure to include relevant information precludes informed decisionmaking and informed public participation, thereby thwarting the statutory goals of the EIR process." (Napa Citizens for Honest Government, 91 Cal.App.4th at 355–356 (citation omitted) (internal quotation omitted); see also California Oak Foundation v. City of Santa Clarita (2005) 133 Cal.App.4th 1219, 1237 (citing Concerned Citizens of Costa Mesa, Inc. v. 32nd Dist. Agricultural Assn. (1986) 42 Cal.3d 929, 935 (concluding that the statutory purpose of the EIR process was not satisfied "in the absence of a forthright discussion [in an EIR] of a significant factor that could affect water supplies.").) Similarly, CEQA's purpose to facilitate informed decisionmaking and public participation is contravened when important information is "scattered here and there in EIR appendices," or significant analyses are "buried in an appendix." (California Oak Foundation, 133 Cal.App.4th at 1239 (citing Santa Clarita Organization for Planning the Environment v. County of Los Angeles (2003) 106 Cal.App.4th 715, 723) [explaining that "information 'scattered here and there in EIR appendices,' or a report 'buried in an appendix,' is not a substitute for 'a good faith reasoned analysis in response [to public comments on an EIR]."].)

For purposes of CEQA, "[s]ubstantial evidence shall include facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts." (Cal. Code Regs., tit. 14, § 15384(b).) "Argument, speculation, unsubstantiated opinion or narrative, evidence which is clearly erroneous or inaccurate, or evidence of social or economic impacts which do not contribute to or are not caused by physical impacts on the environment does not constitute substantial evidence." (Cal. Code Regs., tit. 14, § 15384(a). )

# B. Certified Regulatory Programs.

"In lieu of the requirement for preparing an EIR or negative declaration, CEQA provides a
mechanism for the exemption of certain regulatory programs which themselves require a plan or other
written documentation containing environmental information." (*City of Sacramento v. State Water Resources Control Bd.* (1992) 2 Cal.App.4th 960, 973–74, *as modified* (Feb. 14, 1992) (*citing* Pub.
Res. Code, § 21080.5(a); *Wildlife Alive v. Chickering* (1976) 18 Cal.3d 190, 196.) The State Water

Board's water quality control planning program is a certified regulatory program and thus a substitute environmental document, or "SED," may be prepared in lieu of an EIR. (SED, at 1-3 (*citing* Pub. Res. Code, § 21080.5(c) ; Cal. Code Regs., tit. 14, § 15251(g) ).) In preparing the SED, the State Water Board must support its conclusion with substantial evidence in the administrative record. (Cal. Code Regs., tit. 23, § 3777(a)) ["Any water quality control plan . . . proposed for board approval or adoption must include or be accompanied by Substitute Environmental Documentation (SED) and supported by substantial evidence in the administrative record."].)

Among other things, a draft SED must include "identification of any significant or potentially significant adverse environmental impacts of the proposed project;" "analysis of reasonable alternatives to the project and mitigation measures to avoid or reduce any significant or potentially significant adverse environmental impacts;" and "environmental analysis of the reasonably foreseeable methods of compliance." (Cal. Code Regs., tit. 23, § 3777(b)(2-4) )); Cal. Code Regs., tit. 14, § 15187(b) )-(c) ).) The environmental analysis of the reasonably foreseeable methods of compliance "shall take into account a reasonable range of environmental, economic, and technical factors, population and geographic areas, and specific sites" at a program level. (Cal. Code Regs., tit. 23, § 3777(c).)

The State Water Board must also comply with the requirements of Public Resources Code Section 21159), which provides an agency "shall perform, at the time of the adoption of a rule or regulation requiring . . . a performance standard . . . an environmental analysis of the reasonably foreseeable methods of compliance." (Pub. Res. Code, § 21159(a). ) The required environmental analysis must include: "[a]n analysis of the reasonably foreseeable environmental impacts of the methods of compliance;" "[a]n analysis of reasonably foreseeable feasible mitigation measures;" and, "[a]n analysis of reasonably foreseeable alternative means of compliance with the rule or regulation." (Pub. Res. Code, § 21159(a)(1-3) ).) Similar to the requirements prescribed by California Code of Regulations, Title 23, Section 3777 identified above, the environmental analysis of the reasonably foreseeable methods of compliance required by the statute must "take into account a reasonable range of environmental, economic, and technical factors, population and geographic areas, and specific sites" at a program level. (Pub. Res. Code, § 21159(c-d) ) ).)

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### II. Porter-Cologne Act.

"In addition to CEQA's requirements, the State Water Board's amendments to the 2006 Bay-Delta Plan must be prepared in accordance with applicable water quality planning provisions of the Porter-Cologne Act, Water Code Section[s] 13000 et seq., and other applicable laws." (SED, at ES-63; see also *California Ass'n of Sanitation Agencies v. State Water Resources Control Bd* (2012) 208 Cal.App.4th 1438, 1460, n.19, *as modified on denial of reh'g* (Sept. 27, 2012) [formulation of water quality control plans triggers the need to comply with section 13241].) "The Regional Water Boards have primary responsibility for the formulation and adoption of water quality control plans for their respective regions, subject to State Water Board and [U.S. Environmental Protection Agency] approval. The State Water Board may also adopt water quality control plans, which will supersede regional water quality control plans for the same waters to the extent of any conflict." (SED, at 9-34).

12 "The Porter-Cologne Act requires the establishment of water quality objectives to ensure the reasonable protection of beneficial uses," (United States v. State Water Resources Control Bd. (1982) 13 182 Cal.App.3d 82, 148), a category that includes "domestic, *municipal*, agricultural and industrial 14 supply," (Wat. Code, § 13050(f) (emphasis added).) Water Code Section 13241 "identifies certain 15 factors that must be evaluated when establishing water quality objectives." (SED, at ES-63; see also 16 City of Arcadia v. State Water Resources Control Bd. (2010) 191 Cal.App.4th 156, 177, as modified 17 on denial of reh'g (Jan. 20, 2011) (citing Wat. Code, § 13241) [same].) "These factors include: (1) 18 past, present, and probable future beneficial uses of water; (2) environmental characteristics of the 19 20 hydrographic unit under consideration, including the quality of water available thereto; (3) water quality conditions that could reasonably be achieved through the coordinated control of all factors that 21 affect water quality in the area; (4) economic considerations; (5) the need for developing housing 22 23 within the region; and (6) the need to develop and use recycled water." (Id. at ES-63—ES-64 (emphasis added); Wat. Code, § 13241.) Thus, Water Code section 13241 requires the State Water 24 Board to "consider the cost of compliance" when establishing water quality objectives, 20 (City of

<sup>20</sup> See also Memo titled Guidance on Consideration of Economics in the Adoption of Water Quality Objectives,
William R. Attwater, Chief Counsel, State Water Resources Control Board, January 4, 1994 (referred to below as "Attwater Memo"), attached hereto as Exhibit 3, at 4 (explaining that "[t]he Porter-Cologne Act does impose an affirmative duty on the Boards to consider economics when adopting water quality objectives. The Boards 15
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*Burbank v. State Water Resources Control Bd.*, (Cal. 2005) 35 Cal. 4th 613, 625 ), and imposes "obligations that can be enforced by a writ of mandate," (*City of Arcadia*, 191 Cal. App. 4th at 176).

Adoption of water quality objectives is a quasi-legislative act that "is subject to review by traditional mandamus under Code of Civil Procedure section 1085." (*United States v. State Water Resources Control Bd.*, 182 Cal.App.3d at 150, 170) (citations omitted).) Review under Code of Civil Procedure Section 1085 "is limited to an inquiry into whether the action was arbitrary, capricious or entirely lacking in evidentiary support," and the "petitioner has the burden of proof to show that the decision is unreasonable or invalid as a matter of law." (*City of Arcadia v. State Water Resources Control Bd.* (2006) 135 Cal.App.4th 1392, 1409 (internal quotation omitted).) "When making that inquiry, the court must ensure that an agency has adequately considered all relevant factors, and has demonstrated a rational connection between those factors, the choice made, and the purposes of the enabling statute." (*Hi-Desert Medical Center v. Douglas* (2015) 239 Cal.App.4th 717, 730, *as modified* (Sept. 15, 2015), *reh'g denied* (Sept. 15, 2015), *review denied* (Nov. 18, 2015) (citing *O.W.L. Foundation v. City of Rohnert Park* (2008) 168 Cal.App.4th 568, 585–586) (internal quotation

|| omitted).)

## ARGUMENT

I. The SED Must Analyze the Environmental and Economic Impacts of the Most Reasonably Foreseeable Method of Compliance by San Francisco: Reductions in Deliveries throughout the RWS service territory for the current and projected population through 2040.

As San Francisco has previously explained to the State Water Board, reduction in water

deliveries throughout the RWS service territory is San Francisco's most reasonably foreseeable

21 method of compliance with the implementation of a new unimpaired flow objective on the Tuolumne

22 River.21 The SED concedes that estimated "regional impacts" would be substantially greater if

 <sup>23</sup> probably cannot fulfill this duty simply by responding to economic information supplied by the regulated community. Rather, the Boards should assess the costs of adoption of a proposed water quality objective.").

<sup>25 21 2013</sup> CCSF Comment Letter, *supra* note 3, at 6-7 (citation omitted) [wherein San Francisco explains that if it were required, pursuant to the Fourth Agreement, to bypass flow to meet a 35-percent unimpaired flow objective on the Tuolumne River, "[a]ssuming current demands and a recurrence of the 1987-1992 drought, the

SFPUC's annual diversions from the Tuolumne River could be reduced by 111,7000 AF for each of the six years of the drought. This additional reduction in supply – when added to reductions in deliveries of up to 20%

 <sup>27</sup> already imposed by the SFPUC to ensure delivery of water to customers throughout the 1987-1992 drought –
 28 results in a single year of reduction in deliveries of 42%, and five years of reduction in deliveries of 52%."].)

<sup>&</sup>lt;sup>28</sup> *See also* Letter to Mark Gowdy, Division of Water Rights, State Water Resources Control Board, from Jonathan

implementation of a new unimpaired flow objective on the Tuolumne River resulted in reduced 1 deliveries throughout the RWS service territory than if, as the draft assumes, San Francisco could 2 simply purchase the requisite volume of replacement water supply from the Districts. (SED, at 20-40 3 (emphasis added ["It is assumed that SFPUC would purchase and transfer additional water supplies 4 from the Tuolumne River Watershed to offset water shortages during drought periods. This would 5 result in substantially lower estimates of regional impacts than if it is assumed that SFPUC would cut 6 back its water deliveries (i.e., impose shortages) to its retail and wholesale customers, particularly in 7 assessing impacts for commercial and industrial water users. See Sunding 2014 for an assessment of 8 9 how assumed water shortages, as opposed to the water replacement approach used in this analysis, 10 within the Hetch Hetchy Regional Water System Service Area could impact SFPUC."].)22 However, despite the State Water Board's own recognition that reduced deliveries would result in substantially 11 greater impacts throughout the Bay Area, the draft analysis fails to identify reduction in water 12 deliveries throughout the RWS service territory as a reasonably foreseeable method of compliance by 13 San Francisco, let alone analyze the environmental and economic impacts associated with such 14 shortages.23 This glaring omission contravenes the State Water Board's statutory obligation to 15 "carefully evaluate the recommendations of concerned . . . local agencies" "[d]uring the process of 16 17 18 19 Knapp, Deputy City Attorney, San Francisco City Attorney's Office, July 29, 2014, attached hereto as Exhibit 4 (referred to below as "San Francisco Letter"), at 2 ("The Phase 1 SED must analyze the impacts of 20 reduction in deliveries throughout the RWS service territory that may result from implementation of the

proposed Tuolumne River flow alternatives because reduction in deliveries in the only method of compliance 21 that is within the SFPUC's control, and thus, it is the reasonably foreseeable consequence of the State Water Board's contemplated action."].) 22

<sup>22</sup> Given that, San Francisco has previously informed the State Water Board that its reasonably foreseeable 23 method of compliance would be reductions in deliveries throughout the RWS service territory, which is the only option entirely within San Francisco's control, the State Water Board cannot claim that reduction in deliveries is 24 an "as-yet unknown method of compliance." (SED, at 13-58 (emphasis) ["Service providers may choose any method of compliance described in Chapter 16, or a combination of methods, or they may identify another as-25 yet unknown method of compliance to comply with requirements from the revised objectives."].)

<sup>23</sup> See Bay-Delta Phase 1 Staff Technical Workshop of December 12, 2016, Transcript of Video Recording, 26 attached hereto as Exhibit 5 (referred to below as "December 12th Workshop Transcript"), at 211:23-25-

<sup>212:1-3 (</sup>wherein Les Grober, Assistant Deputy Director of Division of Water Rights, acknowledges that the 27 Draft 2016 fails to "consider the effects of additional water supply rationing by the [SFPUC] system in response

to contributions to the instream flows," but refuses to explain the basis for the omission). 28

formulating or revising state policy for water quality control,"24 and violates the substantive standards of CEOA, the requirements of the certified regulatory program associated with the State Water Board's water quality control program, and the Porter-Cologne Act.

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## The SFPUC currently faces water supply shortages in sequential-year droughts and hardened water supply demands throughout the RWS service territory, as compared to prior drought periods.

Without consideration of the potential implementation of a new unimpaired flow objective on

7 the Tuolumne River, the SFPUC already faces water supply shortages that require customer rationing 8 during sequential-year droughts. "The SFPUC currently operates under a plan that anticipates 9 multiple stages of response to water supply shortages, ranging from use of dry year water supplies (when available) and voluntary customer water reductions to enforced rationing." (SFPUC 2015 10 UWMP, at 7-3.) Water demand in a single dry year would initially be satisfied with water deliveries 11 from storage and use of available dry year supplies. (Id.) As total system storage declines, however, it 12 would be necessary for the SFPUC to impose mandatory rationing. (Id.) Although implementation of 13 the WSIP will improve the SFPUC's water supply reliability,25 particularly in the earlier years of a 14

sequential-year drought, "in extended drought periods, the SFPUC will continue to experience 15

multiple years of 10 to 20% rationing."26 (SFPUC 2015 UWMP, at 7-3.) In fact, the 2040 WaterMAP 16

<sup>24</sup> Wat. Code, § 13144 (emphasis added) ("During the process of formulating or revising state policy for water quality control the state board shall consult with and carefully evaluate the recommendations of concerned federal, state, and local agencies.").

<sup>25</sup> See WSIP PEIR, at 3-37 ("In drought years, the SFPUC would implement a multistep drought response 19 program. Under this program, the initial response to a drought would be to initiate the extraction component of the [groundwater conjunctive-use program in the Westside Groundwater Basin in northern San Mateo County] 20

and to continue to fully deliver customer purchase requests during the initial response stage. If drought conditions were to persist, the groundwater extraction would be augmented with the [proposed 2 mgd water 21 transfer with the Districts], which might be sufficient to defer any additional response actions. If necessary, in

combination with the supplemental water supplies and within the WSIP goals for drought periods, the SFPUC 22 would then implement up to 20 percent systemwide rationing.").

<sup>23</sup> <sup>26</sup> "The SFPUC uses a hypothetical drought that is more severe than what the RWS has historically experienced. This drought sequence is referred to as the 'design drought' and serves as the basis for planning and modeling 24 of future scenarios. The design drought consists of the 1987-92 drought, followed by an additional 2.5 years of dry conditions from the hydrologic record which include the 1976-77 drought. While the current drought (2012 25 through 2015, and potentially ongoing) consists of some of the driest years on record for the SFPUC's watersheds, the design drought still represents a more severe drought in duration and overall water supply

<sup>26</sup> deficit." (2015 SFPUC UWMP, at 7-2.) Although the SFPUC relies on the design drought as part of its water supply planning methodology, the water supply shortages depicted in these comments are based on simulations 27 of the historical hydrology from 1921 through 2011. See Declaration of Matt Moses in Support of Comments

by the City and County of San Francisco to the Draft Substitute Environmental Document in Support of 28 Potential Changes to the Bay-Delta Plan ("Moses Decl."), attached hereto as Appendix 2, see Attachment 1 to

predicts a 5.3 mgd deficit in 2040 in drought years with 10 percent rationing in all years. (WaterMAP, at 24.) This is an approximately 2 percent forecasted shortfall. (Id.) Were San Francisco required to bypass flows in compliance with an unimpaired flow objective on the Tuolumne River, such water supply reductions would exponentially increase the water supply shortages already experienced by the RWS service territory during protracted droughts.

In addition, because water use within San Francisco, *i.e.*, in-City retail service, continues to be 6 among the lowest in the State and below historic consumption levels, (SFPUC 2015 UWMP, at 4-2), 7 San Francisco's current demand "is likely hardened" as compared to historic levels, *e.g.*, the level of 8 9 demand in 1987 at the beginning of the 1987-1992 drought period, (SFPUC 2015 UWMP, Appendix 10 K, at 3). (See also SFPUC 2015 UWMP, Appendix L, at 5 ["[t]he SFPUC retail customers are facing a hardened demand as a result of long-term conservation programs and installation of water-11 12 conserving devices during the 1987-92 drought."]; SFPUC 2015 UWMP, Appendix K, at 3 [explaining that the conservation measures implemented by San Francisco's retail and wholesale 13 customers during the 1987-1992 drought "have led to permanent per capita water usage savings."].) 14 Both per capita usage, *i.e.*, gallons of water consumed per person per day ("GPCD"), and total 15 consumption have declined since the mid-1970s. (SFPUC 2015 UWMP, at 4-2.) "Many factors have 16 contributed to this reduction in water use, including significant changes to the mix of industrial and 17 commercial businesses and their associated water demand, and the general characteristics of water use 18 by San Franciscans. In particular, the severe droughts of 1976-77 and 1987-92, changes in plumbing 19 20 codes, and conservation programs (either voluntarily embraced by residents and businesses or mandated by the City), have affected water demands." (Id.) In FY 2015-2016, per capita water use by 21 in-City retail customers within the residential sector is 44 GPCD, and per capital water use by all 22 23 sectors is 77 GPCD. (Id.) This reduction in water use makes it more difficult to achieve a significant, *i.e.*, 25 percent or greater, reduction in water use as compared to the water savings that were attained 24

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the Moses Decl., SFPUC Analysis of Proposed Changes to Tuolumne River Flow Criteria, March 14, 2017 (referred to below as "SFPUC Analysis of Changes to Flow Criteria"), at 3 (explaining that "[w]hile the design drought sequence does not occur in the historical hydrology, the rationing and storage threshold values that are adjusted to allow a system configuration to maintain water delivery through the design drought sequence can be used to evaluate the system performance in the historical record."). 28

during the 1987-1992 drought, as explained in more detail below. (SFPUC 2015 UWMP, 2 Appendix K, at 4; see also SFPUC 2015 UWMP, Appendix L, at 5 ["[t]his hardened demand means that reducing demand during future droughts will be challenging."].) 3

Similarly, "[a]verage residential per capita consumption (excluding Stanford) in the BAWSCA service area was 64.7 [GPCD] in FY 2014-15," and the average gross per capita consumption in FY 2014-15 was 105.7 GPCD.27 By comparison, at the peak in FY 1986-87, gross per capita consumption in the areas served by the SFPUC's wholesale customers was 186.5 GPCD.28

The low residential use by retail and wholesale customers in the RWS service territory is far below statewide average residential use for November 2016 of 76.6 GPCD.<sup>29</sup> Obtaining further reductions in demand by RWS customers will present new and distinct challenges.

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## Implementation of LSJR Alternatives 3 or 4 would exponentially increase existing water shortages in the RWS service territory during sequential-year droughts.

Although the SED recognizes that if San Francisco were obligated to contribute 51.7 percent of the instream flow required by a new unimpaired flow objective on the Tuolumne River (above the current minimum instream flow requirements prescribed by the Districts' FERC license for the Don Pedro Hydroelectric Project), it could face significant water supply reductions, the draft underestimates the deficit that San Francisco would experience. The SED estimates that, assuming a reoccurrence of 1987-1992 hydrology, the largest potential water supply reduction San Francisco could experience if the State Water Board implemented a 40 percent unimpaired flow objective on the Tuolumne River (LSJR Alternative 3) would be 119,000 AF/year for each year of a 6-year drought. (SED, Appendix L, at L-21, Table L.4-2.) However, the water supply reduction that San Francisco would actually suffer in this scenario is even more severe. Under a 40 percent unimpaired flow

<sup>27</sup> BAWSCA 2015 Annual Survey, supra note 2, at ES-9 (explaining that due to "its unique service area, residential per capita consumption for Stanford is excluded.").

<sup>26</sup> 28 Id.

<sup>29</sup> Fact Sheet, November 2016 Statewide Conservation Date, available at 27 http://www.waterboards.ca.gov/water issues/programs/conservation portal/docs/2017jan/fs010417 nov conser vation.pdf, attached hereto as Exhibit 6, at 5 (unnumbered). 28

objective, San Francisco's water supply would be reduced by 129,884 AF/year for each of the 6 years, 1 2 resulting in a loss of an additional 10,884 AF/year, or 65,304 AF in total for the 6-year period.<sup>30</sup> Using the same assumptions, the SED also estimates that if the State Water Board implemented 3 a 60 percent unimpaired flow objective on the Tuolumne River the greatest potential reduction in 4 5 water supply that San Francisco could experience would be 208,000 AF/year for each of the 6 years, or 1,248,000 AF in total for the 6-year drought period. By comparison, the maximum capacity of the 6 SFPUC's storage facilities on the Tuolumne River, i.e., Hetch Hetchy Reservoir (360,400 AF), Lake 7 Eleanor (27,100 AF), Cherry Reservoir (273,300 AF), including consideration of the operational 8 9 flexibility provided by the SFPUC's water bank in Don Pedro Reservoir (570,000 AF), is 10 1,230,800 AF. As explained, San Francisco relies upon its carryover storage as its primary source of water supply for delivery to the RWS service territory during sequential-year droughts. The required 11 flow volume would consume all of the water available from the SFPUC's Tuolumne River storage 12 *facilities.* This scenario is utterly detached from the reality of the SFPUC's operations on the 13 Tuolumne River. Thus, San Francisco has not separately analyzed whether the SED's estimate of San 14 Francisco's water supply reductions under a 60 percent unimpaired flow objective would, in fact, be 15 even more severe. 16 It is reasonable to assume that San Francisco would require increased levels of С. 17 rationing if LSJR Alternatives 3 or 4 were implemented and a sequential-year drought occurred based on San Francisco's drought planning policies, and the 18 history of its actions during past droughts. 19 1. San Francisco imposed water rationing of up to 45 percent during the 1987-1992 drought. 20 "The 1987-92 [six-year] drought provides an example of how the near-term drought 21 management process works in times when the operational capabilities of Hetch Hetchy and other 22

water supplies available to the SFPUC are taxed to a point that forces drastic actions to avoid running

24 out of water." (SFPUC 2015 UWMP, Appendix K, at 1.) The sequential-year drought "forced San

Francisco to adopt a mandatory rationing program, enforced by stiff excess use charges and the threat

26 of shut-off for continued violations of water use prohibitions." (*Id.*) The rationing program was in

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30 See SFPUC Analysis of Changes to Flow Criteria, *supra* note 26, at 16, Table 9.

effect from May 1988 through May 1989, and was then reinstituted in May 1990 and continued until March 1993. (*Id.*) On April 28, 1988, the SFPUC passed a "Water Shortage Emergency Resolution," Resolution No. 88-0155, that declared these rationing periods and the existence of a water shortage emergency pursuant to Water Code Sections 350, *et seq.* (*Id.* at 1, 6.) The resolution also provided authorization for the SFPUC's General Manager to interrupt water service to San Jose and Santa Clara. (*Id.* at 6.)

"The SFPUC's water rationing program was one of the toughest in the state and the most stringent imposed by any urban water supply agency. Although the specifics of the program varied over time, the basic outline of the mandatory rationing program was to achieve a 25 percent reduction to 1987 (pre-drought) consumption (system-wide), with water allocations set on an account-byaccount basis." (*Id.* at 1.)

In early 1991, the Hetch Hetchy Reservoir became so depleted (less than 25,000 AF of storage in a reservoir with over 360,000 AF of capacity) that minimum instream flow releases and anticipated demands required the SFPUC to initiate programs to achieve a 45 percent reduction in system-wide water deliveries. (SFPUC 2015 UWMP, at 8-1.). The 45 percent reduction was to be achieved through a 33 percent reduction in indoor water use and a 90 percent reduction in outdoor water use. (SFPUC 2015 UWMP, Appendix K, at 4.) "Public and commercial response to 45 percent rationing was overwhelmingly negative. . . . Simply put, rationing had been taken to a level that was considered intolerable to citizens and had become economically disastrous." (*Id.* at 5; *see also* Affidavit of Anson B. Moran ("Moran Affidavit"), FERC Project No. 2299, January 26, 1994, attached hereto as Exhibit 7, at ¶ 8 [explaining that the 45 percent level of rationing initiated in 1991 "was found to be intolerable and not achievable."].)

The SFPUC's mandatory rationing program ultimately reduced demand by approximately 30 percent as compared to pre-drought deliveries.<sup>31</sup> (Moran Affidavit, at ¶ 9.) As explained in more

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<sup>&</sup>lt;sup>31</sup> Although the initial system-wide goal of reducing water use by 25 percent – as compared to pre-drought conditions, *i.e.*, calendar year 1987 water deliveries – was achieved during the 1987-1992 drought, as noted, the ability of SFPUC's retail customers to achieve a 25 percent reduction in the future "is highly unlikely due to the 'hardening' of water demands that occurred during and subsequent to the drought." (SFPUC 2015 UWMP, *supra* note 5, Appendix K, at 3.) "Thus, it would be more difficult to achieve a 25-percent reduction in water

detail below in Section II(A)(1)(a)(i) *infra*, San Francisco also purchased water from other entities.
(*Id.*) "These actions along with a fortuitous storm during the spring of 1991 allowed the City to regain control of its system and efforts moved forward to better plan for the reliability of the City's water deliveries." (*Id.*)

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## 2. During the recent drought, the SFPUC took progressively more aggressive steps to reduce water use.

During the recent drought the SFPUC took progressively more aggressive steps to reduce water use, including: mandatory reduction of all water use by San Francisco city departments; mandatory reduction of outdoor irrigation by customers; a call for voluntary reduction of indoor use by customers; and, other water use restrictions. On January 31, 2014, the SFPUC asked for voluntary 10 percent system-wide rationing. (SFPUC 2015 UWMP, Appendix F, at 2.) On February 10, 2014, the Mayor directed City departments to reduce water consumption by 10 percent. (*Id.* [*citing* Executive Directive 14-01].) On August 12, 2014, in response to State Water Board emergency regulations, the SFPUC imposed a mandatory 10 percent reduction on outdoor irrigation. (*Id.* [*citing* Resolution 14-0121].) On August 26, 2014, SFPUC adopted regulations and restrictions for administering water use allocations and excess use charges on irrigation customers. (*Id.* [*citing* Resolution 14-0140].) On April 28, 2015, the SFPUC imposed additional water use restrictions consistent with State Water Board emergency regulations. (*Id.* [*citing* Resolution 15-0119].) On June 23, 2015, the SFPUC amended rules and regulations for interruptible water service. (*Id.* [*citing* Resolution 15-0149].)

The SFPUC was not compelled to declare a water shortage emergency pursuant to Water Code Section 350 during the recent drought, and, subsequently, to impose mandatory system-wide rationing and shortage allocations, because its customers exceeded the 10 percent voluntary system-wide reduction in conjunction with the Statewide mandatory reductions assigned by the State Water Board. (SFPUC 2015 UWMP, at 8-2.)

It appears that the current drought is now over. However, in future droughts, if the SFPUC determined that mandatory system-wide rationing needed to be imposed, then it would issue a

use since the 1987-1992 drought, and, specifically, would require additional measures beyond those implemented during the 1987-1992 drought to achieve a comparable level of water use reduction." (*Id.* at 4.) declaration of a water shortage emergency under Water Code Sections 350 "and implement rationing in accordance with the WSA and Water Shortage Allocation Plan (WSAP)." (SFPUC 2015 UWMP, at 8-2.)

## 3. Implementation of LSJR Alternatives 3 or 4 would require San Francisco to impose unsustainable levels of mandatory rationing during sequentialyear droughts.<sup>32</sup>

If the State Water Board implemented LSJR Alternatives 3 or 4 and San Francisco were 6 obligated to bypass 51.7 percent of the required flow on the Tuolumne River, San Francisco would 7 8 experience severe water shortages during sequential-year droughts that would, in turn, require the 9 SFPUC to significantly reduce deliveries to the RWS service territory. For example, assuming 1987-1992 hydrology and maximum SFPUC contract deliveries of 265 mgd, the additional reduction in 10 water supply San Francisco would experience under a 40 percent unimpaired flow objective on the 11 Tuolumne River, *i.e.*, 129,884 AF/year for each of the 6 years, would result in a 40 percent reduction 12 in deliveries for the first year of the drought, and a 54 percent reduction in deliveries in each of the 13 subsequent 5 years.<sup>33</sup> Further, using the same assumptions and level of demand, under a 50 percent 14 unimpaired flow objective the SFPUC would need to reduce deliveries to the RWS service territory by 15 a staggering 69 percent in each of the 6 years of the drought.34 16

When lower annual system deliveries are used, the results are similarly jarring. For example,
using the same underlying assumptions, as described above, and annual deliveries of 223 mgd, which
is equivalent to FY 2012-2013 pre-drought demand, if a 40 percent unimpaired flow objective were
implemented on the Tuolumne River the SFPUC would be compelled to reduce deliveries to the RWS

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<sup>Although the SED contemplates flow shifting, carryover storage requirements, and other possible adaptive management adjustments of the unimpaired flow standard, the draft does not describe the application of these elements in sufficient detail for San Francisco to include in its modeling analysis of potential water supply shortages to the RWS service territory. Further, the effect of any potential carryover storage requirement associated with Don Pedro Reservoir on the SFPUC's operations is unclear. These additional adjustments of the unimpaired flow standard may have the effect of further reducing the amount of water that the SFPUC is able to divert from the Tuolumne River, and thereby increasing water supply shortages experienced by the RWS service territory.</sup> *See* SFPUC Analysis of Changes to Flow Criteria, *supra* note 26, at 2, 7.

<sup>&</sup>lt;sup>33</sup> *Id.* at 16, Table 9 (showing SFPUC's average annual contribution from compliance with a 40 unimpaired flow objective on the Tuolumne River, assuming 1987-1992 hydrology and using a simulated demand of 264 mgd, as 129,884 AF/year); *id.* at 10, Table 2 (showing correlative reductions in water deliveries across the RWS service territory).

service territory by 39 percent during the first 3 years of the drought, and then tighten its belt further, 2 by imposing 49 percent reductions in deliveries for the next 3 years.35 Using the same assumptions and level of demand, implementation of a 50 percent unimpaired flow objective on the Tuolumne 3 River would require the SFPUC to reduce its deliveries by an unattainable 62 percent in each of the 6 4 5 years of the drought.36

Even using the level of reduced deliveries achieved by the SFPUC and its customers 6 7 throughout the RWS service territory during the recent drought in FY 2015-2016 of 175 mgd – that represents a reduction in San Francisco's pre-drought deliveries of 223 mgd by over 20 percent – high 8 9 levels of rationing are still required. Using the same set of assumptions, if the State Water Board 10 implemented a 40 percent unimpaired flow objective on the Tuolumne River, the SFPUC would need to reduce deliveries by a further 20 percent during the first 3 years of the drought, and then impose 11 12 32 percent reductions in the next 3 years.<sup>37</sup> In this scenario, the State Water Board's implementation of a 50 percent unimpaired flow objective would require the SFPUC to reduce its deliveries by 13 39 percent in the first 3 years of the drought, and by 62 percent in the next 3 years.<sub>38</sub> 14

### 4. Implementation of LSJR Alternatives 3 or 4 may jeopardize current deliveries from the RWS to San Jose and Santa Clara and constrain the SFPUC's ability to provide these cities with permanent supply guarantees.

It is reasonable to assume that if LSJR Alternatives 3 or 4 were implemented, and San Francisco was responsible for bypassing 51.7 percent of the required flow on the Tuolumne River, that the SFPUC would be compelled to deny the request by San Jose and Santa Clara for permanent individual supply guarantees, and, during sequential-year droughts, might also need to interrupt water service to both cities. As explained, the cities of San Jose and Santa Clara do not have an allocated share of the Supply Assurance due to their temporary, interruptible status under the 1984 Agreement and the WSA. (SFPUC 2015 UWMP, at 4-9.) This is not an abstract consideration: in 1988, in the early stages of the 1987-1992 drought, the SFPUC passed a "Water Shortage Emergency Resolution,"

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38 Id. 28

<sup>35</sup> Id. at 11, Table 3.

<sup>26</sup> 36 Id. 27

<sup>37</sup> Id. at 12, Table 4.

that, among other things, authorized the SFPUC's General Manager to interrupt water service to San 1 Jose and Santa Clara. (SFPUC 2015 UWMP, Appendix K, at 6.) Further, the severe water supply 2 reductions to the RWS that could result from implementation of LSJR Alternatives 3 or 4 would 3 necessarily have to be taken into consideration by the SFPUC before reaching a decision regarding 4 whether the SFPUC should provide permanent individual supply guarantees totaling 14.5 mgd to the 5 cities of San Jose and Santa Clara. 6

### D. It is reasonable to assume that San Francisco's wholesale customers would require increased levels of rationing if LSJR Alternatives 3 or 4 were implemented and a sequential-year drought occurred based on these customers' drought planning policies.

10 It is reasonable to assume that San Francisco's wholesale customers would require increased levels of rationing if LSJR Alternatives 3 or 4 were implemented and a sequential-year drought 11 occurred based on these customers' drought planning policies. For example, the Water Shortage 12 Contingency Plan for the Westborough Water District ("WWD") states that in response to a water 13 supply reduction of up to 20 percent, the district will implement a water budget program to ensure 14 "[w]ater use shall not exceed water allocations established by WWD for each customer." 39 Similarly, 15 the Water Shortage Contingency Plan for the San Jose Municipal Water System provides that the City 16 will implement an "[e]enforceable mandatory water budget program" if water deliveries from its 17 wholesale supplier, *i.e.*, the SFPUC, are reduced by more than 50 percent.<sup>40</sup> Further, as explained in 18 the Water Shortage Contingency Plan for the Alameda County Water District ("ACWD"), the District 19 20is authorized to adopt a base consumption allowance for each class of customers and establish use charges in response to water supply reductions of 20 to 30-percent.41 21

Table 10-3c (explaining that in response to a "Stage 3" reduction in water supply, defined as a reduction of 20 28 to 30 percent, the District will "[i]mplement all actions in Stage 1 and 2 plus some or all of the following, as

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<sup>&</sup>lt;sup>39</sup> 2015 Urban Water Management Plan for the Westborough Water District, Public Review Draft, May 2016, available at http://www.westboroughwater.com/Documents/Public%20Draft%20WWD%20UWMP 2016-05-23.pdf (referred to below as WWD UWMP"), at 63 (explaining that in response to a "Stage 3" reduction in

water supply WWD will ensure that "[w]ater use shall not exceed water allocations established by WWD for 24 each customer"; id. at 59, Table 7-2 - Stages of Water Shortage Contingency Plan (DWR Table 8-1) (defining "Stage 3" as up to a 20 percent water supply reduction). 25

<sup>40 2015</sup> Urban Water Management Plan for the San Jose Municipal Water System, June 2016, available at https://www.sanjoseca.gov/DocumentCenter/View/57483, at 8-5. 26

<sup>41</sup> Alameda County Water District, Urban Water Management Plan 2015-2020, available at 27 http://www.acwd.org/DocumentCenter/View/1264 (referred to below as "ACWD UWMP"), at 10-8,

# E. Increased rationing by San Francisco throughout the RWS service territory would result in severe economic impacts to San Francisco and its retail and wholesale customers throughout the Bay Area that the State Water Board must analyze.

Pursuant to the certified regulatory program for the State Water Board's water quality control planning program and Water Code Section 13241(d), the State Water Board is required to analyze the economic impacts of reasonably foreseeable methods of compliance with the proposed unimpaired flow objective on the Tuolumne River, including, as explained above, San Francisco's reduction of water deliveries to the RWS service territory. (Cal. Code Regs., tit. 23, § 3777(c) ); Cal. Code Regs., tit. 14, § 15187(d) ); Pub. Res. Code § 21159(c); Wat. Code, § 13241(d); Attwater Memo, *supra* note 21, at 4).42 However, the SED completely fails to analyze the economic impacts that would result from reduced water deliveries throughout the RWS service territory.

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## 1. San Francisco's 2014 Draft Socioeconomic Study is <u>not</u> incorporated by reference in the SED.

As a preliminary matter, to the extent that the State Water Board may believe that two passing 13 references to the analysis of economic impacts of water supply shortages in the RWS service territory 14 presented in Socioeconomic Impacts of Water Shortages within the Hetch Hetchy Regional Water 15 System Service Area, Draft Report, March 13, 2014 ("2014 Draft Socioeconomic Study") serve to 16 incorporate that analysis, and thus satisfy the agency's obligation to consider the economic impacts of 17 reductions in deliveries throughout the RWS service territory, the State Water Board is mistaken. (See 18 SED, at L-26) (emphasis added) ["It is reasonable to assume that SFPUC would purchase and transfer 19 20 additional water supplies from the Tuolumne River Watershed to its service area to offset water shortages during drought periods. Such purchases would be expected to result in substantially lower 21 estimates of regional impacts than if SFPUC would cut back its water deliveries (i.e., impose 22 23

hesitate to argue that quantified costs and benefits tell the whole story, or that precise measurements of either
 are possible. But when economic analysis reveals low or non-existent benefits and high costs, something is
 likely amiss. It would seem that the California legislature sought to avoid such a socially undesirable outcome

28 by mandating a consideration of economics when making water quality regulation.")

necessary to meet the District's reduction target . . . Adopt Base Consumption Allowance for each customer
 class and establish use charges. . . . ").

 <sup>42</sup> See David Sunding, David Zilberman, Consideration of Economics Under California's Porter-Cologne Act (2007) 13 Hastings W.-N.W. J. Envtl. L. & Pol'y 73, at \*76 (emphasis added) ("A requirement to 'consider economics' is not the same as a directive to adopt only those regulations that pass a cost-benefit test. Agencies can use the results of economic analysis, but not be bound by 'bottom-line' numbers. Most economists would

shortages) to its retail and wholesale customers, particularly for impacts related to commercial and
industrial water users. *See Sunding 2014 for an assessment of impacts on SFPUC due to assumed imposition of water shortages, as opposed to the water replacement approach used in this analysis, within the Hetch Hetchy Regional Water System Service Area.*"]; *id.* at 20-40 [same].) These passing
references simply represent the acknowledgement of an alternative view; these statements do not even
purport to incorporate the referenced analysis into the SED, nor does the draft rely on the 2014 Draft
Socioeconomic Study as a basis for the analysis of potential economic impacts to San Francisco.43

8 Further, even if the 2014 Draft Socioeconomic Study had been properly incorporated by 9 reference into the SED, the failure to respond – in any substantive way – to the 2014 Draft 10 Socioeconomic Study would, nevertheless, render the analysis inadequate. (See e.g., Santa Clarita Organization for Planning the Environment v. County of Los Angeles (2003) 106 Cal.App.4th 715, 11 12 723 (citing Cleary v. County of Stanislaus (1981) 118 Cal.App.3d 348, 357 (emphasis added) [explaining that "[i]t is not enough for the EIR simply to contain information submitted by the public 13 and experts. Problems raised by the public and responsible experts require a good faith reasoned 14 analysis in response. The requirement of a detailed analysis in response ensures that stubborn 15 problems or serious criticism are not 'swept under the rug.'"].) 16

# 2. Increased rationing by San Francisco and throughout the RWS service territory would result in severe economic impacts to San Francisco and its retail and wholesale customers throughout the Bay Area.

In general, assuming a pre-drought level of water supply demand, within the RWS service
territory, the first 20 to 30-percent of water supply reductions can be borne by the residential sector
and dedicated irrigation alone. These economic losses are experienced as welfare losses by the
consumer, and manifest as consumers not being able to receive the water supply reliability that they
have paid for through their water rates. Over time, these welfare losses result in dissatisfaction by

28 economic impacts, should have been substantively addressed in the SED.

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&</sup>lt;sup>43</sup> Cal. Code Regs., tit. 14, § 15150(f) (emphasis added) (noting that "[i]ncorporation by reference is most appropriate for including long, descriptive, or technical materials that provide general background *but do not contribute directly to the analysis of the problem at hand.*"). By contrast, the 2014 Draft Socioeconomic Study presents an alternative view of how water supply reductions would impact the RWS service territory, *i.e.*, by

resulting in reduced deliveries, that unquestionably "contribute[s] directly to the analysis of the problem at hand," and thus, this reasonably foreseeable method of compliance, and the consequent environmental and

customers with their respective local water providers and City Councils because they are paying for 1 something – water supply reliability – that they are not receiving. Further, the reduced utility revenues 2 result in increased utility rates or deferred capital projects, which may also result in the consumers 3 receiving a reduced level of service.44 Reduced utility revenues may also result in depleted utility 4 financial reserves, e.g., depletion of utility balancing accounts, which would likely necessitate future 5 rate increases. Additionally, as indicated in the Moody Rating Report for the new SFPUC Water 6 Bond, "[s]ustained deterioration of stored water supply" could negatively affect bond ratings, which 7 8 would increase the cost of financing for capital projects, and, consequently, require further rate 9 increases to cover higher interest rate payments.45

Significantly, as described in more detail below, once water supply reductions in the RWS 10 service territory reach a level that can no longer be borne by the residential sector alone a "tipping 11 12 point" occurs. "Tipping point" is defined by the Merriam-Webster Dictionary as "the critical point in a situation, process, or system beyond which a significant and often unstoppable effect or change takes 13 place." The threshold at which water supply reductions can no longer be solely absorbed by the 14 residential sector – a point that will necessarily vary depending on the alternative water supplies 15 available to each agency in the RWS service territory - represents a critical juncture. Further water 16 supply reductions past this tipping point require water rationing by the commercial and industrial 17 18 ("C&I") sectors that, in turn, manifest in the form of reduced economic output and job losses.

<sup>&</sup>lt;sup>19</sup>
<sup>44</sup> See *e.g.*, Budget Workshop Presentation, Board Meeting, Alameda County Water District, May 26, 2016, attached hereto as Exhibit 8, at 14-25 (explaining that during the recent drought Alameda County Water District ("ACWD") implemented a plan to cut and/or defer spending on ACWD's Capital Improvement Program, that included, depending on the level of water shortage, reduction in spending on water line replacements and

and the rever of water shorage, reduction in spending on water line repractments and deferral of spending on seismic improvements to Alameda and Decosto Reservoirs.) See also "Millbrae Residents Learn About Risks of 60 Year Water System," Public, January 30, 2017, available at

http://www.publicnow.com/view/9CC49AE443AED66936959C0EF03AA66E807B1EC2, attached hereto as
 Exhibit 9 (presenting an example of risks borne by deferring permanent main replacements: "Millbrae's water

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<sup>25 45</sup> Moody's Investor Service, Credit Opinion, September 27, 2016, San Francisco Public Utilities Commission, Water Enterprise, *New Issue – Moody's assigns Aa3 to San Francisco Public Utilities Commission (CA) Water* 

<sup>26</sup> *Revenue Bonds Rating Report for SFPUC Bond*, available at <u>https://www.moodys.com/research/Moodys-assigns-Aa3-to-San-Francisco-Public-Utilities-Commission-CA--PR\_903622289</u>, attached hereto as Exhibit 10,

at 2 (emphasis added) (identifying the factors that could lead to a downgrade in the SFPUC's bond rating as "[m]aterial weakening of debt service coverage," "[s]ignificant diminishment of liquidity," or "[s]ustained

<sup>28</sup> deterioration of stored water supply.").

As explained in Section I(C)(3) supra, if the State Water Board implemented a 30, 40, or 1 2 50-percent unimpaired flow objective on the Tuolumne River, and San Francisco was responsible for bypassing 51.7-percent of the requisite flow, San Francisco would experience severe water shortages 3 during sequential-year droughts that would require the SFPUC to significantly reduce deliveries to the 4 5 RWS service territory. The magnitude of these water supply reductions would be too severe for the residential sector to bear alone, and thus, the commercial and industrial sectors would be directly 6 7 affected. The resulting loss in jobs and economic output across the Bay Area would be staggering. For example, assuming maximum contract deliveries of 265 mgd, and a reoccurrence of 1987-1992 8 9 hydrology, implementation of a 30 percent unimpaired flow objective on the Tuolumne River would, 10 in the final year of the drought, result in a total loss of 105,498 jobs throughout the RWS service territory, and a total loss in economic output of nearly \$37 billion.46 Using the same assumptions, 11 implementation of a 40 percent unimpaired flow objective would result in a total loss of 120,063 jobs, 12 and total loss in economic output of over \$43 billion.47 Under the same scenario, implementation of a 13 50 percent unimpaired flow objective would result in a total loss of 191,419 jobs, and total loss of 14 economic output of over \$69 billion.48 15

Total job losses and economic output during the 6-year drought period are extremely dire. For example, again using the assumptions referenced above, and maximum contract deliveries of 265 mgd, implementation of a 40 percent unimpaired flow objective on the Tuolumne River would result a total

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<sup>46</sup> Bay Area Socioeconomic Impacts Resulting from Instream Flow Requirements for the Tuolumne River, The Brattle Group, prepared by David Sunding, Ph.D., March 15, 2017, attached hereto as Appendix 3 (referred to below as "2017 Socioeconomic Impacts Analysis"), at 11, Table 11 (total job losses of CCSF of 33,237 + total job losses of BAWSCA member agencies, or "wholesale customers," of 72,261 = 105,498 total projected jobs lost throughout RWS service territory); *id.* at 10, Table 9 (total economic output losses for CCSF of \$8.248 billion + total economic losses of wholesale customers of \$28.654 billion = \$36.902 billion).

<sup>47</sup> *Id.* at 11, Table 11 (total job losses of CCSF of 33,237 + total job losses of wholesale customers of 86,826 =
120,063 total projected jobs lost throughout the RWS service territory); *id.* at 10, Table 9 (total economic output losses for CCSF of \$8.248 billion + total economic losses of wholesale customers of \$35.179 billion = \$43.427 billion).

<sup>48</sup> *Id.* at 11, Table 11 (total job losses of CCSF of 73,886 + total job losses of wholesale customers of 117,533 =
191,419 total projected jobs lost throughout the RWS service territory); *id.* at 10, Table 9 (total economic output losses for CCSF of \$18.240 billion + total economic losses of wholesale customers of \$50.960 billion = \$69.200 billion).

loss of 657,316 jobs in the RWS service territory during the 6-year drought period, and total loss in economic output of over \$234 billion.49

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Assuming RWS pre-drought demand of 223 mgd, comparably severe job losses and loss in economic output would be experienced throughout the RWS service territory if the State Water Board implemented a 30, 40, or 50-percent unimpaired flow objective on the Tuolumne River.<sup>50</sup> San Francisco did not calculate economic losses associated with water supply reductions below the level of actual purchases of RWS water during the recent drought, *i.e.*, 175 mgd (that would result from implementation of a 30, 40, or 50-percent unimpaired flow objective), because, among other reasons, there is too much uncertainty regarding how the Bay Area would be able to accommodate the projected level of growth in the region across the residential, commercial and industrial sectors if the SFPUC restricted its RWS service territory deliveries to 175 mgd.<sup>51</sup>

Additionally, assuming maximum contract demands of 265 mgd, San Francisco and the SFPUC's wholesale customers throughout the Bay Area would need to increase rates for service in response to water supply restrictions and the attendant loss in revenue.<sup>52</sup> For example, if San Francisco were responsible for bypassing flow in compliance with a 40 percent unimpaired flow objective on the Tuolumne River, San Francisco would need to raise its rates by 7 percent, and the wholesale customers would need to increase their rates by 9 percent.<sup>53</sup> These rates increases would not only "come on top of the some of the highest water rates among California water utilities,"<sup>54</sup> but would also be addition to estimated SFPUC rate increases of 8-9 percent for the next four years to pay

 $26 \int 51 Id. \text{ at } 8-9.$ 

52 *Id.* at 12.

27 || 53 *Id*.

28 || 54 *Id*.

 <sup>49</sup> *Id.* at 11, Table 11 (total job losses of CCSF of 179,961 + total job losses of wholesale customers of 477,355 = 657,316 total projected jobs lost throughout RWS service territory); *id.* at 10, Table 9 (total economic output losses for CCSF of \$44.707 billion + total economic losses of wholesale customers of \$190.057 billion = \$234.764 billion).

<sup>&</sup>lt;sup>50</sup> *Id.* at 10-11, Tables 8 and 10.

for, among other things, completion of the WSIP and the design and planning of the Sewer System Improvement Program.55

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## Increased rationing throughout the RWS service territory would result in significant environmental impacts that the SED did not analyze.

5 The SED fails to assess the significant environmental impacts that would result if the SFPUC were compelled to drastically reduce water deliveries throughout the RWS service territory in response 6 to the State Water Board's implementation of a 30, 40 or 50-percent unimpaired flow objective on the 7 Tuolumne River. This critical omission constitutes an abuse of discretion because the SED fails to 8 9 proffer any justification for why these impacts are not significant under CEQA, and, in fact, fails to 10 present any analysis whatsoever regarding such impacts. (Pub. Res. Code, § 21168.5 (emphasis added) [explaining that standard for judicial review of non-adjudicative decisions involving CEQA 11 12 "shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the agency has not proceeded in a manner required by law or if the determination or 13 decision is not supported by substantial evidence."]; Pub. Res. Code, § 21100(b)(1) ) (emphasis 14 added) [requiring lead agencies to prepare EIR for any project that they propose to carry out or 15 approve that may have a significant effect on the environment that includes, *inter alia*, a detailed 16 statement setting forth "[a]ll significant effects of the proposed project."]; Pub. Res. Code, § 17 21159(a)(1) [requiring agencies to perform environmental analysis at time of adoption of 18 performance standard that must include "[a]n analysis of the reasonably foreseeable environmental 19 20 impacts of the methods of compliance"; Cal. Code Regs., tit. 23, § 3777(b)(2) [requiring that a draft SED prepared by the State Water Board include, *inter alia*, "identification of any significant or 21 potentially significant adverse environmental impacts of the proposed project."].) 22

More specifically, the SED fails to analyze the substantial loss in park vegetation, landscaping and trees (the urban forest) in jurisdictions throughout the RWS service territory that would result if the State Water Board implemented LSJR Alternatives 3 or 4, and San Francisco was responsible for bypassing 51.7 percent of the requisite flow. As explained, in this scenario, San Francisco would

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55 SFPUC website, Your Dollars at Work Everyday, *available at <u>https://sfwater.org/index.aspx?page=749</u>.* 

experience severe water shortages during sequential-year droughts that would require the SFPUC to 2 significantly reduce deliveries to the RWS service territory. Given the demand hardening that has occurred in San Francisco and throughout the RWS service territory since the 1987-1992 drought as 3 result of increased water use efficiency, 56 it is reasonable to assume that severe cutbacks in outdoor 4 5 water use would be required. Substantial reductions in outdoor water use would lead to the loss of park vegetation, urban landscaping, and the urban forest, and a corresponding array of adverse 6 7 environmental impacts. These impacts include, but are not limited to, the following.

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## Adverse impacts to aesthetic and recreational resources.

9 In accordance with the substantive standards of CEQA, the State Water Board is required to 10 examine aesthetics as part of its environmental review of the Plan Amendment because "courts have recognized that aesthetic issues are properly studied in an EIR to assess the impacts of a project." 11 12 (Pocket Protectors v. City Of Sacramento (2004) 124 Cal.App.4th 903, 937 [citations omitted] [internal quotation omitted]; see also Preserve Poway v. City of Poway (2016) 245 Cal.App.4th 560, 13 577, reh'g denied (Apr. 4, 2016), review denied (June 22, 2016) [citing Pub. Res. Code, § 21060.5) .] 14 [explaining that CEQA defines "environment" as including "objects of historic or aesthetic 15 significance."]; see also CEQA Guidelines, Cal. Code Regs., tit. 14, Appendix G, Aesthetics I(b), 16 [requiring the lead agency to determine whether "the project [would] substantially degrade the existing visual character or quality of the site and its surroundings?"].) The loss of vegetation in parks and other public and private outdoor spaces located within the RWS service territory would have an adverse effect on aesthetic resources. Similarly, degradation of outdoor recreational areas would result in reduced use and enjoyment of those areas. The SED must analyze these impacts.

#### 2. Adverse impact to cultural resources.

As the California Supreme Court instructs, "[t]he applicability of CEQA to historic structures is made clear by Public Resources Code sections 5020.1, subdivision (j), 21084, and 21060.5. Section 5020.1, subdivision (j) states: 'Historical resource' includes, but is not limited to, any . . . building, structure, site, area, place . . . which is historically or archaeologically significant, or is significant in

56 See Section I(A) supra.

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the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California." (Friends of Sierra Madre v. City of Sierra Madre (2001) 25 Cal.4th 165, 186, as modified (May 2, 2001) [internal quotation omitted].) A number of parks, open spaces, and heritage trees located in the RWS service territory are also cultural resources protected by applicable local, state, and/or national historical preservation requirements. It is reasonable to assume that significant cutbacks in outdoor water use for landscaping could result in degradation of historic landscapes located with the RWS service territory. The SED must analyze these impacts.

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## Increased risk of urban wildfires.

CEQA requires identification of the significant risk of wildfires adjacent to urbanized areas and in areas where residences are intermixed with wildlands.57 It is reasonable to assume that heightened levels of rationing and water use restrictions would result in parched vegetation and desiccated trees thereby increasing fire hazards within and adjacent to urban areas in the RWS service territory. The SED must analyze these impacts.

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#### 4. Adverse impacts to habitat.

A "potential substantial impact on endangered, rare or threatened species is per se significant." (Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova (2007) 40 Cal.4th 412, 449, as modified (Apr. 18, 2007) [citing Cal. Code Regs., tit. 14, § 15065(a)(1)].) Urban forests and other natural areas within the RWS service territory provide habitat for wildlife, including 18 threatened and endangered species, e.g., the Western Pond turtle, which has been known to inhabit Lake Merced and Golden Gate Park.58 Degradation of urban forests and loss of vegetation in natural areas in the RWS service territory could adversely affect such species. The SED must analyze these impacts.

57 See CEQA Environmental Checklist Form, Appendix G, VII(h), available at http://resources.ca.gov/ceqa/guidelines/Appendix G.html.

<sup>58</sup> Significant Natural Resources Area: Management Plan, February 2016, Executive Summary, available at http://sfrecpark.org/wp-content/uploads/SNRAMP Final Draft/SNRAMP ExecSummary.pdf, at 18 (noting 25

that Lake Merced contains one of the last populations of Western Pond Turtles in San Francisco); San Francisco Planning Department, Planning Commission Draft Motion for San Francisco Westside Recycled Water Plant 26

Project, California Environmental Quality Act (CEQA) Findings, September 3, 2015, available at http://commissions.sfplanning.org/cpcpackets/2015-27

<sup>007190</sup>GPR 3500 Great Hwy CEQAFindingsMotion.pdf, at 25 (noting that Western Pond turtles may be found at Metson Lake and Lloyd Lake in Golden Gate Park). 28

### 5. Effects on energy consumption, human health, water quality, air quality and greenhouse gas emissions from the exacerbation of urban heat islands.

Potentially significant project effects on energy consumption, human health, water quality, air quality, and, more specifically, greenhouse gas emissions, must be analyzed under CEQA. (See e.g., Pub. Res. Code, § 21100(b)(1).) Urban development replaces permeable moist surfaces with surfaces and infrastructure that are impermeable and dry, such as conventional roofs, sidewalks, roads, and parking lots.59 This process of urbanization is known to create urban "heat islands" – the phenomenon whereby urban regions experience warmer temperatures than their rural surroundings."60 Trees, vegetation, and other landscaping in the urban environment provide shade, which helps lower surface 10 temperatures, and "also help reduce air temperatures through a process called evapotranspiration, in which plants release water to the surrounding air, dissipating ambient heat."61 It is reasonable to assume that increased water rationing and water use restrictions in the RWS service territory would result in the loss of trees, vegetation and other landscaping, and thereby reduce (and potentially eliminate) these cooling effects, thus intensifying the effects of urban heat islands. Exacerbation of urban heat islands has the potential to result in the following adverse environmental impacts.

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#### a. Increased energy consumption.

"Appendix F of the CEQA Guidelines requires that projects assess the energy impacts of a project when a fair argument can be made that the project will have significant environmental impact." (California Clean Energy Committee v. City of Woodland (2014) 225 Cal.App.4th 173, 206 (citation omitted).). See also *id*. at 209 (citations omitted) (internal quotation omitted) (emphasis added) ("[u]nder CEQA, an EIR is fatally defective when it fails to include a detailed statement setting forth the mitigation measures proposed to reduce wasteful, inefficient, and unnecessary consumption of energy.... The requirement to adopt energy impact mitigation measures is substantive and not procedural in nature and was enacted for the purpose of requiring the lead agencies to focus upon the

27 60 Id.

61 Id. 28

<sup>&</sup>lt;sup>59</sup> U.S. Environmental Protection Agency, Reducing Urban Heat islands: Compendium of Strategies, October, 2008, available at https://www.epa.gov/heat-islands/heat-island-compendium, attached hereto as Exhibit 11 26 (referred to below as "EPA Compendium Urban Heat Islands."), at 7.

energy problem in the preparation of the final EIR."). Urban heat islands increase energy demand for 2 cooling during elevated summertime temperatures and thereby increase pressure on the electricity grid during peak periods of demand, that generally occur on hot, summer weekday afternoons when offices 3 and homes are running cooling systems, lights, and appliances.62 The SED must analyze these 4 5 impacts.

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#### b. Elevated emissions of air pollutants and greenhouse gases.

The CEQA Guideline on Determining the Significance of Impacts from Greenhouse Gas Emissions "provides that a lead agency should attempt to 'describe, calculate or estimate' the amount of greenhouse gases the project will emit, but recognizes that agencies have discretion in how to do so." (Center for Biological Diversity v. California Dept. of Fish and Wildlife (2015) 62 Cal.4th 204, 217, as modified on denial of reh'g (Feb. 17, 2016) (citing Cal. Code Regs., tit. 14, § 15064.4(a).) As explained, urban heat islands increase summertime temperatures that, in turn, increase demand for electricity to run cooling systems. It is reasonable to assume that the generation of this additional electricity will result in increased emissions from power plants, thereby increasing emissions from air pollutants and greenhouse gases.63 The SED must analyze these impacts.

#### c. **Compromised human health and comfort.**

The California Legislature has made clear that public health and safety are of "great importance" in CEQA's statutory scheme. (California Bldg. Industry Assn. v. Bay Area Air Quality Management Dist. (2015) 62 Cal.4th 369, 386 (citing Pub. Res. Code, §§ 21000(b), (c), (d), (g); §§ 21001(b), (d) .) For example, Public Resources Code Section 21083(b)(3) requires a finding of a "significant effect on the environment" whenever "[t]he environmental effects of a project will cause substantial adverse effects on human beings, either directly or indirectly." (Pub. Res. Code, § 21083(b)(3).) "Increased daytime surface temperatures, reduced nighttime cooling, and higher air pollution levels associated with urban heat islands can affect human health by contributing to general

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63 *Id.* at 14. 28

62 Id. at 13.

discomfort, respiratory difficulties, heat cramps and exhaustion, non-fatal heat stroke, and heat-related mortality."<sup>64</sup> The SED must analyze these impacts.

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## d. Impaired water quality.

The CEQA Guidelines require identification of project effects that will substantially degrade water quality.65 In the urban environment, the temperature of stormwater can substantially increase as it traverses pavement and rooftop surfaces, reaching "temperatures 50 to 90°F (27 to 50°C) higher than air temperatures."66 Urban heat islands intensify this effect by transferring excess heat to stormwater and thereby degrading water quality.67 The elevated temperature of stormwater that becomes runoff raises the water temperature of local streams, rivers, ponds, and lakes.68 Heightened water temperatures that result from this transference of heat from urban areas to local water bodies may detrimentally affect the reproduction and metabolism of many aquatic species.69 The SED must analyze these impacts.

G. The adverse e

### The adverse environmental impacts of heightened levels of water supply rationing in the RWS service territory may be inconsistent with state and local plans promoting green infrastructure.

"[A]n EIR must 'discuss any inconsistencies between the proposed project and applicable

general plans, specific plans and regional plans." (Joshua Tree Downtown Business Alliance v.

County of San Bernardino (2016) 1 Cal.App.5th 677, 695, review denied (Oct. 12, 2016) (citing Cal.

Code Regs., tit. 14, § 15125(d) .) The California Legislature recognizes the social and environmental

values of green infrastructure.<sup>70</sup> (See Gov. Code, § 65593(d) ["[1]andscapes are essential to the quality

23 || <sub>67</sub> *Id*.

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24 68 *Id*.

 $25 ||^{69} Id.$ 

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 26 70 See EPA web page entitled "What is Green Infrastructure?", available at <a href="https://www.epa.gov/green-infrastructure/what-green-infrastructure">https://www.epa.gov/green-infrastructure?</a>, attached hereto as Exhibit 12 (explaining that "Green infrastructure uses vegetation, soils, and other elements and practices to restore some of the natural processes required to

<sup>|| 64</sup> *Id*.

<sup>65</sup> See CEQA Environmental Checklist Form, Appendix G, VIII(f), available at <u>http://resources.ca.gov/ceqa/guidelines/Appendix G.html</u>.

<sup>66</sup> EPA Compendium Urban Heat Islands, *supra* note 59, at 15.

<sup>27</sup> manage water and create healthier urban environments. At the city or county scale, green infrastructure is a patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. At the

<sup>28</sup> neighborhood or site scale, stormwater management systems that mimic nature soak up and store water.").

of life in California by providing areas for active and passive recreation and as an enhancement to the 1 environment by cleaning air and water, preventing erosion, offering fire protection, and replacing 2 ecosystems lost to development."].) Further, a number of state and local policies encourage green 3 infrastructure, *i.e.*, landscaping and open space areas, in order to provide social and environmental 4 benefits, including improved water quality and groundwater recharge.71 As the State Water Board's 5 implementation of LSJR Alternatives 3 or 4 may have the effect of degrading landscaping and open 6 7 spaces in the RWS service territory, as discussed, the SED must identify, discuss, and reconcile the inconsistencies with state and applicable local plans that promote green infrastructure. 8 If water supplies were insufficient to serve new customers in the Bay Area, water H. 9 suppliers throughout the RWS service territory may adopt policies that force new development to go elsewhere, and businesses may choose to locate in areas with 10 more reliable dry-year and future water supplies. 11 1. California law requires that prior to approving a proposed large-scale development, a local government agency must consider, as part of its 12 environmental review, whether water supplies are available to meet the projected future demand of the project for multiple dry years. 13 When a proposed, large-scale development is subject to CEOA, and is considered a "project" 14 within the meaning of Water Code Section 10912, a Water Supply Assessment ("WSA") is required.72 15 (Citizens for Responsible Equitable Environmental Development v. City of San Diego (2011) 196 16 Cal.App.4th 515, 523–24 [citing Wat. Code, § 10910(b).].) The WSA is part of the EIR process and is 17 18 71 See e.g., Strategic Plan for the San Francisco Department of the Environment 2013 – 2017, available at https://sfenvironment.org/sites/default/files/agenda/attach/deptoftheenvironment strategic plan final draft.pdf, 19 at 11 ("Green spaces—natural and planted by humans— provide a broad spectrum of benefits to the environment and to our quality of life. The Department of the Environment is dedicated to protecting and 20 restoring our indigenous natural areas and maximizing the value of all of our vegetated resources, including parks, street trees, green roofs, open spaces, streetscapes, and community gardens, both for people and 21 wildlife."). See also At Risk: the Bay Area Greenbelt, 2017, Greenbelt Alliance, available at http://www.greenbelt.org/at-risk-2017/, attached hereto as Exhibit 13 (referred to below as "Greenbelt Alliance 22 2017"), at 9 (identifying an array of policies that may be adopted at the federal, state, or local levels, or through private initiative, to protect open spaces and natural resources from development). 23 72 See Wat. Code, § 10912 (defining "Project" to mean a proposed large-scale residential, commercial or industrial development, *i.e.*, "residential development of more than 500 dwelling units"; "shopping center or 24 business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space"; "commercial office building employing more than 1,000 persons or having more than 250,000 square 25 feet of floor space"; "hotel or motel, or both, having more than 500 rooms"; "industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of 26 land, or having more than 650,000 square feet of floor area"; "mixed-use project that includes one or more of the projects specified in this subdivision," or, a "project that would demand an amount of water equivalent to, or 27 greater than, the amount of water required by a 500 dwelling unit project."); see also Cal. Code Regs., tit. 14, § 15155(a)(1) (similarly defining a "water-demand project"). 28

intended to assist local governments in deciding whether to approve proposed projects. (O.W.L. 1 2 Foundation, 168 Cal.App.4th at 576.) If the projected water demand of the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system 3 has no urban water management plan, the WSA must discuss whether the public water system's "total 4 projected water supplies available during normal, single dry, and multiple dry water years" for a 5 20-year period will meet the "projected water demand [for] the proposed project," taking into account 6 7 the agency's "existing and planned future uses, including agricultural and manufacturing uses." (Wat. Code, (10910(c)(3)).) If a local government, *i.e.*, a city or county, will provide the water supply, the 8 local government must prepare the WSA. (Wat. Code, § 10910(b).) "The local government must 9 10 include the WSA in the EIR and consider it when deciding whether to approve the project." (O.W.L Foundation, 168 Cal.App.4th at 576 [citing Wat. Code, § 10911 (b)].) Further, a provision of CEQA 11 12 requires compliance with the Water Code Sections pertaining to WSAs. (Pub. Res. Code, § 21151.9.) (See also Cal. Code Regs., tit. 14, § 15155(e) [lead agency shall include water assessment in the 13 EIR].) Significantly, if the WSA does not identify sufficient available water, then the lead agency 14 must include that determination in its findings in the EIR for the project. (Cal. Code Regs., tit. 14, § 15 15155(e).) 16

# 2. When water supplies are insufficient to serve new customers, cities, counties, special districts, and other water suppliers may rely on various sources of authority to adopt policies that limit or prohibit growth.

When water supplies are insufficient to serve new customers, water suppliers may rely on various sources of authority to adopt policies that limit or prohibit growth, including the adoption of water neutral programs and development moratoria. Water neutral programs, often referred to as demand offset programs, require new development that causes increased water demand to offset such demand through conservation or new supplies with the goal of ensuring that the new development will not result in increased demand on the water supplier's system.<sup>73</sup> These programs increase costs for developers, which may result in higherArt home prices, less affordable housing, and, if the costs of

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<sup>73</sup> Jennifer L. Harder, *Demand Offsets: Water Neutral Development in California* (2014) 46 McGeorge L. Rev. 103, at 104-105.

offsets and in-lieu fees are too high, may preclude new development altogether.74 Water suppliers, 1 2 e.g., cities, counties and special districts, have varying degrees of authority to require water conservation, manage and protect water supplies, and mitigate impacts that they may rely on to adopt 3 water neutral programs.75 Water suppliers that approve a water neutral program by way of ordinance 4 5 or resolution typically invoke Article X section 2 of the California Constitution, that requires all uses of water in the state to be reasonable and not wasteful, and Water Code Sections 375, et seq., that 6 7 provides all water suppliers in the state with authority to adopt water conservation programs. 76 Cities and counties also routinely identify the police power in their recitals, while special districts cite to 8 9 specific organic statutes, where such exist, as authorization "to take action to avoid and mitigate the 10 effect of new demand on existing customers."77

Distinct from these sources of authority pertaining to water conservation, the Water Code 11 authorizes a water supplier to declare a water shortage emergency in its service area "whenever it finds 12 and determines that the ordinary demands and requirements of water consumers cannot be satisfied 13 without depleting the water supply . . . to the extent that there would be insufficient water for human 14 consumption, sanitation, and fire protection." (Wat. Code, § 350.) "A water shortage emergency 15 condition within the meaning of section 350 includes both an immediate emergency, in which a 16 district is presently unable to meet its customers' needs, and a threatened water shortage, in which a 17 district determines that its supply cannot meet an increased future demand." (Building Industry Assn. 18 v. Marin Mun. Water Dist. (1991) 235 Cal.App.3d 1641, 1646 [citation omitted].) Once a government 19 20 agency has declared a water shortage emergency in its service area, it must adopt regulations to conserve its water supply for "the greatest public benefit with particular regard to domestic use, 21 sanitation, and fire protection." (Wat. Code, § 353.) Water Code Section 356 expressly authorizes the 22 23 adoption of development moratoria by providing that such regulations "may include the right to deny

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75 *Id*. at 153.

28 || 77 Jennifer L. Harder, *supra* note 73, at 154-155 (citations omitted).

<sup>&</sup>lt;sup>74</sup> *Id.* at 110 (citations omitted) (noting that "[f]oregone development may result in fewer jobs, less economic growth, and lost amenities to the community.").

<sup>76</sup> Id. at 156; Cal. Const., art. X, § 2; Wat. Code, § 375(a).

applications for new or additional service connections." 78 (Wat. Code, § 356.) Where a water 1 2 shortage emergency exists, "the water shortage emergency provisions of the Water Code may provide a basis for adoption of a water neutral program."79 3

> 3. Municipal waters suppliers in the Bay Area have adopted policies to limit or prohibit growth when there was insufficient water available to serve new customers.

The following two examples illustrate circumstances in which municipal water suppliers in the 6 Bay Area have adopted policies to limit or prohibit growth where providing water service to a new project would impose a risk of water supply shortages on its existing customers, or where the additional water supply needed to serve proposed development was simply not available to the 10 municipal water system.

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#### **EBMUD's Water Neutral Program.** a.

12 In order to provide water service to proposed developments, yet avoid imposing "a risk of shortages on its existing customers," the East Bay Municipal Utility District ("EBMUD") adopted its 13 own water neutral program for out-of-service-area subdivisions, that, in at least one instance, required 14 certain developers to offset the water demand of a new residential project by a ratio of 2:1, meaning 15 that "twice as much water would be conserved through various efficiency measures as would be 16 required to serve the development's needs."80 EBMUD relies on diversions from the Mokelumne 17

<sup>19</sup> 78 The adoption of development moratoria during a water shortage emergency, and under circumstances in which significant rationing had already been implemented, would be consistent with the State Water Board's 20 own practice. See *e.g.*, State Water Board Issues Moratorium on New Water Connections, *available at* http://www.dailydemocrat.com/article/ZZ/20141105/NEWS/141103990, attached hereto as Exhibit 14 21 (explaining that in 2014 the SWRCB "slapped" 22 water districts across the state with development moratoriums due to lack of adequate water supply). 22

<sup>79</sup> Jennifer L. Harder, supra note 73, at 156. See also Building Industry Assn., 235 Cal.App.3d at 1647–48 23 ("Read together, [Water Code] sections 353 and 356 unquestionably allow districts to distinguish between all existing or current consumers and potential users when deciding how to respond to a water shortage emergency . . . ."). 24

<sup>&</sup>lt;sup>80</sup> Randele Kanouse, Douglas Wallace, Optimizing Land Use and Water Supply Planning: A Path to 25 Sustainability? (2010) 4 Golden Gate U. Envtl. L.J. 145, 148, 156, 158. See also Jennifer L. Harder, supra note 69, at 149 (explaining that "EBMUD had designed its own water neutral program for out-of-service-area

<sup>26</sup> subdivisions ....."). It is important to emphasize that EBMUD did not implement its water neutral program for subdivisions located outside of its service territory to mitigate insufficient water supply for existing customers. 27 Instead, EBMUD implemented its water neutral program in order to facilitate development of the proposed

subdivisions while simultaneously protecting its existing customers from heightened risk of future water supply 28 shortages. As explained in Section H(4) infra, many water agencies in the RWS service territory contemplate 41

River as its primary source of supply.81 The Mokelumne River flows west from the central Sierra 2 Nevada into the Central Valley and ultimately the Delta, where it empties into the San Joaquin River. Similar to other water suppliers that depend on runoff from rivers that feed the Delta, EBMUD faces 3 future challenges to the reliability of its water supply, including increasingly stringent environmental 4 5 requirements to restore degraded habitat in the Delta that "will call for more flow releases by all water users over time," and the threat that climate change will "inflict more frequent and more intense 6 7 droughts in California, intensifying the already significant challenges to water supply reliability."82

8 The first generation of water neutral residential projects that sought water service from 9 EBMUD required annexation into the utility's service area, and thus, were "inherently controversial 10 and strongly opposed by environmental interests."83 EBMUD's ultimate agreement to provide water to these projects "was contingent on the implementation of water efficiency measures with a 1:1 offset 11 12 ratio."84

Subsequently, in 2001, a proposed 1,200-home residential development called the Camino Tassajara Integrated Project, that included schools, community centers, and associated buildings, approximately 40 percent of which lay outside of EBMUD's service boundary, sparked an even greater controversy.85 One of the issues that militated against providing water to the development was the fact that "EBMUD had only just concluded a decades-long process of securing a supplemental supply for drought years, with its Freeport Regional Water Project on the Sacramento River," and "[t]he sizing of that project had not accounted for potential new demand outside EBMUD's service area."86 EBMUD ultimately annexed the project into its service area on the condition that the developers finance water efficiency features that would achieve a 2:1 offset of the project's demand.87

- 81 Randele Kanouse, supra note 80, at 156 (citation omitted).
- 82 Id. (citations omitted).
- 83 Id. at 157.
- 84 Id. 26

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- 85 Id. (citation omitted).
- 86 Id. (citation omitted).
- 87 Id. at 158 (citation omitted). 28

implementation of water neutral programs to address the more pressing issue of lack of adequate water supply to serve existing customers as part of their drought contingency planning.

"This higher requirement was intended to provide a stronger guarantee (with commensurate funding) that existing EBMUD customers would not face a higher risk of water shortages as a result of the EBMUD's agreement to serve Camino Tassajara."88

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## b. East Palo Alto's Development Moratorium.

5 On July 19, 2016, the City Council for the City of East Palo Alto ("East Palo Alto") approved an ordinance prohibiting new or expanded water connections within the service territory of East Palo 6 7 Alto's water system.<sup>89</sup> All of the water in East Palo Alto's water system is supplied by the RWS.<sup>90</sup> East Palo Alto has an Interim Supply Guarantee ("ISG") of 1.963 MGD, or approximately 2,199 AF.91 8 9 According to the City Council Agenda Report ("Agenda Report") for the ordinance, on average East 10 Palo Alto has been using "approximately 95%, or practically all of its ISG for the last 14 years, and in some years (2006, 2007, 2012) exceeded its ISG."92 The Agenda Report explains that for the purpose 11 12 of long range planning, East Palo Alto "needs to take in account the demand for entitled projects that are under construction, or not yet built, and for potential SFPUC dry year mandatory cutbacks."93 13 After accounting for the demand needed to supply entitled projects, only 13 percent of East Palo 14 Alto's supply remains available.94 Further, if the SFPUC imposes mandatory rationing, it can reduce 15 deliveries to East Palo Alto by 6 percent, leaving only 7 percent of the system's supplies available.95 16 As this "very small amount" of water supply "leaves no room for error," the City Council concluded 17 that under these conditions "the City cannot entitle additional projects, and there is a de facto 18 moratorium in place for any new construction in the City that creates demand for additional water 19

- 25 || 91 *Id*.
- $26 ||^{92} Id.$ 
  - 93 *Id.* at 244.
- $27 \parallel _{94} Id.$
- 28 || 95 *Id*.

<sup>88</sup> *Id.* (citation omitted).

 <sup>89</sup> City of East Palo Alto Agenda, City Council Regular Meeting, July 19, 2016, City Council Agenda Report,
 P&A Item No. 10D, *Approving an Ordinance Prohibiting New or Expanded Water Connections to the City of* East Palo Alto Water System, available at <a href="http://www.ci.east-palo-">http://www.ci.east-palo-</a>

alto.ca.us/AgendaCenter/ViewFile/Agenda/07192016-1211, attached hereto as Exhibit 15 (referred to below as "Agenda Report"), at 242. San Francisco understands that East Palo Alto is in the process of attempting to identify alternative ways to address its water needs.

<sup>24 || 90</sup> *Id*.

supply."96 Numerous proposed projects were rejected in accordance with the moratorium, including
 "[a]n affordable housing project owned by the city," and "11 other developments that had recently
 submitted applications to build in East Palo Alto."97

Significantly, the Agenda Report provides that the "Water Moratorium period" will provide
staff time to study the water shortage issue and "develop new water supply and water demand offset
policies for the City Council to consider for adoption."98 The Agenda Report further explains that
upon adoption of a "Water Demand Offset Policy" staff would request that City Council update the
exemption provisions in the moratorium ordinance to include projects that use the offset policy.99

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4. Many of the SFPUC's wholesale customers explicitly contemplate adoption of policies to limit or prohibit growth as part of their drought water supply planning.

Many of the SFPUC's wholesale customers explicitly contemplate adoption of policies to limit or prohibit growth as part of their drought water supply planning. For example, Alameda County

12 or prohibit growth as part of their drought water supply planning. For example, Alameda County

13 Water District's ("ACWD") Water Shortage Contingency Plan calls for a "[n]et zero water demand

14 increase by new developments" if the district experiences a 30 to 50-percent reduction in its water

15 supplies.100 Similarly, the Water Shortage Contingency Plans for the City of Burlingame and the

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<sup>96</sup> *Id.* at 244, 247. Thus, East Palo Alto did not adopt its development moratorium due to a water shortage brought on by drought, but instead, the crisis in East Palo Alto resulted from the City's insufficient water allocation. As explained in Section H(4) *infra*, many water agencies in the RWS service territory contemplate

allocation. As explained in Section H(4) *infra*, many water agencies in the RWS service territory contemplate
 implementation of development moratoria to address lack of adequate water supply due to drought as part of
 their drought contingency planning.

<sup>20 97</sup> Landgraf, K., "East Palo Alto imposes development moratorium due to lack of water," Mercury News (July 20, 2016) *available at* <u>http://www.mercurynews.com/2016/07/20/east-palo-alto-imposes-development-moratorium-due-to-lack-of-water/</u>, attached hereto as Exhibit 16 (explaining that "[a] water crisis three decades

<sup>21 &</sup>lt;u>moratorium-due-to-lack-or-water</u>, attached hereto as Exhibit 16 (explaining that "[a] water crisis three decades in the making came to a head this week when East Palo Alto's City Council imposed a moratorium on development until the situ con increase its historically measure unter supply

<sup>development until the city can increase its historically meager water supply. . . . [numerous] proposed
developments are out of luck. An affordable housing project owned by the city did not make the cut, nor did 11
other developments that had recently submitted applications to build in East Palo Alto. Many of those
developers showed up at Tuesday's meeting to voice their displeasure.").</sup> 

<sup>24 98</sup> Agenda Report, *supra* note 89, at 247.

<sup>25 99</sup> *Id.* 

<sup>26</sup> No. ACWD UWMP, *supra* note 41, at 10-9, Table 10-3d. See also *id*. at G-17, Table 8-3 Retail Only: Stages of Water Shortage Contingency Plan – Consumption Reduction Methods (indicating that at "Stage 4," *i.e.*, 30 to 50-percent reduction in water supply, ACWD would adopt a "Moratorium or Net Zero Demand Increase on

<sup>27</sup> New Connections," meaning that the district would impose "[t]emporary restrictions on supply to new developments and/or requirements to implement extreme water use efficiency measures, and net zero increase

<sup>28</sup>  $\parallel$  for new developments (stage 4).").

Menlo Park Municipal Water District ("MPMWD") call for the adoption of development moratoriums 1 with limited exceptions, including where the project applicant demonstrates that it will be able to 2 offset completely its water demand, in response to a shortage of between 31 to 50-percent of existing 3 supply.101 Further, the Water Shortage Contingency Plan for the Westborough Water District 4 ("WWD") requires the establishment of a "moratorium on new connections and new landscaping" in 5 response to a reduction of up to 20 percent of existing supply, 102 and the 2015 Urban Water 6 7 Management Plan for the City of Redwood City calls for a "[m]oratorium on new water connections" 8 in response to a reduction of 20 to 30-percent of its water supply.103 9

 <sup>10 101 2015</sup> Urban Water Management Plan for the City of Burlingame, June 2016, *available at* 11 https://www.burlingame.org/modules/showdocument.aspx?documentid=13858, at Table 8-2 Retail Only:
 Restrictions and Prohibitions on End Uses (emphasis added) (explaining that during a "Stage 5" water supply

<sup>12</sup> reduction, "[n]o new potable water service shall be provided, no new temporary meters or permanent meters shall be provided, and no statements of immediate ability to serve or provide potable water service (such as,

will-serve letters, certificates or letters of availability) shall be issued by the City, *with exceptions.*"); *id.* at

Table 7.5 (identifying 4 exceptions to the prohibition on new water connections referenced above, including where the "applicant provides substantial evidence of an enforceable commitment that water demands for the project will be offset prior to the provision of a new water meter(s) . . . . "); see also *id.* at Table 8-1 Retail:

<sup>Stages of Water Contingency Plan (defining Stage 5 as circumstance in which there has been a "[d]eclaration by Burlingame City Council . . . or upon the determination that the SFPUC or another governing authority (e.g., the SWRCB) has required a voluntary or mandatory reduction in water use from 31% to 50% due to water supply shortages or emergency.").</sup> 

<sup>17 2015</sup> Urban Water Management Plan for the Menlo Park Municipal Water District, June 2016, *available at* <u>http://www.menlopark.org/DocumentCenter/View/10111</u>, at Table 8-3 Retail Only: Stages of Water Shortage

<sup>18</sup> Contingency Plan – Consumption Reduction Methods (emphasis added) (explaining that during a "Stage 5" water supply reduction "MPMWD shall not approve new potable water service, new temporary meters or

<sup>19</sup> permanent meters, or issue statements of immediate availability to serve or provide potable water service (such as, will-serve letters, certificates or letters of availability), except under the following circumstances: (1) a valid, unexpired building permit has been issued for the project; (2) the project is necessary to protect the public's

health, safety, and welfare; (3) the applicant provides substantial evidence of an enforceable commitment that water demands for the project will be offset prior to the provision of a new water meter(s) to the satisfaction of

<sup>22</sup> *the Public Works Director*; or (4) to provide continuation of water service or to restore service that has been 22 interrupted for a period of one year or less."); see *id*. at Table 8-1 Retail: Stages of Water Shortage Contingency 23 Plan (defining Stage 5 as a circumstance in which there has been a "[d]eclaration by the City Council upon the

determination that the SFPUC or another governing authority (e.g., the SWRCB) has required voluntary or mandatory reduction in water use from 31% to 50% due to water supply shortages or emergency.").

<sup>WWD UWMP,</sup> *supra* note 39, at 65 (explaining that in response to a "Stage 3" reduction in water supply
WWD will "[e]stablish moratorium on new connections and new landscaping."); *id.* at 59, Table 7-2 – Stages of Water Shortage Contingency Plan (DWR Table 8-1) (defining "Stage 3" as up to a 20-percent water supply reduction).

<sup>103 2015</sup> Urban Water Management Plan for the City of Redwood City, June 2016, available at

 <sup>27 &</sup>lt;u>http://www.redwoodcity.org/home/showdocument?id=8091</u>, at 109, Table 7-5 (explaining that in response to a "Stage 4" reduction in water supply the City of Redwood City will establish a "[m]oratorium on new water
 28 connections" and defining "Stage 4" as a 20-30-percent "[c]utback" in water supply.).

5. If LSJR Alternatives 3 or 4 were implemented, it is reasonable to assume that the pattern of growth called for in Plan Bay Area would be displaced due to inadequate water supply in the RWS service territory.

## a. Plan Bay Area calls for consolidation of new growth in urban centers.

Plan Bay Area was adopted by the Association of Bay Area Governments ("ABAG") and the Metropolitan Transportation Commission ("MTC") in 2013 in accordance with "The California Sustainable Communities and Climate Protection Act of 2008" (California Senate Bill 375 ["SB 375"], Steinberg), which requires each of California's 18 metropolitan areas – including the Bay Area – to reduce greenhouse gas emissions from cars and light trucks. 104 SB 375 directs "the Bay Area and other California regions [to] develop a Sustainable Communities Strategy (SCS) – a new element of the regional transportation plan (RTP) – to strive to reach the greenhouse gas (GHG) reduction target established for each region by the California Air Resources Board." 105 SB 375 also "requires regions to plan for housing that can accommodate all projected growth, by income level, so as to reduce the pressures that lead to in-commuting from outside the nine-county region." 106 Plan Bay Area 2013 is the region's first RTP subject to SB 375.107

Although Plan Bay Area 2013 has multiple performance targets, "[t]wo of the targets are not only ambitious—they are mandated by state law."<sup>108</sup> The first mandatory target addresses climate protection by requiring the Bay Area to reduce its per-capita CO<sub>2</sub> emissions from cars and light-duty trucks by 7 percent by 2020 and 15 percent by 2035.<sup>109</sup> "The second mandatory target addresses adequate housing by requiring the region to house 100 percent of its projected population growth by income level."<sup>110</sup>

107 *Id*.

<sup>&</sup>lt;sup>104</sup> Plan Bay Area: A Strategy for a Sustainable Region, July 18, 2013, Association of Bay Area Governments, Metropolitan Transportation Commission, *available at* 

http://files.mtc.ca.gov/pdf/Plan Bay Area FINAL/Plan Bay Area.pdf, attached hereto as Exhibit 17 ("referred to below as "Plan Bay Area 2013"), at 4.

 $<sup>24 \</sup>parallel 105 Id.$ 

<sup>106</sup> *Id*. at 99.

<sup>[108</sup> Id. at 5.]

<sup>7 || 109</sup> *Id*. at 4-5.

<sup>28</sup>  $\begin{bmatrix} 110 \ Id. at 5. & See also \ id. at 19, 43 (explaining that SB 375 requires that the Bay Area identify a land use pattern for projected growth (from a 2010 baseline year) that will,$ *inter alia* $, house 100-percent of the region's <math>\frac{46}{6}$ 

In order to help achieve the Bay Area's GHG emissions reduction and housing targets, Plan 1 Bay Area 2013 identifies a land use pattern that "directs new growth within locally adopted urban 2 growth boundaries to existing communities along major transit corridors."111 Plan Bay Area 2013 3 projects that between 2010 and 2040 the nine-county Bay Area will: grow in population from 7.2 4 million to 9.3 million, an increase of 2.1 million people, or 30 percent; add 1.1 million jobs; and, 5 increase its housing stock by 3.4 million new homes.<sup>112</sup> Due to the high cost of housing in the region, 6 for decades "an ever-increasing number of people who work in the Bay Area" have been compelled 7 8 "to look for more affordable housing in the Central Valley or other surrounding regions."113 To 9 address this incongruity, Plan Bay Area 2013 calls for the majority of projected growth to occur in Priority Development Areas ("PDAs") that are "transit-oriented, infill development opportunity areas 10 within existing communities" because, as explained by ABAG and MTC, "[c]ompact infill 11 12 development can reduce vehicle use and vehicle miles traveled by 20 to 60-percent when compared to traditional suburban developments."<sup>114</sup> To promote this pattern of development, Plan Bay Area 2013 13 "makes investments in the region's transportation network that support job growth and new homes in 14 existing communities by focusing the lion's share of investment on maintaining and boosting the 15 efficiency of the existing transit and road system."115 However, Plan Bay Area 2013 also supports 16 17 projected 25-year population growth by income level (very-low, low, moderate, above-moderate) without displacing current low-income residents.). 18 111 Id. at 43, 45. 19 112 Id. at 7, 30. 20 21 22 23 46,000 heading towards the Bay Area ...."). 24 25

115 Id. at 63. 28

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<sup>113</sup> Id. at 99; id. at 45 (noting that "past trends saw the outward expansion of urban growth in the region and spillover growth in surrounding regions ...."). See also SED, at 11-12 ("spillover from the Bay Area is causing growth stress in the San Joaquin Valley as commuters seek affordable housing. Over the past 35 years, the northern San Joaquin Valley, including San Joaquin, Stanislaus and Merced Counties, has experienced explosive growth in the numbers of workers who commute north and west out of the valley each day. By 2010, that was estimated to be about 24 percent of workers working outside their county of residence with about

<sup>114</sup> Plan Bay Area 2013, supra note 104, at 77, 123. See also id. at 99 (explaining that "[t]he resulting longerdistance commutes increase emissions while also raising transportation costs for the residents who must venture so far afield in search of more affordable housing. This places a greater burden on lower-income residents and further increases the divide between the region's more-affluent and less-affluent residents. The region's businesses also suffer, since the dispersal of workers tends to constrain the supply of labor they can draw on."); id. at 54 (noting that "[o]ne vehicle (regardless of the number of passengers) traveling one mile constitutes one 'vehicle mile.' The number of vehicle miles traveled is highly correlated with greenhouse gas emissions.").

focused growth in PDAs, including major new transit projects, such as the extension of BART to serve San Jose.116

In addition to reducing GHG emissions and accommodating demand for new housing "within 3 locally adopted urban growth boundaries," the land use pattern posited by Plan Bay Area 2013 4 5 conserves existing open space, natural resources and agriculture lands in the region.117 In fact, one of the four comprehensive objectives for the proposed land use pattern is to protect the region's unique 6 7 natural environment by promoting compact development within PDAs and reducing development 8 pressure on the Bay Area's open space and agriculture lands.<sup>118</sup> This preservation of open space, 9 forests, and other carbon sinks in the Bay Area, also, in turn, contributes to the reduction of GHG 10 emissions by removing greenhouse gases from the atmosphere.119

Plan Bay Area 2013 "is a work in progress" that is to be updated every four years "to reflect
new initiatives and priorities." 120 In May 2016, ABAG and MTC released three alternative land use
and transportation scenarios that represent "a progression of plausible regional futures, from more
intense housing and employment growth in the urban core (Big Cities Scenario); to more evenly
apportioned development among PDAs in medium-sized cities with access to rail services (Connected
Neighborhoods); to a more dispersed development pattern, with relatively more growth occurring

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28 increase in households, related to Plan Bay Area [2013].").

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<sup>18 || 116</sup> *Id.* at 79-80.

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117</sup> *Id.* at 45 ("[i]n contrast to past trends that saw the outward expansion of urban growth in the region and spillover growth in surrounding regions, Plan Bay Area directs new growth within locally adopted urban growth boundaries to existing communities along major transit corridors"); *id.* at 104 ("[a]s the plan assumes that all urban growth boundaries/urban limit lines are held fixed through the year 2040, no sprawl-style development is expected to occur on the region's scenic or agricultural lands. This will help preserve the natural beauty of the Bay Area for future generations to enjoy.").

<sup>22 || 118</sup> *Id.* at 42, 45.

<sup>23</sup> 119 *Id.* at 123.

 <sup>120</sup> *Id.* at 15. *See also* Memo to Joint MTC Planning Committee with the ABAG Administrative Committee to
 MTC Deputy Executive Director, Policy / ABAG Executive Director regarding Plan Bay Area 2040 Draft
 Preferred Land Use Scenario, September 2, 2016, *available at* <u>http://planbayarea.org/the-plan/Draft-Preferred-</u>
 Scenario.html, attached hereto as Exhibit 18 (referred to below as "Plan Bay Area 2040 Memo"), at 2

<sup>25</sup> Scenario.html, attached hereto as Exhibit 18 (referred to below as "Plan Bay Area 2040 Memo"), at 2 (explaining that ABAG relied on updated regional growth projections in its development of Plan Bay Area

<sup>26 2040: &</sup>quot;[t]he Bay Area economy has exploded over the past four years, attracting thousands of new people and jobs. As a result, ABAG adopted a revised regional growth forecast in February 2016. This forecast estimates

an additional 1.3 million jobs and 2.4 million people, and therefore the need for approximately 820,000 housing units between 2010 and 2040. This represents an increase of 15 percent in employment and a 25 percent

outside of PDAs (Main Streets Scenario)."121 Subsequently, ABAG and MTC developed a Draft 2 Preferred Scenario that they finalized and adopted in December 2016.122 ABAG and MTC expect to adopt Plan Bay Area 2040 by mid-2017.123 3

### b. If LSJR Alternatives 3 or 4 were implemented, the SFPUC would not have the water supply needed to accommodate the pattern of growth called for in Plan Bay Area.

If the State Water Board were to implement LSJR Alternatives 3 or 4, the SFPUC would not have the water supply needed to accommodate the pattern of growth called for in Plan Bay Area 2013, or the patterns of growth considered in the three scenarios evaluated as part of the process for developing the proposed Plan Bay Area 2040. Specifically, if the State Water Board implemented a 30, 40, or 50-percent unimpaired flow objective on the Tuolumne River, the SFPUC would not be able to reliably serve its existing customers in the RWS service territory during protracted drought periods, as explained above, let alone meet projected future demand for 2040, as forecasted in Plan Bay Area 2013 (and augmented by ABAG for purposes of developing the proposed Plan Bay Area 2040), during a single critically dry year.

For example, assuming that San Francisco was responsible for bypassing flow in compliance with a new 40 percent unimpaired flow objective on the Tuolumne River, a reoccurrence of 1987-1992 hydrology, and the level of projected population growth between 2010 and 2040 that is being relied on to develop the proposed Plan Bay Area 2040124 – without taking into account the land use patterns proposed in any of the three scenarios described above – by 2035 the population of San Francisco is expected to grow by 34 percent, and employment is projected to increase by 42 percent, although the city's water supply would be reduced by 37 percent (under maximum contract deliveries of 265 mgd).125 The State Water Board's implementation of a 50 percent unimpaired flow objective on the

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<sup>121</sup> Plan Bay Area 2040 Memo, *supra* note 120, at 2 (internal quotation omitted).

<sup>122</sup> See Plan Bay Area 2040 website, Plan Bay Area 2040 Final Preferred Scenario Approved, December 6, 2016, available at http://planbayarea.org/news/story/PBA-2040-Final-Preferred-Scenario-Approved.html. 123 *Id*.

<sup>124</sup> See supra note 120.

<sup>125 2017</sup> Socioeconomic Impacts Analysis, *supra* note 46, at 5-6, Tables 3, 4 and 5. 28

Tuolumne would further exacerbate the level of shortage, resulting in a water supply reduction of 52 percent.<sup>126</sup>

These severe levels of water supply reductions are particularly alarming when considered in the context of the growth projections that correspond to the land use patterns represented by the three scenarios used in the development of Plan Bay Area 2040. Depending on the scenario's underlying assumptions regarding the proposed pattern of growth, San Francisco's population is projected to grow by 40 percent (Main Streets Scenario), 36 percent (Connected Neighborhoods Scenario), or 46 percent (Big Cities).127 Thus, San Francisco's inability to provide water service to new development increases with the rising estimates of its projected population, as identified in the three scenarios.

This conflict between projected growth in population and reduced water supply reliability in critically dry years manifests throughout the RWS service territory across the Bay Area regardless of whether the analysis assumes concentrated infill development along major transit corridors, proposed in the three Plan Bay Area 2040 scenarios, or simply assumes that growth will occur unbounded by such constraints.128

## c. It is reasonable to assume that implementation of LSJR Alternatives 3 or 4 would displace the pattern of growth called for in Plan Bay Area.

17 As explained in Section I(B) supra, if San Francisco was required to contribute flow, pursuant 18 to its contractual obligations under the Fourth Agreement, to satisfy a 30, 40, or 50-percent unimpaired flow objective on the Tuolumne River, the SFPUC would experience a substantial water supply deficit 19 20during sequential-year droughts, *i.e.*, assuming a reoccurrence of 1987-1992 hydrology. Further, in 21 this scenario San Francisco would be unable to meet its projected future water supply demand for 2040, as forecasted in Plan Bay Area 2013 (and augmented by ABAG for purposes of developing the 22 23 proposed Plan Bay Area 2040), during a single critically dry year, *i.e.*, 1991 hydrology. This would 24 compel San Francisco, as described in Section I(C)(3) supra, to significantly reduce deliveries to the

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<sup>126</sup> *Id.* at 5, Table 3.

<sup>|| 127</sup> *Id.* at 6, Table 5.

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 &</sup>lt;sup>128</sup> *Id.* at 6 (observing that "[t]he apparent mismatch between Bay Area growth projections and expected dry-year shortages raises the question of whether the instream flow restrictions in the SED would alter patterns of growth in the Bay Area.").

RWS service territory. Because of San Francisco's cutbacks in deliveries, water suppliers in the RWS 2 service territory with limited access to alternate supplies would face severe water shortages. The highdensity, transit-oriented pattern of development called for in Plan Bay Area 2013 and the three 3 scenarios evaluated for the proposed Plan Bay Area 2040, direct population growth to developed urban 4 areas within the region and thereby amplify these water supply shortages; the same amount of water 5 would need to supply many more people. Due to insufficient water supply, the Bay Area would not be 6 able to absorb the higher level of forecasted growth clustered around major transit corridors, as 7 directed by ABAG and MTC. 8

9 In response to such water supply constraints, local government agencies in the RWS service 10 territory would likely take actions to protect existing customers and/or to limit unsustainable growth. If water suppliers in the RWS service territory followed EBMUD's example and adopted water neutral 11 12 programs, the additional compliance costs would increase the price of new homes, thereby reducing affordable housing, and, ultimately, if the costs were too high, displacing development from the Bay 13 Area. 129 Similarly, if water suppliers followed the example of East Palo Alto and adopted 14 development moratoriums due to insufficient water supplies, businesses that would have otherwise 15 located new development in the region would have to go elsewhere. 16

However, notwithstanding these water supply constraints, if local government agencies in the RWS service territory did not take actions to either protect existing customers or limit unsustainable growth, businesses might still seek to locate development outside the Bay Area due to the region's lack of reliable dry-year and future water supplies. As discussed in Sections I(C)(3) and I(E)(2) supra, if instead of limiting or prohibiting new water connections, water suppliers in the RWS service territory imposed severe – and likely unachievable 130 – levels of mandatory rationing to maintain

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<sup>129</sup> See supra note 74 and accompanying text.

<sup>130</sup> As explained above in Section I(C)(3) supra, assuming 1987-1992 hydrology and annual deliveries of 223 25 mgd, if San Francisco was obligated to bypass water in compliance with a 40-percent unimpaired flow objective on the Tuolumne River, the SFPUC would need to reduce deliveries to the RWS service territory by 39-percent 26 in the first 3 years of the drought, and impose 49-percent reductions in the next 3 years. Further, it would likely be impossible to sustain these extreme levels of water supply rationing, e.g., as noted in Sections I(A) and

<sup>27</sup> I(C)(1)-(2) supra, although during the 1987-1992 drought the SFPUC's mandatory rationing program reduced demand by approximately 30-percent as compared to pre-drought deliveries, the ability of the SFPUC's retail

<sup>28</sup> customers to achieve a 25-percent or greater reduction in the future "is highly unlikely due to the 'hardening' of
water service during sequential-year droughts and to meet projected future demand, the Bay Area's
economy would be dramatically impacted. Faced with the option of locating new development in an
area with more reliable dry-year and future water supplies, it is reasonable to assume businesses would
"see the writing on the wall" and migrate away from the Bay Area, thereby displacing the pattern of
planned growth in the region's urban core called for by ABAG and MTC.

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# I. The SED fails to acknowledge the inconsistency between the State Water Board's implementation of LSJR Alternatives 3 or 4 and Plan Bay Area 2013 and other State plans designed to avoid adverse environmental effects.

The EIR must discuss any inconsistencies between the proposed project and regional plans, 8 9 including "the applicable air quality attainment or maintenance plan or State Implementation Plan... 10 regional transportation plans, regional housing allocation plans, regional blueprint plans, plans for the reduction of greenhouse gas emissions, habitat conservation plans, natural community conservation 11 12 plans and regional land use plans for the protection of ... San Francisco Bay ....." (Cal. Code Regs., tit. 14, § 15125(d); see also Appendix G of the CEQA Guidelines [requiring that the lead agency must 13 identify any "[c]onflict with any applicable land use plan, policy, or regulation of an agency with 14 jurisdiction over the project . . . adopted for the purpose of avoiding or mitigating an environmental 15 effect."].)131 Plan Bay Area 2013 is the Bay Area's first regional plan subject to SB 375, and thus, is 16 designed to meet the legislation's goals by primarily directing future growth into urban infill 17 developments located along major transit corridors.132 By concentrating development in existing 18 urban areas that are easily accessible to transit, Plan Bay Area 2013 would substantially reduce vehicle 19 20 miles travelled as compared to suburban development, accommodate demand for new housing in the urban core, and reduce development pressure on undeveloped and agricultural lands, thereby helping 21 to meet the Bay Area's statutorily required per capita GHG emissions reductions and housing targets, 22 23 and preserving open space, forests and agriculture.133

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water demands that occurred during and subsequent to the drought." (SFPUC 2015 UWMP, *supra* note 5, Appendix K, at 3.)

<sup>26 131</sup> See CEQA Environmental Checklist Form, Appendix G, IX(b), available at http://resources.ca.gov/ceqa/guidelines/Appendix G.html.

<sup>&</sup>lt;sup>132</sup> Plan Bay Area 2013, *supra* note 104, at 4, 123.

<sup>28 || 133</sup> *Id.* at 4-5, 103-104, 123.

The SED fails to analyze, or even acknowledge, that the State Water Board's implementation 1 of LSJR Alternatives 3 or 4 will have the reasonably foreseeable effect of frustrating the legislative 2 goals supporting Plan Bay Area 2013, including the mandatory targets for reduction of GHG 3 emissions and housing projected population growth within the region, by displacing the denser, transit-4 5 oriented pattern of development called for by ABAG and MTC.134 Additionally, the more expansive, sprawling pattern of growth would also contravene Plan Bay Area 2013's comprehensive objective to 6 conserve existing open space, natural resources and agriculture in the region.135 The SED must 7 8 acknowledge, discuss and reconcile these inconsistencies.

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### The SED fails to analyze the significant environmental impacts that would result if the pattern of growth called for in Plan Bay Area is displaced.

The SED fails to assess the significant environmental impacts that would result if the pattern of 11 12 growth called for in Plan Bay Area 2013, and posited in the three scenarios used to develop the proposed Plan Bay Area 2040, was displaced. Such displacement would occur under the reasonably 13 foreseeable events in which local governments limit growth due to insufficient water supply and 14 business leaders decide to locate new development in areas with more reliable dry-year and future 15 water supplies. This critical omission constitutes an abuse of discretion because the SED fails to 16 present any analysis whatsoever regarding such impacts. (Pub. Res. Code, § 21168.5; Pub. Res. Code, 17 § 21100(b)(1); Pub. Res. Code, § 21159(a)(1); Cal. Code Regs., tit. 23, § 3777(b)(2).) Further, the 18 draft's failure to analyze how the State Water Board's implementation of a new unimpaired flow 19 20objective on the Tuolumne River may affect growth in the Bay Area also violates the requirements of the State Water Board's certified regulatory program by failing to analyze the environmental impacts 21 of the reasonable foreseeable method of compliance of reduction in deliveries throughout the RWS 22 23 service territory, taking into account impacts to "population and geographic areas," (Cal. Code Regs, tit. 23, § 3777(c); Pub. Res. Code, § 21159(c)-d).) In addition, the SED's failure to analyze the 24

<sup>|| 134</sup> *Id*. at 5.

<sup>&</sup>lt;sup>134</sup> *Ha.* at 5.
<sup>135</sup> See Section I(H)(5)(a), supra. See also Plan Bay Area 2013, supra note 104, at 103 ("SB 375 requires consideration of open space and natural resource protection and supports accommodating new housing and commercial development within existing areas designated for urban growth. This is of particular importance to the Bay Area, where so much of the region's spectacular natural setting has been preserved as open space.").

reasonably foreseeable displacement of growth violates the Porter-Cologne Act by failing to analyze the "past, present, and *probable future beneficial uses of water*," (Wat. Code, § 13241 (emphasis added)), a category that expressly includes municipal water supply, (Wat. Code, § 13050(f)). The adverse environmental impacts that the SED failed to analyze include, but are not limited to, the following.

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### 1. Greenhouse Gas Emissions and Other Air Pollutants.

7 As noted, the State Water Board, as the lead agency, "should attempt to describe, calculate, or estimate, the amount of greenhouse gases the project will emit." (Center for Biological Diversity 62 8 9 Cal.4th at 217 (*citing* Cal. Code Regs., tit. 14, § 15064.4(a).) Significantly, "Bay Area ecosystems, 10 especially forests and wetlands, are very efficient at storing carbon."136 If the Bay Area's at-risk landscapes are developed, "the carbon that would be released is equivalent to putting 1.3 million cars 11 12 on the road every year."137 In addition to reconciling the aforementioned inconsistency with the GHG emissions reductions targets mandated by SB 375 and incorporated into Plan Bay Area 2013, the State 13 Water Board is also tasked with attempting to "describe, calculate, or estimate" the increased amount 14 of GHG emissions that will result from displacement of the high-density, transit-oriented pattern of 15 growth called for by ABAG and MTC, and the corresponding loss of carbon sinks throughout the 16 region due to the encroachment of sprawling development on existing opens spaces and forests. The 17 SED fails to include any analysis of the reasonably foreseeable increase in GHG emissions that will 18 result from displacement of growth in the urban core in the Bay Area if San Francisco is responsible 19 20 for bypassing flow in compliance with LSJR Alternatives 3 or 4.

In addition, the SED fails to consider other air quality impacts that are likely to occur in the event that growth is displaced. The SED concludes:

It is not expected that the flow requirements would result in population or employment growth that would result in a conflict with or obstruct implementation of the applicable air quality plan because they would not require activities associated with population growth (e.g., housing development, business centers, etc.). Consequently, [air quality] impacts would be less than significant.

28 || 137 *Id.* (citation omitted).

<sup>136</sup> Greenbelt Alliance 2017, *supra* note 71, at 28.

(SED, at B-20.) However, the SED's conclusion fails to consider the air quality impacts that may result if growth is displaced from the Bay Area. For example, growth from the Bay Area displaced to the Central Valley would result in an increase in air pollution in the San Joaquin Air Basin from increased development and traffic. The San Joaquin Air Basin already experiences some of the worst air quality in California. 138 Although the SED recognizes that a project is considered inconsistent with air quality plans if it would result in growth and a consequent increase in emissions that are not accounted for "in the applicable air quality plan emissions budget," 139 the analysis fails to assess the degradation of air quality that can be expected if growth from the Bay Area is displaced to an outlying region such as the Central Valley. 140

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#### 2. Loss of open space, forests, habitat and agriculture.

Under CEQA, the lead agency must analyze potentially significant adverse environmental 12 effects resulting from loss of open space, forests, habitat and agriculture. (See *e.g.*, Pub. Res. Code, § 21100(b)(1); see also Appendix G of the CEOA Guidelines [requiring lead agency to identify 13 potentially significant adverse environmental effects resulting from conversion of farmland to non-14 agriculture use.].)141 As explained, one of the four comprehensive objectives of Plan Bay Area 2013 is 15 to conserve open space, natural resources and agriculture lands in the region by concentrating new 16 development in existing urban areas and locally adopted urban growth boundaries.142 To this end, 17 Plan Bay Area 2013 identifies "over 100 regionally significant open spaces about which there exists 18 broad consensus for long-term protection but which face nearer-term development pressures."143 As 19 explained by ABAG and MTC, past development trends saw the outward expansion of growth within 20

143 Id. at 45. 28

<sup>138</sup> See Summary of California Air Resources Board Select 8 Summary, accessed March 9, 2017, attached hereto as Exhibit 19. 22

<sup>139</sup> SED, at B-20 (explaining that "a project is deemed inconsistent with air quality plans if it would result in 23 population and/or employment growth that exceeds growth estimates included in the applicable air quality plan, which, in turn, would generate emissions not accounted for in the applicable air quality plan emissions budget."

<sup>24</sup> <sup>140</sup> See *e.g.*, SED, at 11-12 (wherein the SED acknowledges there is existing pressure to develop affordable residential housing on agricultural land in the Central Valley to accommodate workers who live in the Central 25 Valley yet commute to the Bay Area).

<sup>141</sup> See CEQA Environmental Checklist Form, Appendix G, II(a), available at 26 http://resources.ca.gov/ceqa/guidelines/Appendix G.html.

<sup>142</sup> Plan Bay Area 2013, supra note 104, at 42, 45.

the Bay Area and spillover of growth into surrounding regions.144 At present, 293,100 acres of natural and agricultural lands in the Bay Area "are at risk of sprawl development over the next 30 years.... 2 The total land at risk is about 458 square miles, nearly 10 times the size of San Francisco."<sup>145</sup> "The 3 speculative pressure is *acute*, with 63,500 acres of Bay Area land at high risk of development within 4 the next years," most of which is located "just outside cities."146 5

If the high-density, transit-oriented pattern of growth called for in Plan Bay Area 2013 is 6 displaced, the "acute" pressure to develop existing open spaces in the region, including habitat of 7 threatened and endangered species and agricultural lands, will inevitably intensify.147 For example, 8 9 Contra Costa County has the most at risk land in any county in the region, 62,000 acres, that includes 41 percent of the "Bay Area's at-risk Critical Habitat lands." 148 "The future of many of the region's 10 remaining burrowing owls, kit foxes, and other rare species depends on the county's growth 11 decisions."149 Another illustration of this pressure is evident in Santa Clara County, where 56 percent 12 of the county's existing farmland is at risk of development.150 The SED fails to include any analysis 13 of the reasonably foreseeable loss of open space, forests, habitat and agriculture that will result from 14 displacement of growth in the urban core in the Bay Area assuming San Francisco is responsible for 15 bypassing flow in compliance with LSJR Alternatives 3 or 4. 16

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148 Id. at 13. 24

149 Id.

150 Id. at 20 (explaining, "[f]armland in Santa Clara County desperately needs conservation. With an astounding 56 percent of the county's farmland at risk of development, this fertile and irreplaceable resource is very close 26 to being lost forever."). See also SED, at 11-12 (wherein the SED explains that the pressure to develop

residential housing on agricultural land in the Central Valley is, in part, driven by workers who live in the 27 Central Valley yet commute to the Bay Area). However, the SED fails to acknowledge that agricultural land

within the Bay Area, e.g., in Santa Clara County, is also at risk of urbanization. 28

<sup>145</sup> Greenbelt Alliance 2017, supra note 71, at 3.

<sup>146</sup> Id. at 8 (emphasis added).

<sup>22</sup> 147 Id. at 27 (noting that the "Bay Area has a total of 2.3 million acres of agricultural land, 1.8 million acres of lands that provide water resources—watersheds and wetlands—and 2.5 million acres of lands that are important 23 for wildlife—habitat corridors, and areas rich in biodiversity.").

## **3.** Water-related impacts of bringing sprawling development into affected areas.

Under CEQA, "[t]he EIR shall also analyze any significant environmental effects the project might cause *by bringing development and people into the area affected*." (Cal. Code Regs., tit. 14, § 15126.2.) To the extent that new development is displaced to outer regions of the Bay Area and the Central Valley, it is reasonable to assume there would be adverse environmental impacts, including impacts to groundwater recharge, water quality and heightened risks of erosion and flooding.

For example, development displaced to currently rural areas in the outer Bay Area or Central Valley, and the attendant construction, would increase the presence of impermeable surfaces, which would, in turn, impede and reduce groundwater recharge.<sup>151</sup> "This is a critical issue in counties like Sonoma, "where groundwater is what people drink."<sup>152</sup> More than half of Sonoma County's water supply – used for both drinking and irrigation – comes from groundwater.<sup>153</sup> In Sonoma County, 58,400 acres of land are at risk of development over the next 30 years, including land that collects water relied on to recharge Sonoma County's groundwater supplies.<sup>154</sup> "If the region's at-risk landscapes are lost to sprawl development, 46 billion gallons of water—a year's worth of water for 677,000 households—is at stake."<sup>155</sup>

Further, the increase in impermeable surfaces associated with development, such as roads and parking lots, increases stormwater runoff, which, in turn, "picks up lawn fertilizer and pesticides, pet waste, trash, pollution from vehicles and pavement materials, and chemicals from industrial and commercial activities."<sup>156</sup> Unless stormwater is treated or soaks into the ground, it will transport the

 $24 ||^{152} Id.$ 

*Id.* at 24.

155 Id. (citations omitted).

<sup>&</sup>lt;sup>151</sup> Greenbelt Alliance 2017, *supra* note 71, at 28 ("[u]ndeveloped Bay Area lands catch and filter rain, replenishing groundwater supplies. But this service is threatened by development; if lands are paved over, they cannot collect water.").

*Id.* (emphasizing that protecting this land from development "is essential, for water and for the people who depend on it.").

 <sup>&</sup>lt;sup>27</sup>
 <sup>156</sup> Our Built and Natural Environments: A Technical Review of the Interactions Among Land Use, Transportation, and Environmental Quality, Second Edition, U.S. Environmental Protection Agency, June 2013, *available at* <u>https://www.epa.gov/sites/production/files/2014-03/documents/our-built-and-natural-</u>

pollutants that it has picked up into a nearby local water body. 157 As explained in Section I(F)(5)(d) 2 supra, the transference of heat from impervious surfaces in the urban environment to stormwater runoff also degrades water quality by increasing the temperatures of local water bodies. 3

The increased speed of flowing stormwater is also problematic; augmented stormwater runoff in developed areas "moves faster, reaches peak flow more quickly after precipitation begins, and flows for a longer period of time, all of which increase erosion and flood risk."158 Moreover, increased stormwater runoff increases the frequency and severity of flooding during wet periods because water that would have otherwise soaked into the ground is unable to infiltrate the new, impervious surfaces.159 The SED must analyze all of these impacts.

Additionally, as noted in Section I(A) supra, as the RWS service territory has some of the lowest per capita water use in the state, it is reasonable to conclude that development displaced from the Bay Area to other regions, such as the Central Valley, will use more water per capita than if that development occurred in the urban core areas, as called for in Plan Bay Area 2013.160

#### K. The SED fails to consider the potential adverse impact of the State Water Board's proposal on the development of housing within the Bay Area.

Water Code Section 13241 "identifies certain factors that must be evaluated when establishing water quality objectives," (SED, at ES-63), including "the need for developing housing within the region," (Wat. Code, § 13241(e)). Although the SED indicates that the required discussion of the "[n]eed for developing housing within the region" primarily appears in the Executive Summary, (SED, at ES-64), in fact, there is no substantive discussion of how the State Water Board's proposal may

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environments.pdf (referred to below as "EPA Technical Review"), at 51. San Francisco incorporates EPA's Technical Review by reference herein.

<sup>157</sup> Id. 23

<sup>158</sup> Id.

<sup>24</sup> 159 Id. at 48.

<sup>25</sup> 160 See e.g., California Department of Water Resources, California Water Plan Update 2013, Volume 2 Regional Reports, San Francisco Bay Hydrologic Region, 2013, available at

http://www.water.ca.gov/waterplan/cwpu2013/final/ (referred to below as "California Water Plan Update 26 2013"), at SFB-40 (explaining that the cool climate, small lot sizes, and high-density development in the Bay

Area contribute to low per capita urban water use, whereas per capita water use in communities in the warmer 27 Central Valley can range from 200 to 300 gallons per day). San Francisco incorporates the California Water

Plan Update 2013 by reference herein. 28

affect development of new housing in the Executive Summary or anywhere else in the document. Instead, the discussion of housing effects in the Executive Summary, and scattered throughout various 2 sections of the SED, with very limited exceptions, denies that the State Water Board's proposal will 3 have any appreciable effect on the development of new housing in the plan area, extended plan area, or 4 other potentially impacted areas, including San Francisco and the RWS service territory.161 The 5 **Executive Summary states:** 6

> *The proposed flow and salinity objectives do not directly restrict the* development of housing in the plan area and the extended plan area. Also, as explained in Chapter 17, Cumulative Impacts, Growth-Inducing Effects, and Irreversible Commitment of Resources, of this SED would not induce growth and new housing development. Depending on the alternative, however, the flow objectives could result in reduced surface and groundwater supplies such that additional infrastructure to treat or provide alternative sources of water may need to be constructed, as explained in Chapter 13, Service Providers. Where alternative sources are not provided, it may affect new housing development because there may be insufficient supplies to serve the development.

(SED, at ES-65 [emphasis added].) Thus, the SED avoids any substantive discussion of how the State Water Board's proposal may affect new housing development within the affected regions, including the Bay Area, in the same way the analysis leapfrogs over an inconvenient discussion of impacts that would result from draconian reductions in water deliveries to the RWS service territory. Instead of acknowledging that an inability to develop needed housing in the Bay Area is a reasonably foreseeable consequence of the State Water Board's implementation of a new unimpaired flow objective on the Tuolumne River, as proposed in the SED, the draft posits that only the failure of service providers to develop adequate alternative water supplies will result in the reduced development of new housing. 162

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<sup>161</sup> See ES-5—ES-6 (defining the boundaries of the plan area and extended plan area, and explaining that "the plan amendments also have the potential to affect areas outside of the plan area or extended plan area that 24 obtain beneficial use of water from the Stanislaus, Tuolumne, and Merced Rivers, and the LSJR downstream of the Merced River, but are not contiguous with the plan area or extended plan area," including San Francisco and 25 "[a]ny other area served by water delivered from the plan area or extended plan area not otherwise listed above"). 26

<sup>162</sup> See Section I(C)(3) infra (explaining that if San Francisco was responsible for bypassing flow in compliance with the State Water Board's implementation of LSJR Alternatives 3 or 4, it would be required to impose 27 unsustainable levels of mandatory rationing throughout the RWS service territory during sequential-year droughts).

Further, although the SED concludes that because "[u]nder the LSJR alternatives, changes in river flows would generally result in more water remaining in the three eastside tributaries rather than being used for consumptive purposes," such "changes in river flows would not increase the reliable water supply and would not directly or indirectly induce economic, population, or housing growth," (SED, at 17-69), the draft entirely fail to address the potential correlative increases in economic, population, and housing growth that may therefore occur elsewhere, *i.e.*, in other regions with more reliable dry-year and future water supplies.

8 As explained in Section I(H)(5)(a) supra, Plan Bay Area 2013 is designed to comply with 9 SB 375's statutory requirement that the Bay Area house 100 percent of its projected population growth 10 without displacing current low-income residents. 163 As a reflection of Plan Bay Area 2013's "emphasis on the existing transit network and connecting homes and jobs, San Francisco, San Mateo, 11 Santa Clara and Alameda counties account for the majority of housing growth (77 percent) and job 12 growth (76 percent)."164 The SFPUC delivers water in each of these counties. As detailed in Section 13 I(C)(3) supra, if the SFPUC was responsible for bypassing flow to meet LSJR Alternatives 3 or 4, 14 during sequential-year droughts it would be compelled to significantly reduce deliveries to its in-City 15 retail customers and wholesale customers located in San Mateo, Santa Clara, and Alameda counties. 16 For all of the reasons discussed above, it is reasonable to assume this lack of dry-year and future water 17 supply reliability would inhibit and deter needed housing growth in the Bay Area, and would induce 18 growth in areas with more reliable dry-year and future water supplies. The SED's utter failure to even 19 20 acknowledge, let alone comprehensively analyze, how the State Water Board's implementation of LSJR Alternatives 3 or 4 may displace the pattern of compact growth called for in Plan Bay Area 21 2013, and thereby, further intensify the pressure to develop affordable housing elsewhere, violates the 22 23 express requirement of Water Code Section 13241(e).

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<sup>&</sup>lt;sup>163</sup> Plan Bay Area 2013, *supra* note 104, at 5, 19, 43.

<sup>28 || 164</sup> *Id.* at 56.

### L. Reduced hydropower generation would result in substantial economic impacts to San Francisco.

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### The SED fails to consider impacts to the SFPUC's hydropower operations.

The SED fails to consider impacts to the SFPUC's hydropower operations from implementation of the LSJR Alternatives. The SED relies on the water supply effects ("WSE") model to estimate the effects of the LSJR Alternatives on hydropower generation at certain dams. (SED, at J-1 ["This analysis relies on the State Water Resources Control Board's (State Water Board's) water supply effects (WSE) model to estimate the effects of the LSJR alternatives on reservoir releases and storage (elevation head), and allowable diversions to off-stream generation facilities, and then calculates the associated change in monthly and annual energy production. This output then provides input to electric grid reliability modeling, which evaluates the potential impacts of these changes on the electric grid reliability under peak load and outage contingency scenarios."].) The SED focused its analysis of estimated impacts to hydropower operations on three identified "rim dams," *i.e.*, New Melones Dam on the Stanislaus River, New Don Pedro Dam on the Tuolumne River, and New Exchequer Dam on the Merced River. (SED, at J-1 (emphasis added) ["Numerous hydropower generation facilities on the three eastside tributaries are evaluated in this analysis. The major facilities potentially affected, however, are those associated with the New Melones Reservoir (New Melones Dam) on the Stanislaus River, New Don Pedro Reservoir (New Don Pedro Dam) on the Tuolumne *River, and Lake McClure (New Exchequer Dam) on the Merced River.*"]; SED, at J-1, fn. 4 ["In this document, the term rim dams is used when referencing the three major dams and reservoirs on each of the eastside tributaries: New Melones Dam and Reservoir on the Stanislaus River; New Don Pedro Dam and Reservoir on the Tuolumne River; and New Exchequer Dam and Lake McClure on the Merced River."].) Significantly, hydropower facilities located upstream of these three "rim dams," e.g., the SFPUC's hydropower facilities located above New Don Pedro Dam on the Tuolumne River, were not included in the WSE model. (SED, at J-5 (emphasis added) ["Hydropower generated from facilities upstream of the rim dams on the Stanislaus and Tuolumne Rivers is not included in the WSE model because the largest hydrologic effects in terms of volume of water will be at and downstream of the rim dams."].)

2 Energy and Greenhouse Gases, in Section 14.4.4, Impacts and Mitigation Measures: Extended Plan 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 2021 reductions at reservoirs under [LSJR Alternatives 2, 3, and 4] in the extended plan area" due to more 22 23 24 25 26

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Area." (SED, at J-5.) However, to the extent that the general qualitative discussion of impacts to hydropower operations upstream of the three identified "rim dams" that appears in Chapter 14 is intended to apply to the SFPUC's hydropower facilities on the Tuolumne river, that discussion is woefully inadequate because it ignores a critical component of San Francisco's operations during sequential-year droughts. To extend the longevity of its water supply, during a protracted drought San Francisco would impose mandatory rationing and reduce deliveries to the RWS service territory from the San Joaquin Pipelines.<sup>165</sup> This would enable San Francisco to maximize the amount of water that could be stored in its three largest reservoirs on the Tuolumne River and its tributaries – Hetch Hetchy Reservoir, Cherry Reservoir and Lake Eleanor. 166 However, because San Francisco generates electricity when it releases water from Hetch Hetchy Reservoir for delivery to the Bay Area, primarily via Canyon Power Tunnel and Kirkwood Powerhouse, rationing the delivery of water supply to the RWS results in reduced hydropower generation.<sup>167</sup> In its qualitative discussion of impacts to hydropower facilities upstream of the three identified "rim dams," the SED fails to consider that reductions in hydropower generation may occur due to reduced water deliveries. Although the SED recognize that "[h]ydropower production is related to both water discharge volume and reservoir head," (SED, at 14-53), the qualitative discussion of impacts to hydropower facilities upstream of the "rim dams" in Chapter 14 solely focuses on reductions in generation associated with reduced reservoir volume, and consequent reductions in reservoir head. (SED, at 14-53 [concluding that during drought conditions "there could be significant hydropower production

The SED states that "[u]pstream hydropower effects are qualitatively discussed in Chapter 14,

<sup>167</sup> SFPUC Analysis of Changes to Flow Criteria, supra note 26, at 5. 28

<sup>165</sup> SFPUC Analysis of Changes to Flow Criteria, supra note 26, at 5.

<sup>166</sup> See WSIP, supra note 7, at 2-7 (explaining that "[w]ater from Lake Eleanor and Lake Lloyd [also known as Cherry Reservoir] is used primarily to meet minimum instream flow requirements to benefit fish and other wildlife, satisfy downstream water rights of the Turlock and Modesto Irrigation Districts . . . produce hydroelectric power, and provide flows to support recreational use including whitewater recreation. However, if necessary during emergency or drought conditions, water from Lake Lloyd or Lake Eleanor can be released to

Cherry Creek and then diverted to Mountain Tunnel for transport to the Bay Area, which occurred once during 27 the early 1990s.").

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frequent and severe reservoir volume reductions.].) Accordingly, the SED fails to analyze, 2 qualitatively discuss, or even acknowledge the hydropower reductions that San Francisco would experience during sequential-year droughts under implementation of LSJR Alternatives 2, 3, or 4.168 3

#### 2. The SFPUC's hydropower operations would be significantly affected by implementation of LSJR Alternatives 3 or 4 during dry hydrologic conditions.

As explained, if San Francisco was responsible for complying with a new unimpaired flow 6 7 objective on the Tuolumne River, then during dry hydrologic conditions the SFPUC would be 8 compelled to implement water supply rationing in order to preserve system storage. Consequently, 9 less water would flow through the SFPUC's water supply delivery pipeline, thereby reducing hydropower generation at facilities situated along the route of the delivery pipeline, *i.e.*, Kirkwood 10 Powerhouse and Moccasin Powerhouse.<sup>169</sup> For example, assuming maximum annual contract 11 12 deliveries of 265 mgd, the SFPUC's hydropower generation could be reduced by as much as 11 percent under a 40 percent unimpaired flow objective (assuming FY 1960-61 through FY 1962-63 13 hydrology), and by as much as 21 percent under a 50 percent unimpaired objective (assuming FY 14 1976-77 through FY 1977-78 hydrology).170 Assuming pre-drought demand of 223 mgd, the SFPUC 15 would experience comparably significant reductions in hydropower generation.171 16

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<sup>19</sup> 168 In fact, it appears the reference to a qualitative discussion of effects to hydropower operations upstream of the three "rim dams" in Chapter 14 was primarily intended to allay concern that impacts to upstream 20 hydropower operations, such as the SFPUC's hydropower facilities in the Tuolumne River Watershed, were simply not considered by the State Water Board. See Declaration of Jonathan P. Knapp in Support of 21 Comments by the City and County of San Francisco to the Draft Substitute Environmental Document in Support of Potential Changes to the Bay-Delta Plan ("Knapp Decl."), attached hereto as Appendix 4, at ¶ 8, see 22 Attachment 2 to Knapp Decl., E-mail from Nicole L. Williams, Senior Environmental Planner, ICF International, to William Anderson and Timothy Nelson, State Water Board, August 15, 2016 (emphasis added) 23 (explaining that "[w]e will edit the text in Appendix J to remove that reservoirs/dams upstream of the rim dams would be unaffected by the LSJR alternatives and to reflect that given the relatively small amount of 24 hydropower generated upstream when compared to the rim dams (Table J-1)) this information was not modeled and Appendix J only focuses on modeling changes associated with the rim dams. In addition, we could add a 25

sentence that says the upstream hydropower effects are qualitatively discussed in the EPA section of Chapter 14 (so people don't think we've left it out)."). 26

<sup>169</sup> SFPUC Analysis of Changes to Flow Criteria, supra note 26, at 5

<sup>27</sup> 170 Id. at 13. Table 5.

<sup>171</sup> Id. at 14, Table 6. 28

#### 3. The SFPUC's hydropower impacts would result in significant economic impacts that have not been analyzed in the SED.

San Francisco estimates that the economic impact of the State Water Board's implementation 3 of a 40 to 50-percent unimpaired flow objective on the Tuolumne River – calculated by determining 4 the foregone revenue as a result of lost sales of hydropower – would be approximately \$2 million per 5 year for each successive year of a protracted drought.172 6 II. The State Water Board's conclusion that it is reasonably foreseeable that San Francisco 7 could develop and/or procure sufficient replacement water supplies through the three methods of compliance identified in the SED is not supported by substantial evidence, or 8 reasonable inferences predicated on fact.173 9 A. The State Water Board's assumption that it is reasonably foreseeable that San Francisco would be able to purchase the requisite volume of replacement water 10 from the Modesto Irrigation District and the Turlock Irrigation District is not supported by substantial evidence, or reasonable inferences predicated on fact, 11 and the analysis of environmental and economic impacts associated with such water transfers is inadequate. 12 Although the SED assumes that San Francisco's primary method of compliance with a new 13 flow objective for the Tuolumne River would be to purchase replacement water from the Districts, 174 14 the draft concedes that whether such a transfer would actually occur is "uncertain," "speculative and 15 unknowable." (SED, at L-20 [emphasis added] [noting that in 2012, the MID Board of Directors 16 rejected a proposal for long-term transfers to SFPUC. This rejection makes future temporary drought 17 transfers uncertain."); id. at 16-9 (emphasis added) [acknowledging that "[t]he number and location of 18 surface water transfers that entities would undertake in response to surface water reductions as a result 19 20 of approving the LSJR alternatives is *speculative and unknowable*."]; *id.* at L-22 (emphasis added) 21 172 Id. at 6. 22 173 SED, at L-22 (identifying three "potential actions SFPUC could take to replace reductions in water supply 23 resulting under the LSJR alternatives" as "Water transfer," "In-Delta diversion(s)," and "Water supply Desalination Project."). 24 174 Id. at L-26 ("[i]t is reasonable to assume that SFPUC would purchase and transfer additional water supplies from the Tuolumne River Watershed to its service area to offset water shortages during drought periods."); id. 25 at 20-27 ("[t]he analysis presented in this section (and described in greater detail in Appendix L, City and County of San Francisco Analyses) assumes that under LSJR Alternatives 2, 3, and 4, during drought periods, 26

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SFPUC could meet its potential water supply shortage by buying water from MID and TID."; id. at 20-38 ("To assess the effects of additional water supply costs on the four-county Bay Area regional economy, it is assumed 27

that the SFPUC would meet its water demands during severe drought periods (such as within the 6-year drought 28

<sup>1987-1992)</sup> by purchasing water from MID and TID.").

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1	["[a] possible water transfer between SFPUC and irrigation districts relies on numerous unknown
2	variables (e.g., willingness of irrigation districts to enter into a transfer agreement, the price of the
3	water, and the volume of water needed)."]; <i>id.</i> at 20-27 [describing "uncertainties of this type of water
4	transfer" as including "price of water, quantity of water available, willingness of parties to enter into
5	an agreement."].) The State Water Board has failed to identify any substantial evidence in support of
6	its assumption that San Francisco would be able to effectuate such a transfer. (Pub. Res. Code, §
7	21168.5 (emphasis added) [providing that under CEQA "[a]buse of discretion is established if the
8	agency has not proceeded in a manner required by law or if the determination or decision is not
9	supported by substantial evidence."].) Thus, the proposed large-scale water transfer from the Districts
10	to San Francisco cannot be considered a reasonably foreseeable method of compliance by San
11	Francisco with the LSJR Alternatives. (Pub. Res. Code, § 21159(a); Cal. Code Regs., tit. 23, §
12	3777(b)(4) .)
13	1. The State Water Board has no basis for assuming that the Districts would agree to transfer the requisite volume of water to San Francisco in the
14	midst of a sequential-year drought.
15 16	a. The State Water Board reaches an unsupported conclusion about past water transfers and provides no support for a water transfer between the Districts and San Francisco of the required magnitude.
17	i. Contrary to the suggestion in the SED, MID only transferred a minimal amount of water to San Francisco during the 1987–1992 drought
18	1987-1992 drougnt.
19	The SED estimates that if the State Water Board implemented a 40 percent unimpaired flow
20	objective on the Tuolumne River, and San Francisco was responsible under the Fourth Agreement for
21	providing approximately 51.7 percent of the increased flow required from the Districts, San Francisco
22	would experience a water supply deficit of 119,000 AF/year for 6 consecutive years based on the
23	historic hydrology from the 1987-1992 drought.175 (SED, at L-21, Table L.4-2). The Districts have
24	never transferred this volume of water to any other entity.
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26	175 In fact, as explained in Section I(A) <i>supra</i> . San Francisco's deficit under a 40-percent unimpaired flow
~-	1. If the set of the section 1(1) supply sufficiences is defined under a to perform an input of the set

or 65,304 AF in total for the 6-year period. *See* SFPUC Analysis of Changes to Flow Criteria, *supra* note 26, at 16, Table 9.

The SED relies on the faulty premise that San Francisco purchased a comparable volume of water from the Districts during the 1987-1992 drought.<sup>176</sup> The SED appears to conclude that San Francisco purchased, on average, 18,000 AF/year from the Districts during the 6-year drought of 1987-1992. The SED estimates that "[u]nder historic conditions the maximum amount of water needed to be purchased by the City to make it through the 6-year drought was about 105 [thousand acre-feet or "TAF"], or an average of 18 TAF per year for the 6-year period (1987-1992)." (*Id.* at L-14.) Further, the SED states that the baseline credit balance in San Francisco's water bank in Don Pedro Reservoir that was used by the State Water Board in its analysis "is lower than historically reported because, during [the 1987-1992 drought], the account dropped below zero *and the City and the districts during this period are unknown, but the difference from baseline and the reported balance can be attributed to this purchase.*" (*Id.* (emphasis added).) However, the SED is mistaken; San Francisco has never purchased a comparable volume of water from the Districts. Although during the 1987-1992 drought San Francisco purchased approximately 107,848 AF

Although during the 1987-1992 drought San Francisco purchased approximately 107,848 AF of water, 177 San Francisco only procured a small fraction of that amount from either of the Districts. The only water transfer completed during the 1987-1992 drought with either of the Districts was a 1990 water transfer from MID to San Francisco for 5,288 AF ("1990 Transfer Agreement").178

<sup>&</sup>lt;sup>176</sup> December 12th Workshop Transcript, *supra* note 23, at 207:4-12 (emphasis added) (wherein Tom Wegge,
<sup>176</sup> Principal Economist at TCW Economics explained, "[w]ell, I mean, we considered all of the options [for
<sup>176</sup> replacement water supply for San Francisco], but we felt that the most reasonable assumption, given the
<sup>177</sup> existing infrastructure, *the history of having transfers*, the fact that the district -- the SFPUC -- has identified
<sup>178</sup> transfers between MID and TID [in] their water supply plan, that based on those factors and the fact that, like I
<sup>179</sup> said, the infrastructure was in place, that seemed like the most reasonable assumption for purposes of
<sup>170</sup> analysis."); *id.* at 2018:21-25—209:1 (emphasis added) (wherein Will Anderson, Water Resources Engineer

<sup>22</sup> with the Division of Water Rights, explains that "the record includes examples of the city pursuing such sales and don't in fact [know] the details of what has actually occurred in the past but that it would certainly be 23 something that would be possible."); *id.* at 208:18-25—209:1-9 (wherein Mr. Anderson acknowledges that State

Water Board Staff generated the assumption that San Francisco would be able to purchase the requisite replacement supply from the Districts that served as the starting point for Mr. Wegge's economic analysis.)

<sup>&</sup>lt;sup>177</sup> The 107,848 AF of transfer water San Francisco secured during the 1987-1992 drought period pales in comparison to the 129,884 AF/year for 6 consecutive years – a total of 779,304 AF during the 6-year period – that San Francisco would need to obtain to replace the significant water supply reduction that it could experience if the State Water Board implemented a 40-percent flow objective on the Tuolumne River. *See* SFPUC Analysis of Changes to Flow Criteria, *supra* note 26, at 16, Table 9.

<sup>&</sup>lt;sup>178</sup> Ritchie Decl., *supra* note 3, at ¶ 6; Agreement Relating to the Transfer of Water, December 20, 1990, attached hereto as Exhibit 20.

Although pursuant to the 1990 Transfer Agreement, MID was required to "utilize its best efforts to make available to [San Francisco] up to 20,000 acre-feet of pumped drainage water," (1990 Transfer Agreement, at ¶ 2), MID only made 5,288 AF available to San Francisco for purchase, and of that amount, only 4,891 AF was actually delivered).<sup>179</sup> In accordance with its express terms, the 1990 Transfer Agreement terminated on March 15, 1991.<sup>180</sup> (1990 Transfer Agreement, at ¶ 1).

#### ii. The vast majority of the water San Francisco purchased during the 1987-1992 drought came from sources that no longer exist, or are no longer a source of reliable replacement supply.

9 The vast majority of the water purchased by San Francisco during the 1987-1992 drought came
10 from sources that no longer exist, *i.e.*, from the state-sponsored Drought Emergency Water Banks of
11 1991 and 1992 established by the California Department of Water Resources ("DWR"), or are no
12 longer a source of reliable replacement supply, *i.e.*, Placer County Water Agency ("PCWA").181
13 During the 1987-1992 drought, San Francisco obtained a commitment from DWR's Drought
14 Emergency Bank for 69,000 AF and from PCWA for 33,560.182 However, given that DWR did not
15 organize a drought water bank during the recent drought, 183 and there is no basis to conclude that San

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<sup>179</sup> Ritchie Decl., *supra* note 3, at  $\P$  6.

 <sup>18</sup> Contrary to the State Water Board's apparent belief that there is an existing water transfer agreement in place between the Districts and San Francisco, no such agreement has been executed since the 1990 Transfer
 19 Agreement. See SED, at 16-15 (emphasis added) (wherein the draft appears to reference "existing" transfer

Agreement. See SED, at 16-15 (emphasis added) (wherein the draft appears to reference "existing" transfer agreements between San Francisco and the Districts: "the [contemplated] water transfer [between the Districts and San Francisco] would be limited to the capacity of *existing infrastructure and existing agreements*.").

<sup>21 181</sup> The SED does not identify the possibility of San Francisco obtaining replacement water supplies either from a modern incarnation of the Emergency Drought Water Banks organized and implemented by DWR in 1991 and 1992, or from PCWA. *See* December 12th Workshop Transcript, *supra* note 23, at 212:10-13 (where Mr.

and 1992, of from 1 C wA. See December 12th workshop transcript, supra hote 23, at 212.10-15 (where with
 Grober acknowledges that State Water Board Staff did not consider transfers to San Francisco from any sources
 other than the Districts); *id.* at 213:6-12 (where Nicole Williams, Senior Environmental Planner at ICF Jones & Stokes, clarifies that the SED's analysis of the in-Delta diversion project may have relied on "a cost associated with a water transfer that might have come outside of the irrigation districts.").

<sup>24</sup> with a water transfer that hight have come outside of the highton districts. ). 182 Of these amounts, only 52,000 AF was actually delivered by DWR, and only 21,042 AF was actually 25 delivered by PCWA. (Ritchie Decl., *supra* note 3, at  $\P$  6.)

<sup>26 183</sup> See *e.g.*, Brekke, Dan, *As California Drought Deepens, Those With Water Can Sell at a High Price*, KQED (July 2, 2014), available at <u>https://ww2.kqed.org/news/2014/07/02/california-drought-water-sales/</u>, attached as Exhibit 21 (emphasis added) (explaining that "[d]uring the last drought, [DWR] ran a drought water bank,

which helped broker deals between those who were short of water and those who had plenty. But several environmental groups sued, alleging the state failed to comply with [CEQA] in approving the sales, and won.

<sup>28</sup> This year, the state is standing aside, saying buyers and sellers have not asked for the state's help. 'We think 67

Francisco would be able to effectuate a future dry-year water transfer with PCWA, it is not reasonable to assume that San Francisco could secure the requisite volume of replacement water from either of these sources.

Even if DWR organized and implemented a drought water bank in the future, it would need to
address an array of challenges, including numerous legal issues that commenters have identified.184
Assuming that a modern incarnation of the Drought Emergency Water Bank could surmount these
challenges, there would inevitably be intense, competing demands on any attainable transfers.185
Therefore, whether San Francisco would be able to secure the requisite amount of replacement supply,
or any significant portion thereof, from the bank would be "speculative and unknowable." (SED, at

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Further, whether San Francisco would be able to secure a dry-year water transfer with PCWA

12 during a future sequential-year drought for the requisite volume of replacement supply, or any

13 significant portion thereof, is also "speculative and unknowable" in light of the agency's existing

14 contractual commitments, potentially augmented regulatory obligations, and practical constraints.

15 || (*Id.*) PCWA has long-term agreements to sell water to several entities, including the City of Roseville,

16 Sacramento Suburban Water District, and San Juan Water District, and in recent years has made short-

that buyers and sellers can negotiate their own deals better than the state,' said Nancy Quan, a supervising engineer with the department.").

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184</sup> See e.g., Brian E. Gray, *The Market and the Community: Lessons from California's Drought Water Bank* (2008) 14 Hastings W.-N.W. J. Envtl. L. & Pol'y 41 (referred to below as "Lessons from California's Drought Water Bank") (identifying challenges that must be addressed by any future state-sponsored drought water banks, including legal considerations). (See *id.* at \*57) (explaining that "because the transfers of water to the [1991 DWR] Bank overwhelmingly involved surface water held pursuant to riparian right and surface water for which groundwater was substituted, both the [State Water Board] and the laws that establish a process for protecting third-party water rights holders, fish and wildlife, instream flows, and other interests within the areas-of-origin were effectively removed from the transfer process. Moreover, because of the decision legally to characterize the transfers for which groundwater was substituted as transfer of surface water for one purpose.

characterize the transfers for which groundwater was substituted as transfer of surface water for one purpose
 and transfers of groundwater for another, the laws designed to protect the counties in which groundwater
 originates were circumvented.").

If the past is any indication of the level and source of competing demands for any transfers that may be available for a future Emergency Drought Water Bank, it is reasonable to assume there will be significant competition from Southern California. See Morris Israel & Jay R. Lund, Recent California Water Transfers:

<sup>26</sup> *Implications for Water Management* (1995) 35 Nat. Resources J. 1, at \*11 (emphasis added) (explaining that "[a] total of 389,970 [AF] was purchased from the 1991 Water Bank by 12 entities, compared to 348 entities

<sup>27</sup> selling water. Three jurisdictions, Metropolitan Water District of Southern California (MWD), Kern County Water Agency and [San Francisco] accounted for over 80 percent of the purchases. *MWD alone purchased 55* 

<sup>28</sup> *percent*. Roughly 80 percent of 1991 Water Bank sales were for municipal and industrial uses.").

term water transfers to additional entities, including the San Diego County Water Authority, Westlands Water District and the East Bay Municipal Utilities District ("EBMUD"). Moreover, 2 EBMUD and PCWA are currently working on a long-term water transfer agreement whereby 3 "EBMUD, as the buyer, would purchase between [10,000-47,000 AF/year] of transfer water from 4 PCWA in dry years for diversion at the Freeport intake and delivery to EBMUD customers."186 Given 5 PCWA's existing (and potential future) contractual commitments regarding water transfers, it is 6 7 unclear whether PCWA would be able and/or willing to sell a significant volume of replacement 8 supply to San Francisco in the midst of a future, sequential-year drought.

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9 A number of potentially augmented regulatory requirements may also affect PCWA's ability and/or willingness to transfer surface water to other entities. For example, the Middle Fork American 10 River Hydroelectric Project is currently the subject of a Federal Energy Regulatory Commission 11 12 ("FERC") relicensing proceeding that may result in a new license that will require PCWA, as the licensee, to increase its instream flow releases. 187 It is unclear what effect, if any, new minimum 13 instream flow release requirements imposed by FERC may have on PCWA's ability to provide water 14 to its customers, and consequently, the agency's ability and/or willingness to transfer surface water to 15 other entities. Moreover, the State Water Board plans to propose unimpaired flow objectives on the 16 Sacramento River and its eastside tributaries as part of Phase 2 of the agency's process for amending 17 the Bay-Delta Plan. 188 The State Water Board's ultimate amendment of the Bay-Delta Plan may 18

<sup>186</sup> East Bay Utility Management District Urban Water Management Plan 2015, available at 20 http://www.ebmud.com/water-and-drought/about-your-water/water-supply/urban-water-management-plan/, at

<sup>61 (</sup>describing current status of potential long-term water transfer between PCWA and EBMUD: "PCWA and 21 EBMUD are seeking to complete all environmental reviews and approvals to implement the proposed project by 2017."). 22

<sup>187</sup> See e.g., Final Environmental Impact Statement for Hydropower License, Middle Fork American River 23 Hydroelectric Project—FERC Project No. 2079-069, February 2013, available at

https://www.ferc.gov/industries/hydropower/enviro/eis/2013/02-22-13.asp, at 117 (emphasis added) (explaining that "[u]nder the proposed and Alternative 1 flow schedules, summer flows in wet and above normal water 24 years would be higher than under existing conditions in all project-affected reaches. In summers of critical, dry, and below normal water years, minimum flows would be increased or maintained in all bypassed and peaking 25 reaches compared with existing conditions.")

<sup>26</sup> 188 See Working Draft Scientific Basis Report for New and Revised Flow Requirements on the Sacramento River and Tributaries, Eastside Tributaries to the Delta, Delta Outflow, and Interior Delta Operations, State 27 Water Resources Control Board, October 2016, available at

http://www.waterboards.ca.gov/waterrights/water issues/programs/bay delta/docs/20161014 ph2 scireport.pdf 28 at 1-12 (emphasis added) (explaining that "[t]he numeric alternatives currently under development fall within

require PCWA to comply with new regulatory obligations. Implementation of Water Code sections 1 10720, et seq. ("SGMA") will also presumably impose new restrictions on PCWA's extraction of 2 groundwater considering the number of high-priority subbasins located in the agency's service 3 territory.189 4 Additionally, there are myriad practical limitations that could complicate a water transfer from 5 PCWA to the SFPUC. For example, in December 2015, despite having surplus water available for 6 7 sale, PCWA was unable to effect water transfers with entities south of the Delta due to limited 8 pumping capacity. 190 PCWA, like many other water agencies, also has to contend with protests to 9 proposed water transfers.191 iii. The fact that San Francisco and the Districts executed the 10 **1995** Side Agreement does not support the State Water Board's assumption that San Francisco will be able to 11 effectuate the proposed large-scale water transfer with the Districts in the future. 12 13 To the extent that the State Water Board is relying on the 1995 Side Agreement in support of the assumption that San Francisco will be able to purchase the requisite volume of replacement water 14 supply from the Districts, such reliance would be misplaced.<sup>192</sup> More specifically, the history and 15 16 the range of 35 to 75 percent of unimpaired flow and will be further refined with modeling to evaluate needs to reserve cold water in storage and other considerations."). 17 189 SGMA requires the formation of local groundwater sustainability agencies and the development and implementation of groundwater sustainability plans for each medium- or high-priority basin to provide for 18 sustainable management. (See Wat. Code, §§ 10720.1(a) (identifying legislative goals of SGMA), 10723.6 (detailing methods for forming groundwater sustainability agencies), 10727(a) (prescribing that "[a] 19 groundwater sustainability plan shall be developed and implemented for each medium- or high-priority basin by a groundwater sustainability agency to meet the sustainability goal established pursuant to this part."). 20 190 Placer County Water Agency, Board of Directors, Regular Meeting, Minutes, July 21, 2016, Book 26, at 21 117, available at https://res.cloudinary.com/pcwa/image/upload/pcwa-website/board-minutes/07-21-2016 Minutes.pdf, attached hereto as Exhibit 22 (emphasis added) (explaining that "[i]n December, parties 22 south of the Delta approached the Agency for water to refill their reservoirs. As hydrology improved, the ability to move water in the transfer season from north to south became limited because of limited pump 23 capacity in the south Delta and interested buyers left the market."). 191 Placer County Water Agency, Board of Directors, Regular Meeting, Minutes, June 18, 2009, Book 21, at 24 126, available at https://res.cloudinary.com/pcwa/image/upload/pcwa-website/board-minutes/06-18-2009 Minutes.pdf, attached hereto as Exhibit 23 (noting protests to the transfer between PCWA and San Diego 25 County Water Authority.). 26 192 In its PRA Request, San Francisco specifically asked for: "All public records containing information that served as the basis for Staff's conclusion that the volume of water identified in the 2016 Draft SED, Appendix 27 L, at page L-21, Table L.4.-2, would be available for purchase by San Francisco from the [Districts] during a six-year drought if LSJR Alternatives 2, 3, or 4 were implemented." Knapp Decl., supra note 168, see 28 Attachment 1 to Knapp Decl., Letter to Tom Howard, Executive Director, State Water Resources Control 70

existence of the 1995 Side Agreement does not constitute substantial evidence in the administrative
 record that the State Water Board can rely on for the conclusion that a large-scale water transfer with
 the Districts is a reasonably foreseeable method of compliance by San Francisco with implementation
 of a new unimpaired flow objective on the Tuolumne River. 193

5 First, based on the modeling assumption used in the SED that the 1995 Side Agreement would continue to obligate the Districts to contribute the total amount of flow required by the 1996 6 7 Settlement Agreement, the proposed large-scale water transfer would not replace the 1995 Side 8 Agreement, but instead, would represent an *additional commitment of water* by the Districts on top of 9 the current FERC instream release flow schedule for the Don Pedro Project ("FERC Flow Schedule"). 10 In order to analyze the reduction in San Francisco's water supply that could result if a new flow objective on the Tuolumne River that calls for a percentage of unimpaired flow to remain in the river 11 between February and June is implemented, both San Francisco and the State Water Board assume 12 San Francisco could be required to bypass 51.7 percent of the *additional increment of flow above* the 13 current FERC Flow Schedule, while the Districts would continue to meet the existing FERC Flow 14 Schedule under the terms of the 1995 Side Agreement. In compliance with the existing FERC Flow 15 Schedule, the Districts currently release between 94,000 and 300,923 AF/year depending on the water 16 year type (51.7 percent of that amount equates to approximately 48,598 to 155,577 AF/year).194 Based 17 on the hydrological record from 1987 through 1992, the Districts would be required, between February 18 and June, to bypass a total of 707,841 AF during the 6-year period under the existing FERC Flow 19

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<sup>Board, from Jonathan Knapp, Deputy City Attorney, San Francisco City Attorney's Office, October 14, 2016
("referred to below as "CCSF PRA Request"), at 1. In response to this request, the State Water Board identified
the 1995 Side Agreement, among other documents. Knapp Decl. at ¶ 4.</sup> 

 <sup>&</sup>lt;sup>193</sup> See Letter from California Sportfishing Protection Alliance, Tuolumne River Trust, American Rivers,
 American Whitewater, California Trout, Central Sierra Environmental Resource Center, Friends of the River,
 Golden West Women Flyfishers, Merced Fly Fishing Club, Trout Unlimited (collectively referred to as

<sup>&</sup>lt;sup>24</sup> "Conservation Groups") to the State Water Resources Control Board, October 8, 2014 ("Conservation Groups")
<sup>25</sup> Letter"), at 11 (asserting that "[s]ince there is substantial evidence in the FERC record, and now in the record for Phase 1, that this contractual agreement was the solution in the only previous case in which additional flow was required (in this case, by FERC), it is reasonably foreseeable that the City and the Districts might once again conclude a similar agreement.").

<sup>27 &</sup>lt;sup>194</sup> 1996 FERC Decision, 76 FERC ¶ 61117, 61608 (explaining that under the 1996 Settlement Agreement "[a]nnual minimum water releases from the project will range from 94 thousand acre feet (TAF) in the driest
28 6.4 percent of years to 301 TAF in the wettest fifty percent of years.").

Schedule.195 Assuming continuation of the 1995 Side Agreement, approximately 365,954 AF of this amount would be bypassed by the Districts on San Francisco's behalf.196

The State Water Board further assumes that during a 6-year drought sequence, using 1987-1992 hydrology, that beyond the 707,841 AF required to comply with the existing FERC Flow Schedule, the Districts would also be able to bypass – on San Francisco's behalf – an additional 714,000 AF (119,000 AF x 6 years = 714,000 AF) under a 40 percent unimpaired flow objective. (SED, at L-21, Table L.4-2). As explained in Section I(B) *supra*, San Francisco's actual water supply deficit in this scenario is more severe, *i.e.*, 129,884 AF x 6 years = 779,304 AF total.<sup>197</sup> This would be on top of the water that the Districts themselves would be required to bypass under a new unimpaired flow objective, assuming they were responsible for 48.3 percent of the requisite flows. For example, under a 40 percent unimpaired flow objective, and assuming 1987-1992 hydrology, the Districts would be required to bypass, between February and June, 107,504 AF/year for 6 years, or 645,024 AF, in addition to the FERC flow schedule.<sup>198</sup> Thus, based on the historical 1987-1992 hydrology, and assuming implementation of a 40 percent unimpaired flow objective, between February and June, during the 6-year drought sequence the Districts would be required to bypass approximately 707,841 AF under the existing FERC Flow Schedule and an additional 1,424,328 AF (645,024 AF + 779,304 AF) for a total volume of 2,132,169 AF.199 Significantly, this exceeds the total storage capacity of Don Pedro Reservoir, which is 2,030,000 AF.

In short, the Districts' ability and willingness to bypass flow on behalf of San Francisco to meet the requirements of the existing FERC Flow Schedule, as provided by the 1995 Side Agreement, cannot be relied on as substantial evidence or precedent regarding the Districts' ability or willingness to bypass the *additional, and far larger* volume of water that San Francisco may be required to contribute in order to comply with a new unimpaired flow objective on the Tuolumne River.

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196 *Id*.

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197 See SFPUC Analysis of Changes to Flow Criteria, supra note 26, at 16, Table 9.

195 Ritchie Decl., *supra* note 3, at ¶ 7.

198 Ritchie Decl., *supra* note 3, at ¶ 7.

Second, under LSJR Alternatives 3 and 4 far more water would have to be bypassed in dry 1 years than is currently required under the existing FERC Flow Schedule. For example, on average, in 2 a critically dry year, the existing FERC Flow Schedule calls for approximately 67,521 AF to be 3 bypassed on the Tuolumne River during the February-June period. By contrast, under a 40 percent 4 5 unimpaired flow objective approximately 292,495 AF would have to be bypassed during the same period, over 4 times the amount of water. In fact, in 2014 the Conservation Groups referenced above 6 7 suggested that the State Water Board consider modifying the proposed unimpaired flow requirements to "avoid short-term calamities" that may result during sequential-year droughts and specifically 8 9 recommended that "the Board should evaluate specific options for limiting or mitigating water supply 10 impacts to urban water users in particular during multiple dry year scenarios."200 Unfortunately, however, the State Water Board did not act on the Conservation Groups' recommendation, and thus, 11 12 compliance with the proposed unimpaired flow objectives, particularly LSJR Alternatives 3 and 4, requires a substantially greater volume of water to be bypassed in dry years than the existing FERC 13 Flow Schedule. 14 15 Third, the 1995 Side Agreement cannot be relied on as a predictor of any potential, future 16

agreements between San Francisco and the Districts for the simple reason that the 1995 SideAgreement was executed nearly two decades prior to the State Water Board's initial release of itsproposal for unimpaired flow objectives in 2012, and thus, the agreement did not contemplate thedraconian water supply reductions, particularly in dry years, that could result from implementation ofsuch an amendment to the Bay-Delta Plan for both San Francisco and the Districts, as detailed above.

Additionally, there is no guarantee that San Francisco and the Districts will reach agreement on a new iteration of the 1995 Side Agreement, which terminates by its express terms upon issuance of a new FERC license for the Don Pedro Project.<sup>201</sup> If San Francisco and the Districts are unable to reach agreement regarding the allocation of responsibility for bypassing the volume of water called for in the existing FERC Flow Schedule, San Francisco's water supply shortages would be more severe, and San

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<sup>200</sup> Conservation Groups' Letter, *supra* note 193, at 9.

<sup>28 201 1995</sup> Side Agreement, at Provision 1.

Francisco's corresponding need to obtain replacement water supplies would be that much more substantial.

#### b. Unlike the water transfer between the Districts and San Francisco contemplated by the State Water Board, the 1990 transfer from MID to San Francisco was expressly contingent on the water at issue being surplus to MID's needs.

The 1990 Transfer Agreement was contingent on the water being surplus to MID's needs. 6 7 MID agreed to pump groundwater during the non-irrigation season from certain wells located on the 8 western side of its irrigation service territory that had historically only been operated during the 9 irrigation season – from approximately March through October – for irrigation drainage and other 10 incidental purposes. (1990 Transfer Agreement, at 1). But the agreement expressly stated that MID could "reduce or discontinue any or all deliveries of water to the City" if MID needed "the facilities to 11 12 be utilized for the pumping and transportation of water under this agreement ... to meet other requirements of the District," or the groundwater pumping "will, or is likely to, adversely affect the 13 aquifer from which the water is being pumped or groundwater supply of adjacent or nearby 14 groundwater users." (*Id.* at  $\P$  6(a)(1-2).) 15

By contrast, the SED contemplates that the Districts will transfer an unprecedented amount of water to San Francisco notwithstanding a substantial loss of supply to meet their existing water demands, and other material considerations. The SED assumes that under a 40 percent unimpaired flow objective the Districts will transfer approximately 119,000 AF/year every year for 6 consecutive years during a protracted drought while also bypassing their share of water to satisfy the flow objective on the Tuolumne River, and other associated requirements, *e.g.*, the Tuolumne River's share of the proposed year-round minimum requirement of 1,000 cubic feet per second ("cfs") at Vernalis.202 The Districts have previously informed the State Water Board that even without the

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<sup>24 202</sup> See SED, at K-29 (emphasis added) (explaining that "the LSJR base flow objective for February through June shall be implemented by requiring a minimum base flow of 1,000 cfs, based on a minimum 7-day running average, at Vernalis at all times. . . . When the percentage of unimpaired flow requirement is insufficient to meet the minimum base flow requirement, the Stanislaus River shall provide 29 percent, *the Tuolumne River 47 percent* and the Merced River 24 percent of the additional total outflow needed to achieve and maintain the required base flow at Vernalis."). It is unclear whether the 1,000 cfs minimum baseflow requirement at Vernalis would require additional releases from storage. *See* SFPUC Analysis of Changes to Flow Criteria, *supra* note 29, at 7 (explaining that the "SFPUC could not realistically evaluate the need for additional releases from storage to meet the Vernalis requirement in dry years.") Similarly, it is unclear how the State Water 74

implementation of a new flow objective on the Tuolumne River, the Districts may simply not have water available to sell to San Francisco in certain dry years.<sup>203</sup>

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c. Given the recent history of failed water transfers involving MID, and competing local interests regarding groundwater management in the Central Valley, it is not reasonably foreseeable that MID and TID would agree to export water that may be needed during a protracted drought.

The SED unreasonably assumes that the Districts would willingly transfer water to San 6 Francisco instead of meeting the needs in their respective service territories. (See *e.g.*, SED, at L-22) 7 8 (emphasis added) ["[t]he analysis assumes that agricultural resources would not receive their total 9 water supply to meet needed demand under each of the LSJR alternatives."]; id. at L-23 (emphasis added) ["[a] larger water transfer under the LSJR alternatives between SFPUC and the irrigation 10 districts could result in indirect environmental impacts on several resources as a result of the potential 11 12 reduced surface water supply in the Central Valley (i.e., surface water supply going to SFPUC would not go to Central Valley surface water users)."].) 13

This assumption contravenes the Districts' stated positions concerning their obligations to their respective customers. As the Districts previously explained to the State Water Board, "[f]irst and foremost, there is a broad variety of customers to which the Districts' water is already pledged, and any potential sale would necessarily have to be subject to those needs. The Districts' duty to serve its existing customers' varying demands is the paramount use of District water, if not the very purpose of the Districts' locally-financed water distribution and storage system."<sup>204</sup>

Board's application of the carryover storage requirement described in Appendix K would impact the operations of affected water agencies. (SED, at K-28 ["[w]hen implementing the LSJR flow objectives, the State Water Board will include minimum reservoir carryover storage targets or other requirements to help ensure that providing flows to meet the flow objectives will not have adverse temperature or other impacts on fish and wildlife or, if feasible, on other beneficial uses."].)

<sup>24 203</sup> See Letter from Roger VanHoy, General Manager, Modesto Irrigation District and Casey Hashimoto,
25 General Manager, Turlock Irrigation District, to Mark Gowdy, State Water Resources Control Board, dated
25 August 6, 2014, attached hereto as Exhibit 24 (referred to below as "Districts' Letter"), at 2 [explaining that "as this most recent drought has highlighted, it is hydrological reality that in certain dry years water will not be
26 available to sell to CCSF, willingly or as otherwise contemplated by the State Water Board."].)

 <sup>204</sup> Districts' Letter, *supra* note 203, at 2. For a comparable articulation of local sentiment by another irrigation district in the Central Valley *see* Stockton East Water District Water Management Plan, January 20, 2014, *available at* <u>http://www.water.ca.gov/wateruseefficiency/sb7/docs/2014/plans/Stockton-Eeast WD WMP-</u>
 28 Final 012014.pdf, at 15 (emphasis added) ("Transfer water policy is in the [Stockton East Water District or

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Moreover, the SED's assumption ignores the recent history of San Francisco's failed attempts to secure a relatively small water transfer from MID or the Oakdale Irrigation District ("OID") and the related local opposition in Stanislaus County concerning water transfers to San Francisco. The most recent effort to transfer a relatively small amount of water – 2 million gallons per day ("mgd") – from MID to San Francisco met with significant local opposition and MID was unable to approve the agreement.<sup>205</sup> San Francisco also pursued a 2 mgd water transfer with OID that would have required an exchange between OID and MID, but, again, the parties were unable to reach agreement to effectuate the transfer, even though the water in question would have come from OID and not MID.<sup>206</sup>

9 Local opposition concerning a water transfer to San Francisco also surfaced in the comments
10 of two Stanislaus County Board of Supervisors in 2013 regarding a then proposed local groundwater
11 management ordinance. Prior to its adoption, the two Supervisors "*praised the proposed ordinance*12 *because it would prevent an irrigation district from pumping groundwater to replace surface water*13 *sold to a buyer outside the county*. That scenario was raised by the Modesto Irrigation District's
14 proposal to sell water to San Francisco, which was dropped last year after months of fierce debate."<sup>207</sup>

<sup>&</sup>quot;SEWD"] Act under Section 6. The policy specifies that SEWD can sell water outside the district, as long as the SEWD water users' needs are met first, and water is available.").

<sup>205</sup> See San Francisco Letter, *supra* note 21, at 4, n. 9 (*citing*, Holland, John, "Modesto Irrigation District kills
proposed water sale," Modesto Bee (September 18, 2012) *available at*

http://www.modbee.com/2012/09/18/2378903/modesto-irrigation-district-kills.html, attached hereto as Exhibit
 [25 [explaining that MID voted to cease negotiations with CCSF regarding the proposed 2 mgd water transfer].)

<sup>20</sup> See also Closed Session Resolution No. 2012-07 Directing Staff and General Counsel to Discontinue Further 20 Negotiations Regarding the Proposed Sale of Water to the City and County of San Francisco, Modesto

Irrigation District, September 18, 2012. (San Francisco Letter, *supra* note 22, at Attachment 1.) Remarkably, despite relying on a potential future large-scale transfer of water from the Districts to San Francisco in its

analysis, the SED recognizes that MID's recent "rejection" of the proposed 2 mgd water transfer "makes further temporary drought transfers uncertain." (SED, at L-20.)

<sup>23 206</sup> San Francisco Letter, *supra* note 21, at 4, n. 10 (*citing* Stapley, "Modesto Irrigation District blocks Oakdale water sale to SF, for now," The Modesto Bee (January 23, 2014) *available at* 

<sup>24</sup> http://www.modbee.com/news/special-reports/groundwater-crisis/article3159608.html, attached hereto as Exhibit 26; *see also* Stapley, "OID reveals big-money water sale to outside buyers," The Modesto Bee (October 13, 2015), *available at* http://www.modbee.com/news/article39016221.html, attached hereto as Exhibit 27

 <sup>[&</sup>quot;With the drought worsening two years ago, OID formally sought offers from MID and its partners on the Tuolumne River, the Turlock Irrigation District and San Francisco. At the [Stanislaus Local Agency Formation]
 [Comprised meeting [OID Concerd Manager Steve Knell] agid MID and TID 'didn's worst any next of its' at a set of the Stanislaus Local Agency Formation]

Commission] meeting, [OID General Manager Steve Knell] said MID and TID 'didn't want any part of it;' at last week's OID meeting, he said, 'after meeting with MID, we decided there was no point in pursuing this.'''].)

<sup>207</sup> Carlson, Ken, *Stanislaus County Supervisors to Vote on Water Export Rules*, Modesto Bee (September 9, 2013), attached hereto as Exhibit 28 (emphasis added).

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Monitoring or "CASGEM"] Program ranked the Modesto Subbasin as a high priority groundwater basin, partially due to the basin's history of groundwater reliance for agricultural and municipal use, and water quality degradation due to industrial and agricultural practices."); id. at 9-29 (noting same for Turlock Subbasin). 28

208 See e.g., SED, at 9-27 (noting that "[i]n 2014, DWR's [California Statewide Groundwater Elevation

groundwater levels over a number of years," and cautions that the estimated rates of groundwater

overdraft in these subbasins "bring into question how long such levels of overdraft can be sustained."

The State Water Board's assumption that MID, TID, or any other irrigation district or water

(SED, at ES-34.) The draft identifies a number of factors that "should be considered to make estimates and determinations of sustainability," including that "[t]here will be very large associated 2 effects, including subsidence and loss of recharge capacity, that occur long before all water in an 3 aquifer could be removed," and consequently recommend "[t]his means that action is needed now to 4 5 address groundwater overdraft in the four groundwater subbasins, with or without the plan amendments." (Id. at ES-34—ES-35 [emphasis added].) 6

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7 However, having admonished MID and TID, amongst others in the four subbasins to take action "now" to address groundwater overdraft, prior to the adoption of GSPs in January 2022, the 8 9 SED nonetheless assumes the Districts will be able to make up the volume of surface water transferred 10 to San Francisco through increased groundwater pumping (not to mention the increased groundwater production within the Districts that would be necessary to offset the Districts' reduced surface water 11 deliveries following implementation of a new unimpaired flow objective). (SED, at 16-14 [emphasis 12 added] ["[s]urface water transfers implemented through groundwater substitution could result in a 13 lowering of groundwater levels if groundwater is pumped in substitution for transferred water and 14 15 could contribute to impacts on groundwater levels or groundwater quality, as described in Chapter 9, Groundwater Resources. Chapter 9 assumes that reductions in surface water supply would be 16 replaced with groundwater pumping up to a maximum amount. Based on this analysis, significant 17 impacts would occur on four primary subbasins (Eastern San Joaquin, Turlock, Modesto, and the 18 Extended Merced)."]; id. at 16-10 (emphasis added) ["Groundwater wells could potentially be 19 20 constructed as part of groundwater substitution transfers, and if this were to occur, potential environmental effects associated with construction and operation would be similar to those impacts 21 discussed for substitution of surface water with groundwater."]; id. at 16-16 (emphasis added) 22 23 ["Reductions in surface water diversions are expected as a result of approving the LSJR alternatives and the respective program of implementation. A reasonably foreseeable method to augment a surface 24 25 water supply is to obtain more water from groundwater resources. This could be achieved by additional pumping from existing wells or the development of new groundwater wells."].) 26

27 In fact, the State Water Board acknowledges that its analysis of groundwater impacts does not consider the potential effect of SGMA, which it characterizes as "an ameliorating factor," thus 28

suggesting that the groundwater impacts depicted in the SED would be less severe because SGMA would constrain future groundwater pumping to some extent. (SED, at 9-3) (emphasis added) ["However, since the groundwater protections that will be afforded by SGMA cannot be determined at this time with precision, this chapter evaluates the potential impacts on groundwater levels from LSJR alternatives without including SGMA as an ameliorating factor, which means that estimates of impacts are likely more conservative (i.e., worse) than would occur in the groundwater basins over time."].) Significantly, the analysis fails to consider the extent to which SGMA may be a *limiting factor* that could, in the near term, constrain the Districts' ability to replace lost surface water – be it as a result of reduced diversions from the Tuolumne River and/or a large-scale water transfer to San Francisco – by 10 increased reliance on groundwater pumping.

Similarly, although the SED states that a recently enacted groundwater management ordinance 11 in Stanislaus County209 "restricts out-of-county transfers of groundwater or pumping to replace surface 12 water sold to buyers outside of the county,"210 (SED, at 9-42), and emphasizes that given SGMA's 13 statutory mandate to local agencies to protect and manage high and medium priority groundwater 14 basins "mitigation to protect the groundwater basin[s] from the indirect impacts of the LSJR 15 alternatives . . . under local authorities is both feasible and required," (*id.* at 9-61), the analysis 16 nevertheless assumes that the Districts may make up the volume of water sold to San Francisco by 17 increased groundwater pumping without analyzing the potential application of the ordinance to such a 18 transfer. The SED makes no attempt to reconcile the existence of Stanislaus County's groundwater 19 20 management ordinance with the assumption that the reductions in the Districts' water supply - as a result of the implementation of a new flow objective on the Tuolumne River and the contemplated 21 large-scale water transfer to San Francisco – "would be replaced with groundwater pumping up to a 22 23 maximum amount." (Id. at 16-14).

The analysis disregards the significance of materials facts, *i.e.*, the existence of SGMA, the groundwater management ordinance in Stanislaus County, and similar groundwater management

209 Both MID and TID are located in Stanislaus County.

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210 See Stanislaus County Municipal Code Section 9.37.040 (prohibiting "[t]he export of water," subject to 27 certain express exemptions); id. § 9.37.030(7) (emphasis added) [defining "Export of water" to mean "the act of conveying groundwater, or surface water for which groundwater has been substituted, out of the county."].) 28

ordinances that have been enacted in counties throughout the Central Valley.211 Accordingly, the 1 analysis in the SED is internally inconsistent and fails to provide an adequate factual basis for the State 2 Water Board to conclude that it is reasonably foreseeable that San Francisco can replace its lost water 3 supply through a transfer with the Districts. (Uphold Our Heritage v. Town of Woodside (2007) 147 4 Cal.App.4th 587, 596 (citing Bakersfield Citizens for Local Control v. City of Bakersfield (2004) 124 5 Cal.App.4th 1184, 1198 (internal quotation omitted) (emphasis added) [explaining that "[t]he 6 7 substantial evidence standard is applied to conclusions, findings and determinations.... Substantial 8 evidence shall include *facts*, reasonable assumptions *predicated upon facts*, and expert opinion 9 supported by facts."].)

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# The SED's environmental analysis of a large-scale water transfer from the Districts to San Francisco improperly relies on the WSIP PEIR's environmental analysis of a 2 mgd transfer with the Districts.

The SED references the WSIP PEIR's environmental analysis of a proposed 2 mgd transfer from the Districts to San Francisco and states that "this information is useful because it provides context for the potential to transfer water *and the types of impacts associated with the transfer of water*." (SED, at L-23 [emphasis added].) The SED's reliance on the environmental analysis in the WSIP PEIR is misplaced for two reasons. First, the requisite amount of replacement supply that San Francisco would need if it were obligated, under the Fourth Agreement, to contribute flow to satisfy a

<sup>19 211</sup> The Draft 2016 repeatedly refers to a future water transfer between the Districts and San Francisco as a source of replacement water supply for San Francisco. (See *e.g.*, SED, at 20-27 (emphasis added) ["[t]he analysis presented in this section (and described in greater detail in Appendix L, City and County of San Francisco Analyses) assumes that under LSJR Alternatives 2, 3, and 4, during drought periods, SFPUC could meet its potential water supply shortage by buying water from MID and TID."].) However, the SED also more obliquely refers, in at least two instances, to San Francisco purchasing water from "willing sellers in the Central Valley." (See *e.g.*, *id.* at 20-34 ["In addition, the potential economic effects of purchasing water (i.e., water transfers) by SFPUC from willing sellers in the Central Valley are analyzed."]; *id.* at L-1 (same).) To the extent the draft is suggesting that it is reasonably foreseeable that San Francisco will be able to secure a large-scale water transfer between from from from the potential form.

water transfer from a different, unidentified entity in the Central Valley, San Francisco observes, as the SED
 recognizes, similar groundwater management ordinances have been enacted in several counties in the Central
 Valley, in addition to Stanislaus County. (*See* SED, at 9-42 [noting that "[s]everal ordinances applicable to
 groundwater resources that underlie the Stanislaus, Tuolumne, and Merced Rivers and [San Joaquin River] have

been passed."]; see *e.g.*, San Joaquin County Municipal Code § 5-8100(c) (emphasis added) [providing that "[i]t is essential for the protection of the health, welfare, and safety of the residents of the County, and the

public benefit of the State, *that groundwater resource of San Joaquin County be protected from harm resulting from the extraction of groundwater for use on lands outside the County*, until such time as needed additional
 surface water supplies are obtained for use on lands of the County, or overdrafting is alleviated, to the

<sup>28 ||</sup> satisfaction of the Board."].)

40 percent unimpaired flow objective on the Tuolumne River, assuming 1987-1992 hydrology, *i.e.*, 1 129.884 AF/year for 6 consecutive years, is exponentially more water than the proposed 2 mgd 2 transfer (equivalent to 2,240 AF/year) that was analyzed in the WSIP PEIR. Second, the potential 3 2 mgd transfer analyzed in the WSIP PEIR solely involved the use of conserved water – not a transfer 4 of surface water to be replaced by groundwater substitution.212 (See WSIP PEIR, at 9-78 [explaining 5 that the proposed 2 mgd transfer between the Districts and San Francisco involved a "transfer of 6 conserved water only, rather than a transfer of stored water."]; id. at 9-81 [emphasis in original] ["the 7 [proposed] water transfer agreement with TID, MID or other agency(ies) specify *conserved* water."]; 8 9 see also SED, Appendix H, at H-5 [excerpting section of Final WSIP PEIR that identifies potential 10 mitigation measures that a seller could implement to supplement its water supply following a water transfer "that involves use only of conserved water."].) By contrast, as noted *supra*, the environmental 11 12 analysis of surface water transfers implemented through increased groundwater pumping – particularly in groundwater basins designated as "high priority" by DWR – would presumably involve disparate 13 impacts. For example, the SED explains that environmental impacts from the proposed 2 mgd water 14 transfer described in the WSIP PEIR, "would be less than significant" for a number of "resources on 15 the Tuolumne River," including "groundwater." (SED, at L-23). This conclusion, of course, has no 16 relevance to the transfer of surface water to be implemented through groundwater substitution, as 17 contemplated in the SED, because, by the State Water Board's own account, "[s]urface water transfers 18 implemented through groundwater substitution could result in a lowering of groundwater levels if 19 20groundwater is pumped in substitution for transferred water and could contribute to impacts on groundwater levels or groundwater quality." (Id. at 16-14) [emphasis added].) 21

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 212</sup> DWR and the State Water Board have acknowledged the limited availability of water transfers using conserved water. *See* Background and Recent History of Water Transfers in California Prepared for the Delta
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<sup>25</sup> July, 2015, *available at* <u>http://www.water.ca.gov/watertransfers/docs/Background and Recent History of Water Transfers.pdf</u> (referred to below as "SWRCB/DWR Water Transfer History"), at 5 (emphasizing that "[t]ransfers based on

<sup>26</sup> implementation of water conservation measures have been limited, because most conservation programs" cannot demonstrate, among other things, that the "conservation measures . . . result in a reduction in the consumptive use of water or prevent water from discharging to an unusable water supply [and thereby] make

water available for transfer."). San Francisco incorporates the SWRCB/DWR Water Transfer History herein by reference.

The SED's reliance on the environmental analysis of the proposed 2 mgd transfer of conserved 1 water from the Districts to San Francisco that appears in the WSIP PEIR to disclose the environmental 2 impacts of a much larger transfer that could involve groundwater substitution is inaccurate and 3 erroneous. The environmental assessment of impacts associated with the transfer of surface water 4 5 implemented through conservation fails to identify the disparate impacts associated with the transfer of surface water implemented through groundwater substitution, and thus, does not constitute substantial 6 7 evidence in the record. (Pub. Res. Code, § 21080(e)(2) (emphasis added) [explaining that for purposes of CEQA "substantial evidence" does not include "evidence that is clearly inaccurate or 8 9 erroneous."].) Further, by relying on the WSIP PEIR analysis of a transfer of 2 mgd of water to 10 identify the environmental effects of a transfer of 129,884 AF/year for 6 consecutive years (to satisfy San Francisco's potential responsibility for a 40 percent unimpaired flow objective, assuming 1987-11 1992 hydrology) the analysis fails to identify impacts associated with a transfer of this magnitude. The 12 SED completely fails to disclose the significant environmental impacts that would arise from the 13 massive water transfer, potentially through groundwater substitution, that would be needed to comply 14 with the proposed flow objective. 15 3. The SED's economic analysis of a large-scale water transfer improperly 16 relies on an assumed purchase price for the water without any reasonable basis for determining such a purchase price. 17 As noted, pursuant to the certified regulatory program for the State Water Board's water 18 quality control planning program and Water Code Section 13241(d), the State Water Board is required 19 20 to analyze the economic impacts of reasonably foreseeable methods of compliance with the proposed 21

unimpaired flow objective on the Tuolumne River. (Cal. Code Regs., tit. 23, § 3777(c); Cal. Code Regs., tit. 14, § 15187(d) ; Pub. Res. Code § 21159(c); Wat. Code, § 13241(d); Attwater Memo, *supra* note 16, at 4). However, the SED fails to adequately analyze the economic impacts that would result from reduced water deliveries throughout the RWS service territory.

Although the SED repeatedly emphasizes that the concept of a large-scale water transfer from
the Districts to San Francisco for 6 consecutive drought years "relies on numerous unknown
variables," including "the price of the water," (SED, at L-22, 20-27), the analysis assumes that San
Francisco would be able to purchase water from the Districts for \$1,000/AF, (*id.* at 20-48). The SED

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1	explains, "[t]his assumed price is key to the analysis, and is derived based on a review of recent water
2	purchases involving both MID and TID, as well as by other agricultural districts in California." (Id. at
3	20-48 [emphasis added].) The SED does not disclose any details of these purported recent water
4	purchases involving both MID and TID. In its document request under the California Public Records
5	Act, Government Code Sections 6250, et seq. ("PRA"), San Francisco specifically asked the State
6	Water Board to provide:
7	All public records containing information that served as the basis for
8	Staff's analysis in the 2016 Draft SED that identify "recent water purchases involving both [Modesto Irrigation District ("MID")] and
9	[Turlock Irrigation District ("TID")], as well as by other agricultural districts in California," as stated in the 2016 Draft SED at page 20-48, including, but not limited to, the price of the water and volume(s)
10	transferred.213
11	In response, the State Water Board failed to identify <i>any</i> recent water transfer agreements that
12	involved both MID and TID.214
13	In fact, the only agreement identified in the reference sections for the SED or provided in
14	response to San Francisco's PRA request that involves both MID and TID is the agreement executed
15	between the Districts and San Francisco over 2 decades ago, in 1995, as described above, in which San
16	Francisco agreed to make annual payments to the Districts in exchange for the Districts meeting all the
17	minimum instream flow release requirements prescribed by the 1996 Settlement Agreement (1995
18	Side Agreement).215 Reliance on the 1995 Side Agreement in support of the assumed purchase price
19	of \$1,000/AF is faulty for at least two reasons. First, as noted, the 1995 Side Agreement was executed
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21	213 CCSP FRA Request, <i>supra</i> note 168, at ¶ 5-6 (explaining that the State Water Board identified the Agricultural
22	Water Management Plan " in its response to CCSE's PRA Request) The 2015 MID Water Management Plan
23	details MID's limited experience with out-of-district transfers. <i>See</i> 2015 MID Water Management Plan, <i>available at</i> http://www.water.ca.gov/wateruseefficiency/sb7/docs/2015/plans/Modesto ID 2015 AWMP pdf_at_
24	39 (recounting that "[d]uring the 1987 through 1992 drought, MID transferred several thousand acre-feet of water to [San Francisco] " and "participated in the transfer of water [batwan 1000 and 2010] through a U.S.
25	Bureau of Reclamation program for river and fishery enhancement known as the Vernalis Adaptive
26	to 2014.").
27 28	<sup>215</sup> The SED includes the 1995 Side Agreement in the list of references for Appendix L, not Chapter 20, in which the \$1,000/AF assumed purchase price is identified. <i>See</i> SED, at L-41—L-42 ( <i>citing</i> City and County of San Francisco (CCSF), Turlock Irrigation District (TID), and Modesto Irrigation District (MID). 1995. <i>Agreement</i> . April 21).

over 2 decades ago, and thus, does not constitute substantial evidence of the purchase price of water on the current transfer market. Second, the 1995 Side Agreement does not take into account the water 2 supply impacts on the Districts that would result from the State Water Board's implementation of 3 LSJR Alternatives 3 and 4, particularly during sequential-year droughts, and how such impacts would 4 5 increase the price of any water that may be available for purchase.

Given the heightened demand for water on the transfer market that would occur as a consequence of the State Water Board's proposal, especially during protracted droughts, the purchase price of water will certainly continue to rise, perhaps precipitously, assuming it is even available for transfer. For example, between 2009 and 2014 the price of water grew "tenfold to as much as \$2,200 an acre-foot."216 While acknowledging that the assumed purchase price of water transfers is key, the SED fails to provide evidentiary support for reasonable assumptions about the probable price of water transfers under its proposal.

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#### The assumption that potential water transfers would simply make up for reduced water supply is not reasonable or logical because it fails to take into account that transfers are needed to ensure delivery reliability in dry years and to meet projected future demand.

It is not reasonable to assume that additional, potential water transfers represent a new and 16 unaccounted for source of replacement supply that the SFPUC could use to mitigate water supply 17 18 reductions that may result from implementation of the LSJR Alternatives during protracted droughts. The SFPUC's water supply plans already rely on a potential water transfer of 2 mgd from the Districts 19 20to ensure delivery reliability to meet existing demand in dry years, and on a potential transfer of 25 mgd to meet projected future demand through 2040. Specifically, the Phased WSIP Variant adopted by the SFPUC relies on a potential 2 mgd water transfer with the Districts in order to ensure delivery 22 23 reliability in dry years.<sup>217</sup> Further, the SFPUC has projected the need for an additional water transfer 24

<sup>216</sup> See e.g., Brekke, supra note 183.

<sup>217</sup> WSIP CEQA Findings, supra note 14, at 3 (explaining that "[u]nder the Phased WSIP Variant, the SFPUC 27 also would implement the delivery and drought reliability elements of the WSIP, including the ... proposed dry-year transfers from the [Districts]."). 28

of up to 25 mgd in order to meet projected future demand by 2040.218 This future demand specifically takes into account the additional 19.5 mgd of demand associated with: (1) the SFPUC offering permanent status to Santa Clara and San Jose via combined individual supply guarantees; (2) the SFPUC offering an increase of 1.5 mgd to East Palo Alto's current individual supply guarantee; and (3) recovering net losses in yield of 3.5 mgd resulting from local watershed instream flow requirements in drought and non-drought years.219 The WaterMAP assumes that a 2 mgd dry-year transfer will be in place by 2018.220

By contrast, the SED explicitly states that water transfers, as contemplated in the draft, would solely be used to replace reductions in surface water supply that result from implementation of the LSJR Alternatives in order to meet existing demand. (SED, at 16-16 [emphasis added] ["[a] water transfer is not expected to result in an increase in population or growth or the development of housing, or the need for housing, *because the water would be used to meet existing demand* in a particular service area for a particular duration of time."].) Thus, the SED not only ignores the water supply planning obligations of the affected water agencies, including the SFPUC, but also disregards the agencies' respective Urban Water Management Plans, and other planning documents.221 In the case of the SFPUC, the SED does not even *attempt* to reconcile the assumption that San Francisco will be able to purchase the requisite volume of replacement supply, with the fact that the SFPUC has already taken the potential availability of water transfers into consideration as part of its water supply planning to meet existing and projected future demand.

It is not reasonable for the SED to assume that in addition to the potential 27 mgd (equivalent to 30,244 AF/year) of water supply that may be available to San Francisco from water transfers –

<sup>&</sup>lt;sup>218</sup> WaterMAP, *supra* note 16, at 2 ("[b]ased on regional activity over the past two years, for planning purposes, it is estimated that up to 25 mgd in transfers could be available to the SFPUC. This estimate is consistent with the planning estimate evaluated in the PEIR for the WSIP.").

*Id*. at 1.

*Id.* at 11 ("For the purpose of this water supply planning document, it is assumed that a 2 mgd drought year transfer will be secured as part of the implementation of the Phased WSIP.").

 <sup>&</sup>lt;sup>221</sup> See SFPUC 2015 UWMP, supra note 5, at 6-5 (describing elements of Phased WSIP Variant adopted by the SFPUC); *id.* at 7-4—7-7 (describing dry year water supply projects identified in the Phased WSIP Variant);
 *id.* at 7-6 (explaining that "[t]he Phased WSIP . . . only included a 2 mgd dry year transfer [with the Districts] as

that was the dry year need associated with meeting a demand of 265 mgd.").

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	which the STT OC recognizes are contingent on a number of variables, meruding that there may simply
$\left  \begin{array}{c} 2 \end{array} \right $	not be water available to purchase in certain dry years <sup>222</sup> – that San Francisco would also be able to
3	rely on water transfers with the Districts to replace the loss of <u>an additional</u> 119,000 AF/year (106.23
4	mgd) for 6 consecutive years during a protracted drought, assuming the water would even be available
5	for purchase. (SED, at L-21, Table L.4-2.) (As explained in Section I(B) <i>supra</i> , San Francisco's
6	actual water supply deficit in this scenario is more severe, <i>i.e.</i> , 129,884 AF/year, or 115.95 mgd.) The
7	State Water Board's assumption is unreasonable, as it ignores and disregards the SFPUC's water
8	supply planning process, and, more fundamentally, the SFPUC's responsibility to meet the water
9	supply needs of its customers, that necessarily includes consideration of dry year delivery reliability
10	and ability to meet projected future demands.
11	B. The State Water Board's assumption that it is reasonably foreseeable that San Francisco would be able to obtain replacement water through the development of
12	a large-scale desalination plant located at Mallard Slough is not supported by substantial evidence and the analysis of environmental and economic impacts is
13	inadequate.
14	1. The State Water Board's assumption that a desalination-plant at Mallard Slough with more than twice the capacity of any prior proposal for a
15	facility at that location would be feasible is not supported by substantial evidence.
16	a. The State Water Board reaches an unsupported conclusion that the
17	envisioned large-scale desalination plant located at Mallard Slough would be feasible based on the SED's misplaced reliance on two
18	disparate projects.
19	There is no basis for the SED's conclusion that it is reasonably foreseeable San Francisco
20	could obtain a significant source of replacement water supply – to mitigate, at least partially, the
21	massive deficit that it could experience from the State Water Board's implementation of LSJR
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25	<sup>222</sup> WaterMAP, <i>supra</i> note 16, at 2 (emphasis added) (explaining that "the SFPUC may pursue additional regional drought and non-drought year transfer opportunities, <i>but the yield and availability is contingent upon</i>
26	the opportunity."); id. at 41 (emphasis added) (noting that "[t]he water supply available to the SFPUC through transfers will depend largely on the nature and source of the transfer water, and will require further
27	<i>investigation to define more accurately.</i> "); <i>id.</i> at 57 (cautioning that "[d]uring drought years, in particular, water transfer opportunities may be limited in duration, quantity, and timing. Water transfers are often short-term and
$\frac{2}{28}$	may not be available as a long-term supply planning option. Competition may also increase the price of transfers ")
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Alternatives 3 or 4 – from a large-scale desalination plant located in Mallard Slough.223 To reach this conclusion, the SED unreasonably relies on the feasibility, environmental, and economic analyses of 2 two disparate projects, and fails to take into account newly enacted legal requirements that apply to 3 desalination plants in California. The draft's untenable assumptions regarding the relevancy of the 4 comparisons drawn in the SED between the contemplated large-scale desalination plant at Mallard 5 Slough and the referenced projects does not constitute substantial evidence under CEQA. (Pub. Res. 6 7 Code, § 21080(e)(1-2).)

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The State Water Board's reliance on prior analyses of the **BARDP** is misplaced because the site specific analyses contemplated a facility that produces no more than 22.400 ÅF, and fail to address numerous unresolved potential feasibility concerns.

Although the SED references prior analyses of a desalination plant at Mallard Slough in 11 12 support of their envisioned large-scale facility at the same location, *i.e.*, the 2007 SFPUC Water Supply Options Report ("WSO Report"), the WSIP PEIR, a 2010 report entitled "Pilot Testing at 13 Mallard Slough—Pilot Plant Engineering Report" prepared for the Bay Area Regional Desalination 14 Project ("BARDP"), and the 2014 Bay Area Regional Desalination Project Site Specific Analyses, that 15 included a Site Specific Modeling and Storage Optimization Report, 224 the draft acknowledges that 16 while demand estimates for the partner agencies were revised numerous times over the course of 17 project planning, none of the site-specific analyses that considered the limitations of existing water 18 rights and infrastructure assessed proposals for a facility that would have a capacity to produce more 19 20than 22,400 AF.225 Given that the SED envisions a facility more than double the size of a desalination

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<sup>223</sup> SED at 16-70 (noting that "[u]nder certain LSJR alternatives (i.e., higher unimpaired flow LSJR Alternatives 3 and 4), SFPUC may need multiple new water supplies to augment their current drought supply. One option is desalination of ocean or brackish water.").

<sup>224</sup> Bay Area Regional Desalination Project Site Specific Analyses Final Report, Contra Costa Water District, 24 January 2014 (referred to below as "BARDP Site Specific Delta Modeling Report"), available at http://www.regionaldesal.com/downloads/Bay%20Area%20Regional%20Desalination%20Project%20Site%20 25 Specific%20Analyses%20Final%20Report.pdf.

<sup>26</sup> 225 SED, at 16-70 (noting that the WSO Report analyzed a facility with an intake capacity of 28,000 AF/year); id. at 16-72 (explaining that the 2010 pilot plant engineering report "estimated the capital cost for a facility that 27 would use 28,000 AF/y of brackish or ocean water to produce approximately 22,175 AF/y of treated water"); id.

at 16-71 ("[p]resently, water supply desalination is being considered for all hydrologic year types under the 28 BARDP at Mallard Slough in the Delta, with an estimated production of 20,900 AF/y."); id. at 16-71 (emphasis
plant that can be supported with existing infrastructure at the Mallard Slough location, *i.e.*, with a capacity of 56,000 AF, the draft's reliance on these previous analyses of the BARDP is misplaced.<sup>226</sup>

Further, these analyses fail to provide a meaningful basis of comparison for purposes of assessing the feasibility, environmental impacts, or costs of the 56,000 AF/year desalination plant at Mallard Slough envisioned in the SED. The draft recognizes that the referenced analysis in the WSIP PEIR provides only "a conceptual-level, generalized impact analysis of the BARDP, which, at the time of the analysis, was based on limited, preliminary information regarding project design and operation, and site location." (SED, at 16-73.) Inexplicably, the SED makes no attempt to update the prior analyses from almost a decade earlier or to undertake an analysis of a larger facility.227

Similarly, the State Water Board's reliance on the BARDP Site Specific Delta Modeling Report is improper because these analyses of the BARDP operations "were not considered in a comprehensive regulatory setting." (BARDP Site Specific Delta Modeling Report, at 10.) Although the BARDP Site Specific Delta Modeling Report includes a limited entrainment analysis, it does not contain "a comprehensive examination of all of the potential impacts to aquatic resources that could result from BARDP." (*Id.* at 86.) Instead, the analyses in the BARDP Site Specific Delta Modeling Report were limited to consideration of certain water quality regulations.<sup>228</sup> Accordingly, the report

28 BARDP Site Specific Delta Modeling Report, *supra* note 224, at 10 (explaining that "BARDP operations were evaluated within the context of several key water quality regulations: California State Water Resources 88

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added) (noting that a "desalination project would likely need to be larger than analyzed in the WSO report, or the BARDP feasibility studies, for LSJR Alternatives 3 and 4."); *id.* at L-25 (same).

<sup>&</sup>lt;sup>9</sup> <sup>226</sup> See e.g., *id.* at 16-74 (noting that "[a] facility that is larger than the BARDP (e.g., 56,000 AF/y) would have similar types of construction and operation impacts," and, make further comparisons regarding "[t]he types of construction activities associated with a large desalination facility with a capacity of 56,000 AF/y," and the "[1]ong-term operational impacts associated with a large desalination facility with a capacity of 56,000 AF/y," and the

 <sup>.&</sup>quot;).) *C.f.* SED, at 16-74 ("The increased electrical demand as a result of a larger design capacity (i.e., increase from 28,000 to 50,000 AF/y) could result in increases in GHG emissions and air quality impacts under operating conditions.") Although the exact size of the large-scale desalination plant at Mallard Slough envisioned in the SED is not clear from the State Water Board's analysis, based on the number of references to

the larger plant size, San Francisco assumes that the State Water Board is contemplating a facility with a production capacity of 56,000 AF/y.

 <sup>24 227</sup> See *id.* at 16-73, 16-74 (referencing findings concerning environmental impacts of BARDP in WSIP PEIR];
 *id.* at L-25 (emphasis added) (wherein the SED relies on the SFPUC's environmental impact analysis of the
 25 BARDP in the WSIP PEIR, as discussed in Chapter 16 of the SED: "[t]he construction and operation of

BARDP could result in potentially significant environmental impacts on various resources, as disclosed in Chapter 16...."].) Following preparation of the WSIP PEIR, many subsequent studies have demonstrated the

 <sup>20</sup> Induction of the work of the work of the work of the states have demonstrated the limitations on both institutional and physical capacity of the existing infrastructure to support a desalination
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explains, "[e]valuation of BARDP operations in a comprehensive regulatory setting would be required in an environmental impact report."229 (BARDP Site Specific Delta Modeling Report, at 10.)

Additionally, the BARDP Site Specific Delta Modeling Report raises a number of other concerns regarding a desalination plant located at Mallard Slough with a maximum production capacity of 22,400 AF/year, which is substantially smaller than a plant of the envisioned size of 56,000 AF/year. Issues that would need to be resolved during subsequent phases of project development, environmental evaluation and permitting, include necessary coordination amongst BARDP partner agencies in sequential-year droughts to address unmet water supply demands from the project and additional modeling to ensure the project would be able to comply with increasingly more stringent Bay-Delta water quality regulations.230 The SED fails to identify, let alone substantively address, any of these concerns.

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#### ii. The State Water Board's reliance on analyses of the **Carlsbad Desalination Project is misplaced because these** analyses address a facility located in a disparate geographic area with a distinct source water intake.

The SED attempts to address the obvious disparity between the envisioned larger scale desalination plant that could be developed at Mallard Slough, as compared to the prior site specific 16 analyses of a facility at that location, by referencing analyses of the "costs and environmental impacts" 18 associated with the larger Poseidon Desalination Facility in Carlsbad" ("Carlsbad Desalination Plant"), that has a capacity of 56,000 AF/year. The SED concedes "there are many geographic differences 19

229 Memo from Leslie Moulton-Post Leslie Moulton-Post, Alisa Moore, Karen Lancelle, Chris Mueller, 23 Environmental Science Associates to San Francisco City Attorney's Office, CEQA Adequacy Review of the Desalination Water Supply Alternative in the Draft Substitute Environmental Document (SED) in Support of 24

Control Board Decision 1641 and California Department of Public Health Secondary Maximum Contaminant 21 Level of Chlorides in drinking water. Changes in compliance with these two regulations were evaluated based on the location of the proposed BARDP facilities and the nature of the operations."). 22

Potential Changes to the Water Quality Control Plan for the San Francisco Bay-Sacramento / San Joaquin Delta Estuary: San Joaquin River Flows and Southern Delta Water Quality, March 15, 2017, attached hereto as 25 Appendix 5 (referred to below as "ESA Tech Memo – Desalination Plant"), at 5 (explaining that the BARDP

Site Specific Delta Modeling Report identified the need for "[f]uture project planning and evaluation studies . . . 26 to more specifically analyze both general environmental impacts of project construction and operation to

aquatic species to identify appropriate project design features and mitigation measures and ... to address

<sup>27</sup> impacts to listed species to achieve compliance with state and federal endangered species regulations.").

<sup>230</sup> Id. at 3-5. 28

between the San Francisco Bay-Delta and Carlsbad," and acknowledges that these differences "could 1 influence the significance of an impact on an environmental resource ....."231 However, the SED fails 2 to describe in any detail, or draw any conclusions about, the nature of the geographical differences 3 between the San Francisco Bay-Delta and coastal Carlsbad, and to explain how these differences 4 might affect impacts of a similarly sized facility at Mallard Slough. For example, important potential 5 impacts overlooked by the SED are those associated with brine discharge into the ocean as opposed to 6 the already stressed ecosystem of the Delta.232 The draft appears to disregard any difference between 7 a San Francisco-Bay Delta facility and a coastal Carlsbad facility by relying on the 2015 EIR and other 8 9 findings related to the Carlsbad Desalination Plant to simply conclude "similar environmental impacts were identified for the project-level analyses of the Carlsbad facility." (SED, at 16-75.) 10

Further, the SED ignores the fact that the Carlsbad Desalination Plant has a distinct source water intake as it relies on source water previously diverted by an adjacent power plant.233 The power plant intake is located in a constructed lagoon/coastal embayment and the outfall pipeline discharges to the ocean. Because the desalination plant withdraws water from and discharges into "the same seawater outfall pipeline that the power plant uses now," the Carlsbad Desalination Plant EIR concluded that the "effects are essentially the same as current conditions."<sup>234</sup> Thus, the Carlsbad

234 City of Carlsbad California website, FAQs, *available at* 

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http://www.carlsbadca.gov/services/depts/pw/utils/desalination/faq.asp, attached as Exhibit 29 (explaining that because the desalination plant relies on the power plant's existing source water intake "[t]he city's certified EIR concluded that the desalination plant can operate without significant impacts to marine life."). See also City of Carlsbad California website, Agua Hedionda Lagoon, available at

28 || extends approximately 1,800 yards in a southeasterly direction from the Interstate 5 highway bridge.").

<sup>&</sup>lt;sup>231</sup> SED, at L-25 (where the draft explains that the desalination plant at Mallard Slough they envision "would likely need to be larger" than any prior facility analyzed for that location, and thus, rely on analyses for the Carlsbad Desalination Plant to assess the increased costs and environmental impacts associated with a larger facility: "[t]herefore, costs and environmental impacts associated with the Claude 'Bud' Lewis Carlsbad Desalination Plant . . . which has a larger capacity, are summarized below."); *id.* at 16-71 (same); *id.* at 16-75

<sup>20 (</sup>acknowledging "there are many geographic differences between the San Francisco Bay–Delta and Carlsbad").

<sup>232</sup> ESA Tech Memo – Desalination Plant, *supra* note 229, at 8, 11-12.

 <sup>21 233</sup> See *e.g.*, water-technology.net website, Carlsbad Desalination Project, *available at* <u>http://www.water-technology.net/projects/carlsbaddesalination</u> (explaining "[s]eawater from the [NRG Energy's Encina Power Station] used for cooling boilers in operation, is diverted to the desalination facility through an existing cooling water discharge system.").

<sup>26</sup> http://www.carlsbadca.gov/residents/fun/lagoons/agua.asp, attached as Exhibit 30 (emphasis added) (describing the lagoon as follows: "[t]he 66 acre outer lagoon, adjacent to the Pacific Ocean, *provides cooling water for the* 

<sup>27</sup> *power plant*, shore fishing and is leased to an aquaculture company cultivating shellfish for a wide-ranging market. The 27 acre middle lagoon is home to the North Coast YMCA Aquatic Park. The 295 acre inner lagoon

facility did not have to grapple with the intake related entrainment issues associated with a new source water intake that any new desalination plant at Mallard Slough withdrawing water directly from the Delta would have to address.235

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iii. The State Water Board's reliance on prior analyses of the BARDP and Carlsbad Desalination Project is misplaced because those analyses fail to take into account regulatory requirements enacted in 2015 that apply to all new desalination projects.

7 An additional reason that the SED's reliance on prior analyses of the BARDP and Carlsbad Desalination Project is misplaced is that those analyses fail to take into account 2015 amendments to 8 9 the Ocean Plan that impose regulatory requirements on all new desalination projects in California. For example, the 2015 amendments to the Ocean Plan require consideration of, and include an express 10 preference for, subsurface intakes for any new desalination projects. (Cal. Code Regs., tit. 23, § 3009; 11 12 SWRCB Resolution 2015-0033.) Indeed, the 2015 Ocean Plan directs the regional water boards, in consultation with State Water Board Staff, to require subsurface intakes unless it is not feasible. (See 13 2015 Ocean Plan, at III.M.2.d.(1)(a).) The past analyses of the BARDP did not include any analysis of 14 the potential for a subsurface intake at Mallard Slough, and the Carlsbad Desalination Project uses a 15 surface intake. Further, the analyses of the BARDP also fail to take into account the 1.0 mm 16 maximum screen opening size identified in the 2015 Ocean Plan. In fact, the BARDP Site Specific 17 Delta Modeling Report contemplates a surface water intake with screens that have a maximum 18 opening of 2.38 mm. (See BARDP Site Specific Delta Modeling Report, at 72-73.) Therefore, the 19 20SED's reliance on the analyses of the BARDP and Carlsbad Desalination Project is improper because the referenced analyses were performed before the State Water Board adopted the 2015 amendments 21 to the Ocean Plan, and neither the current proposal for the BARDP nor the completed Carlsbad 22 23 Desalination Project comply with the new requirements.

 <sup>235</sup> Notwithstanding the Carlsbad Desalination Plant's distinct source water intake (and outfall), the facility has
 still generated environmental controversy. See Gorn, David, Desalination's Future in California Is Clouded by
 Cost and Controversy, KQED Science, October 31, 2016, available at

<sup>26 &</sup>lt;u>https://ww2.kqed.org/science/2016/10/31/desalination-why-tapping-sea-water-has-slowed-to-a-trickle-in-</u> california/, attached as Exhibit 31 (emphasis added) (explaining that "[t]he Carlsbad plant isn't even a year old

<sup>27</sup> but state officials have cited it a dozen times for environmental violations. That includes what they call 'chronic toxicity,' from an unknown chemical used in water treatment that has been piped into the ocean. The

<sup>28</sup> company is still trying to identify, isolate and clean it up.").

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# b. The State Water Board fails to account for other limiting factors that may render their envisioned 56,000 AF/year desalination plant at Mallard Slough infeasible.

In addition to failing to address the unresolved issues with a desalination plant at Mallard Slough with a maximum production capacity of 22,400 AF/year identified in the BARDP Site Specific Delta Modeling Report, as referenced above, the SED also fails to account for other limiting factors that may render their envisioned 56,000 AF/year facility infeasible, *e.g.*, the need for a larger source water intake and additional water rights to withdraw the requisite amount of source water from the Delta, and the potential need for a new outfall to discharge the increased amount of brine generated by the larger desalination facility.<sup>236</sup>

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# The State Water Board's environmental analysis of the envisioned 56,000 AF/year desalination plant located at Mallard Slough is woefully inadequate.

12 The SED's collage of the referenced, prior analyses for the BARDP and Carlsbad Desalination Project does not present an accurate assessment of the feasibility or environmental impacts of the 13 envisioned 56,000 AF/year desalination plant at Mallard Slough. "[I]t is reasonable to expect that a 14 desalination plant at Mallard Slough with twice the intake capacity assumed for the BARDP could 15 have significant unavoidable impacts on biological resources including endangered species, water 16 quality and hydrology, and potentially significant unavoidable impacts related to greenhouse gas and 17 air pollutant emissions."237 However, the SED "draws no conclusions as to significance of the 18 impacts" the 56,000 AF/year desalination plant located at Mallard Slough, as envisioned in the SED, 19 20 would have.238 The draft's untenable assumption regarding the propriety of exclusively relying on the feasibility and environmental analyses of disparate projects – that, in the case of the BARDP, are 21 preliminary and incomplete – in lieu of attempting to discretely analyze the feasibility and impacts of 22

26 236 ESA Tech Memo – Desalination Plant, *supra* note 229, at 5-7.

28 238 *Id.* at 8 (emphasis in original).

<sup>237</sup> *Id.* at 9; see also *id.* at 9-11 (summarizing the SED's failure to adequately address or identify impacts of the larger desalination plant at Mallard Slough envisioned in the draft.).

the envisioned 56,000 AF/year desalination plant at Mallard Slough, does not constitute substantial evidence under CEQA.239 (Pub. Res. Code, § 21080(e)(1-2).)

#### 3. The State Water Board's economic analysis of the envisioned 56,000 AF/year desalination plant located at Mallard Slough is woefully inadequate.

5 The SED also woefully fails to analyze the economic impacts of the 56,000 AF/year desalination plant at Mallard Slough envisioned in the draft, and thereby violates the requirements of 6 7 the certified regulatory program for the State Water Board's water quality control planning program and Water Code Section 13241(d). (Cal. Code Regs., tit. 23, § 3777(c); Cal. Code Regs., tit. 14, 8 9 § 15187(d); Pub. Res. Code § 21159(c); Wat. Code, § 13241(d); Attwater Memo, *supra* note 16, at 4). 10 As an initial matter, the SED fails to assess *any* potential rate impacts associated with the large-scale desalination plant. (SED, at 20-34 [explaining that the State Water Board's proposal only includes an 11 12 analysis of "the potential economic effects of purchasing water (i.e., water transfers) by SFPUC from willing sellers in the Central Valley."].) Further, although the SED includes "[c]ost information" for 13 the other two identified alternative sources of replacement water supplies, (*id*), the analysis does not 14 even attempt to estimate the capital costs associated with the envisioned larger desalination facility at 15 Mallard Slough, but instead appears to suggest that construction costs would total somewhere within 16 the broad range of \$168 million to \$1 billion. (See SED, at L-25 [noting that in the 2007 WSIP PEIR 17 the SFPUC estimated that the cost to construct the BARDP with a production capacity of 22,400 18 AF/year, "including the intake and pipeline for conveyance to the existing conveyance system," would 19 20be \$168 million]; id. [explaining that the SED includes "costs and environmental impacts" associated with the Carlsbad Desalination Facility because it has a "larger capacity"].) Notably, the SED fails to 21 identify the \$1 billion capital cost of the Carlsbad Desalination Facility and the annual operation and 22 23 maintenance costs associated with the facility of approximately \$50 million/year.240

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<sup>24</sup> 239 See also *id*. at 9 (explaining that "[t]he inadequacy of the impact analysis thus raises additional questions about the feasibility of the desalination plant anticipated in the [SED] because, given its probable environmental 25 impacts, it is far from obvious such a plant could be permitted."); id. at 7 (noting that the SED "provides only a vague indication of how these other project analyses might apply to the desalination water supply option the 26 [SED] anticipates would be needed as an 'additional action' to address drought-period supply shortfalls under the LSJR Alternatives."). 27

<sup>240</sup> Gorn, supra note 235, (emphasis added) (explaining that "[b]eyond the environmental cost is the actual price 28 tag: the plant in Carlsbad cost \$1 billion to build, with a rough estimate of \$50 million a year for the power to

Nor does the SED account for the fact that the State Water Board's implementation of LSJR 1 Alternatives 3 or 4 would make it far more difficult, if not impossible, for the SFPUC to pay for the 2 56,000 AF/year desalination facility at Mallard Slough envisioned in the draft. The SED fails to 3 mention that the Carlsbad Desalination Plant took decades to develop, and, specifically, that 14 years 4 elapsed between the initial feasibility study for the project and construction of the plant.241 As 5 discussed in Section I(E)(2) infra, during periods of heightened water supply rationing, reduction in 6 7 utility revenues result in increased utility rates or deferred capital projects. If the State Water Board 8 implemented LSJR Alternatives 3 or 4, and San Francisco was responsible for bypassing flow in 9 compliance with a new unimpaired flow objective on the Tuolumne River, it would be compelled to severely reduce deliveries to the RWS service territory and suffer the attendant loss of revenue. This 10 loss of revenue would make it far more difficult, if not impossible, to fund the development of any 11 large-scale capital project, such as the 56,000 AF/year desalination facility at Mallard Slough 12 envisioned in the SED. 13

> 4. The State Water Board's conclusion that a 56,000 AF/year desalination plant located at Mallard Slough would simply make up for reduced water supply is not reasonable or logical because it fails to take into account that the SFPUC already relies on yield from the BARDP to meet projected future demand.

It is not reasonable for the SED to conclude that the envisioned 56,000 AF/year desalination facility at the Mallard Slough location "would not be built to accommodate an increase in population 18 in the service area" (SED, at 16-73). The SFPUC has identified the BARDP, to the extent that it is 19 20 ever developed, as a potential new source of additional water supply to meet projected future demand,

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run it. The estimated cost of the water to San Diego is about \$2,300 dollars an acre-foot — more than double 22 the cost most Southern California cities pay for water. (An acre-foot is enough water to supply one-to-two California households per year.) And ratepayers need to pony up for that water even during rainy seasons when 23 the price of water from more traditional sources plummets."); see also Fikes, Bradley J., State's biggest desal

plant to open: What it means, San Diego Union-Tribune, December 13, 2015, 24

http://www.sandiegouniontribune.com/news/environment/sdut-poseidon-water-desalination-carlsbad-opening-2015dec13-htmlstory.html, attached hereto as Exhibit 32 ("[i]n the early 2000s, the Poseidon plant was 25 estimated to cost about \$270 million, a figure that rose to \$300 million, to \$530 million and finally to about \$1 billion."). 26

<sup>&</sup>lt;sup>241</sup> See *e.g.*, Fikes, *supra* note 240 ("Poseidon Water's desalination plant in Carlsbad is poised to begin regular operations within days — decades after water officials first considered harvesting drinking water from the sea 27 and 14 years after they formally took the first steps toward its construction."); see *id*. (presenting timeline for construction of the project). 28

(WaterMAP, at 1-2 [explaining that to meet "the proposed planning objectives," including meeting 1 2 "new requests for permanent supply," by San Jose and Santa Clara, the WaterMAP identifies that the SFPUC could pursue desalination, among other options]; *id.* at 60-63 [describing Bay Area Brackish 3 Water Treatment Project, also referred to as the "Regional Desalination Project," or BARDP].) 4 5 Specifically, the SFPUC has currently identified the BARDP as a potential, future source of additional yield of up to 9 mgd (10,080 AF) to meet future demand in the RWS service territory, with the 6 7 possibility, if more capacity is available (assuming that up to 3 other partner agencies take no water deliveries to meet future demands), of securing up to 15 mgd (16,800 AF). (WaterMAP, at 60.) Thus, 8 9 the SED not only ignores the SFPUC's water supply planning obligations, but also disregards the specific plans the SFPUC has articulated for potentially meeting projected future demand, *e.g.*, in the 10 WaterMAP. The SED does not even *attempt* to support the conclusion that the envisioned 56,000 11 12 AF/year desalination plant at Mallard Slough would only be used to "replace reductions in water supply resulting under the LSJR alternatives," (SED, at 16-70), and "not be built to accommodate an 13 increase in population in the service area," (id. at 16-73). As explained, the SFPUC has already 14 considered the potential availability of additional yield from development of the BARDP in its water 15 supply planning to meet projected future water supply needs, not as a source of replacement water 16 supply. 17

> C. The State Water Board's assumption that it is reasonably foreseeable that San Francisco would be able to obtain replacement water through the development of the identified in-Delta diversion project is not supported by substantial evidence, or reasonable inferences predicated on fact, and the analysis of environmental and economic impacts is inadequate.

There is no basis for the SED's conclusion that it is reasonably foreseeable San Francisco 21 could obtain a significant source of replacement water supply - to mitigate, at least partially, the 22 23 massive deficit that it could experience from the State Water Board's implementation of LSJR Alternatives 3 or 4 – through the development of the identified in-Delta diversion project. To reach 24 25 this conclusion, the SED unreasonably (and incomprehensibly) relies on the SFPUC's prior determination that the same project was infeasible yet offers no additional analysis, facts, or even an 26 27 explanation as to why this project should now be considered feasible. The draft recognizes that "[i]n the 2008 WSIP PEIR, the SFPUC concluded that the in-Delta diversion option was infeasible, in part, 28

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because it would not achieve consistent year-round diversions due to uncertainties regarding the 1 availability of water supplies and pumping capacities ....." (SED, at L-24; id. at 16-68 [same].) 2 Although the SED exclusively relies on the SFPUC's previous analysis of the in-Delta diversion 3 project, it casually brushes off the SFPUC's prior determination that it was infeasible, stating: 4 5 "[nonetheless, a discussion of this possible water supply option has been included in light of the changing circumstances since 2008 (e.g., Pelagic Organism Decline, climate change, California 6 7 WaterFix, and the State Water Board's Final Report on the Development of Flow Criteria for the Sacramento Delta Flow Criteria .... Thus, it is discussed as a possible option available to the SFPUC 8 9 that may be explored in the future in light of the changing circumstances." (Id. at L-24 [emphasis 10 added].) Yet the draft fails to identify how the referenced "changing circumstances" may affect the feasibility of an in-Delta diversion project. In fact, the list of "changing circumstances" presented in 11 12 the analysis identifies stricter regulation and/or more restrictive environmental conditions and therefore greater project impacts that would likely make a new in-Delta diversion even less feasible. 13 In short, the SED has failed to address, in any substantive manner, the feasibility issues regarding the 14 in-Delta diversion project that the SFPUC previously identified.242 Nor has the draft addressed or 15 even identified other, more recent developments that present additional feasibility concerns, such as 16 the fact that during the interim 9 years since the SFPUC completed its preliminary analysis of the in-17 Delta diversion project, the SFPUC has developed other WSIP projects on the site contemplated in the 18 SED for the new 18-acre treatment plant and blending facility at Tesla Portal.243 The SED's untenable 19 20 suggestion that the project may now be feasible (for some unexplained reason) is mere "[a]rgument, speculation, unsubstantiated opinion or narrative," and thus, does not constitute substantial evidence 21 under CEQA. (Cal. Code Regs., tit. 14, § 15384(a)-(b).) 22

 <sup>242</sup> See Memo from Leslie Moulton-Post and Jill Hamilton, Environmental Science Associates to San Francisco City Attorney's Office, Adequacy Review of In-Delta Diversion Alternative Analysis in State Water Board SED, March 15, 2017, attached hereto as Appendix 6 (providing a comprehensive evaluation of the adequacy of the State Water Board's description and analysis of environmental impacts of the in-Delta diversion project contemplated by the SED as a potential source of replacement water supply for San Francisco).

<sup>243</sup> *Id.* at 2. *See* SED, at L-24 (explaining that "[t]his project would include a new Delta intake and pumping plant, a new pipeline, a new Delta Water Treatment Plan and a new blending facility at Tesla Portal.").

The SED also woefully fails to analyze the economic impacts of the larger in-Delta diversion 1 2 project that the draft envisions, and thereby violates the requirements of the certified regulatory program for the State Water Board's water quality control planning program and Water Code Section 3 13241(d). (Cal. Code Regs., tit. 23, § 3777(c); Cal. Code Regs., tit. 14, § 15187(d); Pub. Res. Code § 4 5 21159(c); Wat. Code, § 13241(d); Attwater Memo, supra note 16, at 4). As an initial matter, the analysis fails to assess *any* potential rate impacts associated with the in-Delta diversion project. (SED, 6 at 20-34 [explaining that the State Water Board's proposal only includes an analysis of "the potential 7 economic effects of purchasing water (i.e., water transfers) by SFPUC from willing sellers in the 8 9 Central Valley.") Further, although the SED includes "[c]ost information" for the other two identified 10 alternative sources of replacement water supplies, *(id)*, the draft does not even attempt to estimate the cost of compliance associated with the larger in-Delta diversion project that they envision, (id. at 16-11 69 [emphasis added] [wherein the State Water Board opines that "[t]he size of the project may need to 12 be larger than what was examined in the WSO report which is summarized below."]; id. at 16-68 13 [emphasis added] [wherein the draft speculates that the "cost per AF of additional water from delta 14 diversion for a larger project could be less than \$255 per AF because of the economies of scale (i.e., 15 the larger infrastructure projects are, the less they cost per unit per year)."]; id. at L-24 (same)].) 16 Instead, the SED solely references the preliminary cost estimates previously developed by the SFPUC 17 for a smaller project, *i.e.*, with a design capacity of 28,000 AF/year. (Id. at 16-68 ["[t]his section uses 18 information regarding a delta diversion project as was analyzed in the WSO report to evaluate costs 19 20 and potentially significant environmental impacts."].)

III. The SED is Inconsistent in its Treatment of Municipal Water Service Providers Resulting in an Unstable Project Description and Deficient Impact Analysis.

The SED's explanation of whether and how various municipal water providers may be required to comply with the State Water Board's proposal is confusing, internally inconsistent, and impermissibly scattered throughout various chapters and appendices.244 As noted, "[a]n accurate,

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<sup>244</sup> See e.g., *California Oak Foundation*, 133 Cal.App.4th at 1239 (citing *Santa Clarita Organization for Planning the Environment*, 106 Cal.App.4th 715, 723) [explaining that "information 'scattered here and there in EIR appendices,' or a report 'buried in an appendix,' is not a substitute for 'a good faith reasoned analysis in response [to public comments on an EIR].'"].)

stable and finite project description is the [s]ine qua non of an informative and legally sufficient EIR." (County of Inyo, 71 Cal.App.3d at 193; see also City of Santee, 214 Cal.App.3d at 1454) ["only 2 through an accurate view of the project may the public and interested parties and public agencies 3 balance the proposed project's benefits against its environmental cost, consider appropriate mitigation 4 measures, assess the advantages of terminating the proposal and properly weigh other alternatives."].) 5 The SED fails to present a clear description of the project because it fails to clarify the extent to which 6 7 municipalities are responsible for complying with the LSJR Alternatives. Instead, the Draft 2016 8 contains vague, conflicting statements regarding how the LSJR Alternatives will apply to 9 municipalities.

For example, some sections of the SED appear to suggest that municipalities are not 10 responsible for complying with the LSJR Alternatives. Specifically, the SED states that the Water 11 Supply Effects model<sub>245</sub> "assumes that municipal water providers would not experience a reduction in 12 surface water supply." (SED, at 9-44; see *id*. at 11-36 [stating that for purposes of modeling 13 groundwater and agricultural impacts, "[v]olumes of water assumed not to be subject to a water 14 shortage (e.g., municipal and industrial water supply, riparian rights) are subtracted from the total 15 diversions for each river to calculate the remaining water."]; see also *id*. at G-6 [emphasis added] 16 ["[f]or a more conservative estimate of the groundwater and agricultural impacts, it is assumed that 17 municipal deliveries would not be cut in times of surface water shortage. This is a simplifying 18 assumption based on the program of implementation in Chapter 3, Alternatives Description, which 19 20describes actions to assure that implementation of the LSJR alternatives (i.e., percent of unimpaired flow requirement) does not impact supplies of water for minimum health and safety needs."].)246

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<sup>245</sup> See SED, at 4-24 (explaining that "[t]he WSE model is a monthly water balance spreadsheet model based on 23 the CALSIM II analysis framework that calculates for each tributary reductions in water supply diversions and changes in reservoir operations that could occur based upon user-defined diversion and reservoir operating rules, flood storage curves, and minimum river flow requirements, across 82 years of monthly historical 24 watershed hydrology.").

<sup>25</sup> 246 SED, at G-6 (emphasis added) (explaining that "[t]here is one exception to the analytical assumption that all municipal demands for surface water would be met. In the WSE model, SEWD and CSJWCD diversions from 26 the Stanislaus River are calculated separately from the [South San Joaquin Irrigation District or "SSJID"] and [Oakdale Irrigation District or "OID"] diversions because they only receive water after SSJID and OID water 27 rights have been met. As a result, in some years SEWD is not able to meet its municipal demand for Stanislaus

River water, which is assumed to be 10 TAF/y .... These municipal needs, however, could be met by either 28

Calaveras River water or groundwater."]; see also Bay-Delta Phase 1 Staff Technical Workshop of December 5, 98

Although the SED appears to justify excepting municipal water service providers from compliance with the proposed flow objectives by referring to Water Code Section 106, the explanation provided in the analysis is ambiguous and obscure: "[a]lthough California recognizes water for domestic purposes as the most important use of water and irrigation as the next most important use (Cal. Code Regs., tit. 23, § 106), *this does not necessarily mean that the water supply for domestic uses cannot be modified.*" (SED, at 13-61 [emphasis added].)<sup>247</sup> Thus, it remains unclear whether the SED is treating particular municipal water service providers, such as San Francisco, as entities that are responsible for complying with the State Water Board's proposal.

9 Confusingly, other passages and sections of the SED appear to contemplate that municipal water service providers are responsible for complying with the proposed unimpaired flow objectives. 10 (SED, at G-6 [noting that "[p]otential impacts on municipal and industrial water users are evaluated in 11 12 Chapter 13, Service Providers"]; id. at 13-58 (emphasis added) ["[t]his chapter provides a programmatic-level analysis of *the impacts on service providers* and refers to Chapter 16, Evaluation 13 of Other Indirect and Additional Actions (Section 16.4), with respect to environmental impacts caused 14 by service provider actions associated with various methods of compliance. Service providers may 15 choose any method of compliance described in Chapter 16, or a combination of methods, or they may 16 identify another as-yet unknown method of compliance to comply with requirements from the revised 17 objectives."].) 18

Appendix L states "[San Francisco or "CCSF"] *may be one of the entities responsible for implementing an unimpaired flow requirement*. The principal means by which CCSF would be
responsible are [if] [r]esponsibility is assigned specifically to CCSF in a proceeding amending the

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<sup>23 2016,</sup> Transcript of Video Recording, attached hereto as Exhibit 33 (referred to below as "December 5th Workshop Transcript"), at 86:18-25 [where Mr. Anderson explained that in the "[water supply] effects analysis, we have not modified the available surface water to the water treatment plants. Those are fixed quantities, and that is a component of demand. And so, *essentially, when there is decreased availability, that would -- that would fall on the irrigation districts rather than on the municipalities in terms of our effects analysis.*"].).

<sup>247</sup> December 5th Workshop Transcript, *supra* note 246, at 87:1-9 (emphasis added) (where Anne Huber, a
26 Water Resources Analyst with ICF Jones & Stokes, described how the analysis treats municipalities as follows:
"for service providers, we analyze impacts qualitatively because we are -- you know, *it is uncertain at this point*

<sup>27</sup> to what degree their demands may be cut. So there is some consideration of potential reductions in supply to service providers, but it was not part of the groundwater analysis. For the groundwater analysis, the assumption

<sup>28</sup> was that all reduction and supply effected agriculture.").

agency's water rights [or] [r]esponsibility is assigned to MID and TID in a proceeding amending the districts' water rights, and the SFPUC's water availability is determined by agreements with the irrigation districts." (SED, at L-4 [emphasis added]; see also *id*. at ES-24 [emphasis added] [noting that "water right implementation of the flow proposal could affect CCSF and related service water suppliers"]; *id.* at 20-27 (emphasis added) ["[i]n addition to potential effects within the plan area, implementation of the LSJR alternatives under drought conditions could result in water supply reductions within the SFPUC retail service area, and within the service areas of the 27 agencies in Alameda, San Mateo, and Santa Clara Counties that purchase wholesale water from SFPUC."]; id. at 20-34 ["LSJR Alternatives 2, 3, and 4 may affect the amount of surface water 10 diversions to the SFPUC service area."].)

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Elsewhere, the SED concedes that San Francisco would experience "substantial" water supply 11 12 reductions if the State Water Board implemented its proposal. (SED, at 13-60 (emphasis added) ["[a]t 30 percent unimpaired flow under LSJR Alternative 2 with adaptive implementation method 1, the 13 average percent reduction in water supply on the Stanislaus, Tuolumne, and Merced Rivers was 14 estimated to be 5 percent, 7 percent, and 10 percent, respectively. Thus, surface water supply 15 reductions would be greater at the 30 percent unimpaired flow level compared to 20 percent 16 unimpaired flow. Reductions would be greatest for service providers receiving Merced River 17 diversions (i.e., Merced ID), but would also be substantial for Tuolumne River service providers (i.e., 18 TID, MID, and *CCSF*)."].)248 19

What is clear is that although the SED explicitly identifies impacts to some municipal water supply providers, the draft fails to identify impacts to all of the potentially affected entities, including San Francisco in any coherent fashion. The SED recognizes that reduction in municipal water supply is an impact that the State Water Board must analyze. (SED, at 13-49 ["[w]hile substantially reducing existing surface water supplies of service providers can be considered an impact, the extent to which

<sup>&</sup>lt;sup>248</sup> Perplexingly, elsewhere in the SED, while discussing municipal water service providers that rely on the 26 Tuolumne River, the draft fails even to reference either San Francisco or its wholesale customers. (SED, at G-6 ["[m]unicipal and industrial water suppliers use a relatively small portion of the total surface water diversion 27

from the Stanislaus and Tuolumne Rivers. ... On the Tuolumne River, the City of Modesto has an agreement with MID to purchase surface water from the district."].) 28

service providers are affected is a function of their ability to use existing alternative supplies (e.g., groundwater) or develop alternative water supplies."].) The SED appropriately analyzes potential 2 impacts to the Central Valley Project ("CVP") and State Water Project ("SWP") export service areas, 3 yet fails to include any such impact analysis for many other municipal water service providers, 4 including San Francisco. (SED, at 13-87–13-89.)249 However, as San Francisco has previously 5 explained, "[i]t is inconsistent and unreasonable for the draft SED to analyze impacts to service 6 7 providers relying on CVP/SWP exports and to ignore impacts to service providers relying on the same water resources developed upstream of the rim dams."250 8

9 Thus, although the SED in scattered locations posits that: San Francisco may be responsible for 10 implementing the proposed unimpaired flow requirement (*id.* at L-4); the impacts to San Francisco would be "substantial," (*id.* at 13-60); and substantial reductions of existing surface water supplies 11 12 constitute an adverse impact, (*id.* at 13-49), the draft nevertheless fails to identify, let alone analyze, as detailed above, the adverse impacts to the Bay Area that could result from implementation of the State 13 Water Board's proposal. The SED thereby avoids any comprehensible, substantive discussion in the 14 Project Description, or elsewhere, of how the State Water Board's proposal may impact San Francisco 15 - and many other potentially affected municipal water service providers - by leapfrogging over an 16 analysis of the impacts that would result from the proposed draconian water supply reductions. 17 Instead of acknowledging that a reasonably foreseeable consequence of the State Water Board's 18 implementation of an unimpaired flow objective on the Tuolumne River, as proposed in the SED, 19 20would be reduced water deliveries throughout the Bay Area and consequent adverse environmental impacts, the draft limits any analysis of adverse impacts to the Bay Area to those impacts associated 21 with mitigation, *i.e.*, that would result from the construction of new water supply facilities, 251 or a 22

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251 See e.g., SED, at ES-93, SP-1 (explaining that as a result of "[s]urface water diversion reductions on the 28 Stanislaus, Tuolumne and Merced rivers" under LSJR Alternatives 3 or 4, and the consequent "substantial 101

<sup>23</sup> 249 See SED, at ES-95, SP-3 (stating that impacts to the CVP/SWP export service areas would be less than significant under LSJR Alternatives 3 and 4 because under these alternatives there would be an average increase 24 in exports of 76 TAF or 194 TAF, respectively). Significantly, by failing to include a comparable summary of impacts from the State Water Board's proposal to other potentially affected water service providers, including 25 San Francisco, the State Water Board violated Section 15132(b)(1) of Title 14 of the California Code of Regulations, that requires "[e]ach significant effect with proposed mitigation measures and alternatives that 26 would reduce or avoid that effect" to be identified in the Executive Summary.

<sup>250 2013</sup> CCSF Comment Letter, supra note 3, at 9. 27

	municipal water service provider's failure to replace their reduced supply. As noted above in Sect	ion l
2	supra, the SED simply assumes that the SFPUC will not need to reduce deliveries to the RWS ser-	vice
i.	territory in response to the State Water Board's implementation of LSJR Alternatives 3 or 4, but	
	instead will be able to replace the reduction in water supply from alternative sources, (see SED,	4
	at L-26; id. at 20-40), and thereby avoid analyzing the predictable, adverse impacts to the Bay Are	a.?
	This glaring omission violates the substantive standards of CEQA, the requirements of the certified	d
1	regulatory program associated with the State Water Board's water quality control program, and the	7.6
	water resources developed upstream of the rim dams "250 January 250 January 25	
4	Thus, although the SED in scattered locations posits that: San Francisco may be responsible	6
1	Dated: March 17, 2017	01
į	City Attorney JONATHAN KNAPP	11
2	constitute an adverse impact, (vernottA vij) vjuqed nevertheless fails to identify, let alone analyz	12
c)	detailed above the second result from implementation of the second result from implementation of the second	13
i	Water Board's proposal. The SED thereby a ds any comprehensible, substantive discussion in (	14
i	Attorneys for City and County of San Francisco	15
	- and many other potentially affected municipal water service providers - by leapfrogging over an	91
	analysis of the impacts that would result from the proposed draconian water supply reductions.	Ĩ7
	Instead of acknowledging that a reasonably foreseeable consequence of the State Water Board's	81
	implementation of an unimpaired flow objective on the Tuolumne River, as proposed in the SED,	61
	would be reduced water deliveries throughout the Bay Area and consequent adverse environmenta	20
	impacts, the draft limits any analysis of adverse impacts to the Bay Area to those impacts associati	21
	with mitigation, <i>i.e.</i> , that would result from the construction of new water supply facilities, 251 or a	22
	As See SED, at ES-95, SP-3 (stating that impacts to the CVP/SWP expert service areas would be less than significant under LSJR Alternatives 3 and 4 because under these alternatives there would be an average include in expense of 70 TAF or 194 TAF, respectively). Significantly, by failing to include a comparable summar impacts from the State Water Board's proposal to other potentially affected water service providers, includ San Francisco, the State Water Board's proposal to other potentially affected water service providers, includ Regulations, that requires '(clach significant effect with proposed mingation measures and alternatives the potential of the state water solution of the proposed mingation measures and alternatives that the potential service and the proposed mingation measures and alternatives the	23 24 25 26
	groundwater supplies in the Modesto, Turlock, and Extended Merced Subbasins," and that to the extent such reductions require water service providers "to construct new or expanded water supply or wastewater treatm facilities," the construction of such facilities could result in significant environmental effects.").	h72 hent 28

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0	BEFORE THE CALIFORNIA		
1	STATE WATER RESOURCES CONTROL BOARD		
2	DRAFT SI	UBSTITUTE ENVIRONMENTAL CITY AND COUNTY OF SAN FRANCISCO'S	
3	CHANGES TO THE WATER QUALITY CONTROL PLAN FOR THE SAN FRANCISCO BAY-SACRAMENTO/SAN		
4			
5	JOAQUIN	RIVER FLOWS AND	
6	SOUTHER	IN DELTA WATER QUALITY	
7			
8	The	City and County of San Francisco ("San Francisco") hereby provides its Exhibit List to its	
9	Comments to the Draft Substitute Environmental Document in Support of Potential Changes to the		
0	Bay-Delta Plan:		
1			
2	EXH DESCRIPTION NO.		
3	1 Submission to Federal Energy Regulatory Commission by Turlock Irrigation District and Modesto Irrigation District of Settlement Agreement and Request for License Amendments Pursuant to Settlement Agreement, February 5, 1996.		
5 6	2 Public Utilities Commission, City and County of San Francisco, Resolution 08-0202 adopting CEQA findings for Water System Improvement Program.		
7	3	Memo titled Guidance on Consideration of Economics in the Adoption of Water Quality Objectives, William R. Attwater, Chief Counsel, State Water Resources Control Board, January 4, 1994.	
		1	

EXH NO.	DESCRIPTION
4	Letter to Mark Gowdy, Division of Water Rights, State Water Resources Control Board, from Jonathan Knapp, Deputy City Attorney, San Francisco City Attorney's Office, July 29, 2014.
5	Bay-Delta Phase 1 Staff Technical Workshop of December 12, 2016, Transcript of Video Recording.
6	Fact Sheet, November 2016 Statewide Conservation Date, State Water Resources Control Board website.
7	Affidavit of Anson B. Moran ("Moran Affidavit"), FERC Project No. 2299, January 26 1994.
8	Budget Workshop Presentation, Board Meeting, Alameda County Water District, May 26, 2016.
9	"Millbrae Residents Learn About Risks of 60 Year Water System," Public, January 30, 2017.
10	Moody's Investor Service, Credit Opinion, September 27, 2016, San Francisco Public Utilities Commission, Water Enterprise, New Issue – Moody's assigns Aa3 to San Francisco Public Utilities Commission (CA) Water Revenue Bonds Rating Report for SFPUC Bond.
11	U.S. Environmental Protection Agency, Reducing Urban Heat islands: Compendium o Strategies, October, 2008.
12	U.S. Environmental Protection Agency web page entitled "What is Green Infrastructure?"
13	At Risk: the Bay Area Greenbelt, 2017, Greenbelt Alliance.
14	Baumann, Adrian, "State Water Board Issues Moratorium on New Water Connections, Daily Democrat, November 5, 2014.
15	City of East Palo Alto Agenda, City Council Regular Meeting, July 19, 2016, City Council Agenda Report, P&A Item No. 10D, Approving an Ordinance Prohibiting New or Expanded Water Connections to the City of East Palo Alto Water System.
16	Landgraf, K., "East Palo Alto imposes development moratorium due to lack of water," Mercury News, July 20, 2016.
17	Plan Bay Area: A Strategy for a Sustainable Region, July 18, 2013, Association of Bay Area Governments, Metropolitan Transportation Commission.
18	Memo to Joint MTC Planning Committee with the ABAG Administrative Committee MTC Deputy Executive Director, Policy / ABAG Executive Director regarding Plan Bay Area 2040 Draft Preferred Land Use Scenario, September 2, 2016.
19	Summary of California Air Resources Board Select 8 Summary, accessed March 9,

EXH NO.	DESCRIPTION
20	Agreement Relating to the Transfer of Water, December 20, 1990.
21	Brekke, Dan, "As California Drought Deepens, Those With Water Can Sell at a High Price," KQED, July 2, 2014.
22	Placer County Water Agency, Board of Directors, Regular Meeting, Minutes, July 21, 2016.
23	Placer County Water Agency, Board of Directors, Regular Meeting, Minutes, June 18, 2009.
24	Letter from Roger VanHoy, General Manager, Modesto Irrigation District and Casey Hashimoto, General Manager, Turlock Irrigation District, to Mark Gowdy, State Water Resources Control Board, dated August 6, 2014.
25	Holland, John, "Modesto Irrigation District kills proposed water sale," Modesto Bee (September 18, 2012).
26	Stapley, "Modesto Irrigation District blocks Oakdale water sale to SF, for now," The Modesto Bee, January 23, 2014.
27	Stapley, "OID reveals big-money water sale to outside buyers," The Modesto Bee, October 13, 2015.
28	Carlson, Ken, "Stanislaus County Supervisors to Vote on Water Export Rules, Modesto Bee," September 9, 2013.
29	City of Carlsbad California website, FAQs, Carlsbad Desalination.
30	City of Carlsbad California website, Agua Hedionda Lagoon.
31	Gorn, David, "Desalination's Future in California Is Clouded by Cost and Controversy," KQED Science, October 31, 2016.
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32 33 Dated: Mar	Fikes, Bradley J., "State's biggest desal plant to open: What it means," San Diego Union-Tribune, December 13, 2015. Bay-Delta Phase 1 Staff Technical Workshop of December 5, 2016, Transcript of Video Recording. rch 16, 2017 DENNIS J. HERRERA City Attorney By:/s/ JONATHAN P. KNAPP Deputy City Attorney Attorneys for the City and County of San Francisco
33 Dated: Mar	Bay-Delta Phase 1 Staff Technical Workshop of December 5, 2016, Transcript of Video Recording. cch 16, 2017 DENNIS J. HERRERA City Attorney By: /s/ JONATHAN P. KNAPP Deputy City Attorney Attorneys for the City and County of San Francisco
Dated: Mai	rch 16, 2017 DENNIS J. HERRERA City Attorney By: /s/ JONATHAN P. KNAPP Deputy City Attorney Attorneys for the City and County of San Francisco
	DENNIS J. HERRERA City Attorney By: /s/ JONATHAN P. KNAPP Deputy City Attorney Attorneys for the City and County of San Francisco
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# **EXHIBIT 1**

# ORIGINAL

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Honorable Lois D. Cashell, Secretary Federal Energy Regulatory Commission 888 First Street, N. E., Room 1A Washington, D. C. 20426



Re Turlock Irrigation District and Modesto Irrigation District - Project No. 2299=0 Supplement to February 5, 1996 - Submission of Settlement Agreement

Dear Ms. Cashell:

Transmitted herewith for filing are an original and eight copies of an additional signature page to the Settlement Agreement submitted for filing in this proceeding on February 5, 1996. This signature page evidences the concurrence in the Settlement Agreement of the San Francisco Bay Area Water Users Association.

With the submission of this signature page the support for the Settlement Agreement can now be considered unanimous. All parties to the proceeding including the FERC Staff have now signed the Settlement Agreement.

Respectfully submitted,

William J. Madden, Jr.

Attorney for Turlock Irrigation District and Modesto Irrigation District

960 3180138

Enclosure Copy to Service List



## FEDERAL ENERGY REGULATORY COMMISSION

WASHINGTON, D. C. 20426



October 10, 1995

New Don Pedro Settlement

To the participants:

Enclosed is the U.S. Fish and Wildlife Service's (FWS) biological opinion for the New Don Pedro settlement. We are striving to have the settlement signed and filed with the Commission prior to Thanksgiving. If you have not already done so, please obtain authorization to sign the settlement. A specific signing date will be set next week after you have a chance to confer with your respective organizations and have a better idea when you may have the requisite authorization. Tentatively, please consider a signing date in early November. Please keep us informed.

In our comments on the draft biological opinion, we stated:

We do not, on a practical basis, consider reporting of any take of delta smelt to be objectionable, unreasonable, or inappropriate. This type of cooperation is fundamental to the relationships agreed to among the participants to the initialed settlement. We will discuss this issue with the participants to the settlement and see if a consensual agreement can be reached.

Accordingly, the issue is raised for discussion to see if there is any objection to an informal consensual agreement (**not to be part of the settlement**) that the participants will report to the FWS any take of delta smelt in the Tuolumne River, of which they become aware. Absent any objection, we will assume we have such an agreement.

Stephen Angle / (202) 208-0361 (202) 208-1219 FAX

John A. Schr (ql

(202) 219-**1**661 (202) 219-2732 FAX



ENCLOSURE



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# NEW DON PEDRO PROCEEDING

P-2299-024

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# SETTLEMENT AGREEMENT

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#### SETTLEMENT AGREEMENT

#### 1. INTRODUCTION

This settlement proposes that Article 37 of the license for the New Don Pedro Project be amended to increase flows released from the New Don Pedro Dam. When this settlement is signed, it shall be binding on the parties to the settlement. The signature of the Federal Energy Regulatory Commission (FERC or Commission) staff represents a commitment by staff to recommend the settlement to the Commission for approval.

The settlement entered into by the participants is more comprehensive than the scope of Article 37; therefore, only the portion of the settlement that resolves the issues related to Article 37 will be filed for approval by the Commission. The proposed changes also affect the ongoing studies required by Article 58 which is also recommended for amendment. The material to be filed for Commission approval is described in Appendix A.

#### 2. LIST OF PARTICIPANTS:

The following is a list of participants who support the settlement agreement:

California Department of Fish and Game (CDFG) California Sports Fishing Protection Alliance (CSPA) City and County of San Francisco (City) Federal Energy Regulatory Commission staff (FERC staff) Friends of the Tuolumne (FOTT) Modesto Irrigation District (MID) Tuolumne River Expeditions (TRE) Tuolumne River Preservation Trust (TRPT) Turlock Irrigation District (TID) U.S. Fish and Wildlife Service (FWS)

Signature of this settlement by a participant indicates that participant's consent to enter into this agreement. The San Francisco Bay Area Water Users Association contributed to the settlement discussions yet chose not to sign the agreement.

 EFFECTIVE DATE: The participants intend that this settlement becomes effective upon signature of the participants. The participants acknowledge that the portion of the settlement filed for Commission approval is subject to ultimate approval by the Commission. No money is required to be transferred among the participants until 30 days after the date of issuance of an order by the Commission amending articles 37 and 58 of the license consistent with Appendix A. 4. TERM OF THE SETTLEMENT: The term of this settlement shall correspond with the term of the license.

5. SUPPORT OF SETTLEMENT: The participants agree to support this settlement.

6. FILING OF SETTLEMENT WITH THE COMMISSION: The participants to the settlement agree that the Districts will file the settlement agreement with the Commission in accordance with Rule 602 of the Commission's Regulations (18 CFR § 385.602), within 5 business days from the date the last participant listed in section 2 signs the settlement.

7. COMMISSION ACTION: If the Commission fails to act on the proposed amendment within 6 months from the date the signed settlement is filed with the Commission, or if the Commission amends the license in a manner that is substantially different than that proposed herein, CDFG, CSPA, City, FOTT, MID, TRE, TRPT, TID, and FWS reserve the right, at their own discretion, and within 30 days of the date of Commission action, to notify all other participants in writing that they are withdrawing from the settlement.

8. STRATEGY FOR RECOVERY OF TUOLUMNE RIVER CHINOOK SALMON: This recovery strategy attempts to: 1) increase naturally occurring salmon populations, 2) protect any remaining genetic distinction, and 3) increase salmon habitat in the Tuolumne River. Both instream flow and non-flow measures are employed as part of the strategy.

The participants to the settlement agree to the following strategy for recovery of Tuolumne River chinook salmon.

Implement measures generally agreed upon as necessary to improve chinook salmon habitat and increase salmon populations. These measures include increased flows, habitat rehabilitation and improvement, and measures to improve smolt survival. When the chinook salmon population increases to acceptable levels, implement additional measures of some risk that the Technical Advisory Committee (TAC) agrees may help improve the population.

The participants to the settlement agree to an adaptive management strategy that would initially employ measures considered feasible and have a high chance of success. The success of these initial measures would be evaluated and, based on the results of evaluation, the measures would either be finetuned to improve success or alternative measures would be taken.

In support of this adaptive management strategy, a detailed review will be conducted annually to assess progress toward meeting the goals described in this settlement.

9. GOALS AND TIMETABLE FOR ACHIEVING GOALS: Many of the factors that will affect the chinook salmon population are beyond the control of the participants to the settlement. Rather than setting numeric goals in this settlement, comparative goals are identified whose attainment may be readily determined. These comparative goals are:

- Improvements in smolt survival and successful escapement in the Tuolumne River.
- Increase in naturally reproducing chinook salmon in this subbasin.
- Barring events outside the control of the participants to the settlement, by 2005 the salmon population should be at levels where there is some resiliency so that some of the management measures described herein may be tested, on an experimental basis.

10. MEASURES TO BE TAKEN IF GOALS NOT ACHIEVED: Assessment of achievement of the above goals will require an evaluation of trends established over several years. The participants agree that, given a good faith effort to implement the strategy for recovery of Tuolumne River chinook salmon, a fair assessment of the success of the strategy will require analysis of conditions from implementation to the year 2005. If the above goals are not achieved because of factors within the control of the Districts, or there has not been a good faith effort to fulfill the terms of this settlement, any participant may, at its own discretion, notify all other participants, in writing, that it is withdrawing from the settlement. Examples of factors within the control of the Districts include: New Don Pedro Dam operations (including decisions on the delivery, distribution, and transfer of water within and outside of the Districts) and river flows at LaGrange dam except during flood control operations, and land use activities on District-owned lands within the Tuolumne River riparian corridor. Examples of factors outside the control of the Districts include: Delta export operations, commercial and sport salmon harvest, land use activities on non-District owned lands within the Tuolumne River riparian corridor, and riparian diversions below LaGrange Dam.

In the event the goals are not achieved because of factors within the control of the Districts, the Districts agree to implement additional non-flow measures. The Districts, CDFG, and FWS will determine appropriate measures after reviewing recommendations from the TAC. In the event that goals are not achieved because of factors outside the control of the Districts, no additional measures would be required.

If a participant has a concern regarding fulfillment of the terms of this settlement, the participants agree to make a good faith effort to resolve any concerns. The participants agree to address the concerns at the TAC. If the concern is not resolved by the TAC, it will be addressed by the Management Committee in a timely manner.

11. FISHERY FLOWS: The Districts agree to maintain minimum streamflows in the Tuolumne River at La Grange bridge in accordance with the schedules set forth in this agreement or with such schedules as may be mutually agreed to among the Districts, CDFG, and FWS. The total volume of water allocated for a specific fish flow year shall not be less than that identified in the applicable Appendix A flow schedule. These schedules shall be available for public review at the Districts' offices.

By March 15 of each year, CDFG shall submit a preliminary fish flow schedule to the Districts and the FWS for review and comment. By April 10 of each year, CDFG shall submit a final fish flow schedule to the Districts for review and approval.

The water year type and corresponding flow volumes are listed below. Definition of the water year types and how flow volumes will be calculated from year to year are contained in the proposed amendment to article 37, attached as Appendix A.

Wa <u>ter Year Type</u>	<u>Flow Volume</u>
	(acre-feet)
Critical Water Year and below	94,000
Median Critical Water Year	103,000
Intermediate C-D Water Year	117,016
Median Dry	127,507
Intermediate D-BN	142,502
Median Below Normal	165,002
Intermediate BN-AN	300,923
Median Above Normal	300,923
Intermediate AN-W	300,923
Median Wet/Maximum	300,923

In addition, the participants agree to work cooperatively in an effort to obtain additional flows in the Tuolumne River. The participants will have fully complied with this cooperative effort to obtain additional flows by implementing, to the extent practicable, the following actions:

- The Districts and the City will seek permission from the Corps of Engineers to modify flood control rules in order to obtain greater flexibility in water releases from New Don Pedro reservoir. The Districts and the City agree to meet with the Corps within 2 months from the effective date of this agreement and to present a preliminary proposal to the Corps within 6 months thereafter. The Districts and the City agree to commit up to \$25,000 in support of the request to modify the flood control rule curve.
- The Districts will agree to make water transfers on mutually agreeable terms subject to the Districts' ability to free water from other committed uses.
- The Districts will provide an option to FWS and CDFG to purchase an amount of water cumulatively of up to 20% of any water to be sold by the Districts for diversion above New Don Pedro reservoir for municipal water supply. The sale price to the resource agencies will be no more than that paid by the transferee.
- The FWS will seek funds as appropriate, including Central Valley Project Improvement Act funds, for the purpose of purchasing water from the Districts, monitoring smolt production, and other measures agreed upon in this settlement agreement.
- TID will promote the proposed Turlock Area Drinking Water Project, the diversion for which is proposed to be located between river miles 19 and 26. The project will be implemented so that it will not be injurious to MID's water rights. FWS and CDFG agree to expedite the review of any permits and applications necessary for the drinking water project.
- TID will conduct a feasibility and cost analysis of withdrawing water for irrigation at the proposed Turlock Area Drinking Water Project diversion point. This analysis will be included in the EIR for that project. Based on the results of these analyses, CDFG and FWS will determine if it would be appropriate for them to fund or cost share in the design and construction of alternative irrigation diversion facilities. The parties to the settlement are under no obligation to fund the design, construction, operation, or maintenance of these facilities.

• The participants will work cooperatively through the TAC to achieve any efficiencies available through realtime management in an effort to conserve water deliveries in one year to increase incremental flows in the following year. To the extent that real-time management, in the judgement of the TAC, reduces the required minimum flow in one year, that water may be carried over for use in the following year and attributed to the efforts to achieve incremental flows; however, only 5,000 acre-feet may be carried over beyond October 1 of each year for use until the following October 1.

The water made available through the above measures will be provided as an increment above the minimum flows described above and will be scheduled as may be agreed to by the Districts, CDFG, and FWS except that flows to be diverted for the Tuolumne River Drinking Water Project will not be subject to such scheduling approvals. No water obtained and released pursuant to these measures shall be credited toward the calculation of minimum flow releases.

12. NON-FLOW OPTIONS: The parties agree that restoration and maintenance of Tuolumne River salmon habitat and reducing predation losses by isolating gravel ponds from the Tuolumne River channel would be beneficial. A program, overseen by the TAC and administered by the Districts, shall be implemented as follows:

The TAC shall determine whether to fund and a. complete a programmatic environmental document covering all spawning and rearing improvement and channel modifications (e.g. pond isolation projects) anticipated for the lower Tuolumne River, including those not funded through this agreement. Due to the likelihood of both federal and state matching or other funds for planning and implementation, a joint EIR/EIS (CEQA/NEPA) should be considered. Up to \$250,000 of the authorized funding under paragraph 12(g)(1) shall be provided for the completion of this document. If additional funds are needed, CDFG, FWS and other parties shall use their best efforts to locate and secure funds. The TAC will provide a recommendation regarding agency roles to the Management Committee for consideration.

b. The selection of priority non-flow options funded under this agreement shall be made by the TAC. The area between Old La Grange Bridge and the two riffles below Basso Bridge constitute the upper onethird segment of the Tuolumne River spawning reach.

This upper one-third segment is the most heavily used portion of the spawning area. Spawning habitats from Basso Bridge downstream to Waterford also receive significant use. There are several pond isolation projects on this reach that have good potential to reduce the recruitment and colonization of predator fish in the ponded sections of the river and restore a more natural river ecosystem. These ponded areas (created by in-channel aggregate mining) provide habitat for smallmouth and largemouth bass which prey on outmigrating chinook salmon smolts, significantly increasing smolt mortality.

c. The TAC will identify 10 priority projects. A minimum of two pond isolation projects will be included in the 10 priority projects. At completion of this phase, there will essentially be "turn key" projects ready for implementation. The objective is to implement the priority projects by 2005.

d. The methods used for implementation of these projects shall include, but not be limited to, simple gravel cleaning, hydraulic gravel cleaning, gravel replacement, gravel additions, ripping, re-contouring, barrier placements or removals, placement of object cover (boulders), restoring floodplain, land acquisition and riparian removal and replanting (e.g. shade). The design of the monitoring program will integrate closely with the timing, location and type of habitat improvement projects to assist in evaluating the merits of these projects.

Due to similar requirements for permitting, e. environmental documentation and implementation management, all other non-flow options will also be evaluated by the TAC in the manner described above. These measures include but are not limited to riparian restoration, land acquisition, sediment source control, predator control, enhancing turbidity during smolt outmigration, reduced poaching, fish screens, sound or behavioral devices to guide fish away from problem areas, livestock management (e.g. fencing, rotational grazing or compensating ranchers for not grazing riparian pastures). Upon recommendation from the TAC and approval by the Management Committee, projects such as these may be substituted for, or identified as part of the 10 priority projects described above, and funded as indicated. The parties agree to pursue outside funds and encourage others to complete these non-flow measures.
f. The Districts shall provide administrative services for these projects. Participants of the TAC shall participate at their own expense.

#### g. Funding

(1) The total amount of funds to be provided by Districts and the City for the cost of non-flow options shall not exceed \$500,000, except that up to an additional \$500,000 shall be provided to match, on a dollar-for-dollar basis, funds provided by other sources.

(2) Allowable project costs shall include development of the scope of work, preliminary and design engineering, permitting, environmental review, implementation work, preparation of required reports, and post-implementation monitoring incurred pursuant to a monitoring program approved by the TAC.

(3) The Districts will manage these funds in an efficient manner. CDFG and FWS will actively pursue funding from various sources to assist in completion of the 10 priority projects selected by the TAC. After completion of the 10 priority projects, any remaining funds shall be made available for designing or completing additional habitat projects identified by the TAC.

(4) The parties agree that nothing herein is intended to prevent any of the parties from seeking funds or financial assistance from third parties for the funding of non-flow options and the parties are encouraged to seek and to cooperate in obtaining such outside funding.

13. MONITORING: The 1986 Study Agreement shall terminate upon approval by the Commission of the amendment of articles 37 and 58 in accordance with the terms of this agreement. The following activities shall be completed pending Commission approval:

a. Fluctuation Study: GIS mapping of the river reach between river mile 26 and river mile 52 at river flows at approximately 1,100 cfs, 3,100 cfs, and 5,100 cfs and aerial photographs of the river flows at 5,100 cfs at an estimated total cost of \$50,000.

b. Juvenile seining study during 1995 at an estimated cost of \$20,000.

c. Temperature monitoring during 1995 at an estimated cost of \$5,000.

d. Smolt survival index study in spring 1995 at an estimated cost of \$50,000.

The fish program for the Tuolumne River shall shift its emphasis from studies to determine appropriate action, to implement and monitor the effectiveness of the fishery improvement measures described herein.

The Districts and the City will provide up to \$1,355,000 over the term of the license for funding monitoring costs. The Districts, with the cooperation of CDFG, FWS, and the City, will monitor the following:

#### Chinook Salmon Fall-Run

a. <u>Spawning Escapement</u> - The number, size distributions, scale or otolith samples for aging, timing, coded-wire tag recovery and decoding, and the linear distribution of redds in the designated salmon spawning area shall be estimated or collected annually from approximately October through mid-January. CDFG will perform the monitoring and use its best effort to fund this monitoring as a collaborative effort with the Districts for the first 10 years of this agreement. CDFG agrees to include funding for this monitoring in its proposed annual budgets and to seek approval of these budgets in good faith, however, the participants understand and agree that the Districts are responsible for this monitoring and that CDFG funding is subject to appropriations in the Governor's budget.

If CDFG cannot obtain funding for this monitoring for any giver year during the first 10 years of this agreement, CDFG shall notify the TAC in writing by September 1 and the Districts will fund this monitoring. In these instances, the \$40,000 per year allocation for this monitoring shall be deducted from funds otherwise required to be paid by the Districts for monitoring performed under this agreement. After reviewing alternative funding options, the TAC shall recommend how the scope and extent of the monitoring in section 13 may be modified to adjust for any such funding deficit.

If, at the end of the first 10 years of this agreement, the CDFG finds that it is necessary and appropriate to continue monitoring spawning escapement for the remainder of this agreement, it will do so to the extent possible.

b. <u>Quality and Condition of Spawning Habitat</u> - The TAC will assign responsibility for developing a protocol to monitor the quality and relative condition of spawning riffles from La Grange downstream to Waterford. The TAC will review the adequacy and validity of implementing this monitoring aspect in relation to the habitat improvement measures planned under this Agreement. The monitoring will be conducted by the Districts and will occur during four years before 2005 as scheduled and funded in Appendix A. CDFG and FWS will actively pursue additional monitoring funds for projects constructed in whole or in part by other funding.

c. <u>Relative Fry Density/Female Spawners</u> - Beach seine survey results over the past ten years for the Tuolumne River from old La Grange Bridge to Waterford shall be analyzed (by reach and by riffle) for the January 15 through March 15 time period (bi-weekly, monthly and season total) to define the range, median and mode, and variance of fry/100m<sup>2</sup>/female adult spawned in the reach. An assessment of the validity of using these "indices" or an alternate shall be completed by June 1996 by the TAC. Thereafter, monitoring shall occur during four years before 2005, as scheduled and funded in Appendix A. The purpose is to monitor changes in fry density/female spawner and evaluate the hypothesis that poor quality gravel is constraining salmon production on the Tuolumne River. Additional monitoring performed outside the terms of the Agreement will be summarized and evaluated in combination with these monitoring results by the TAC, when defining the phases approach to gravel restoration projects.

d. Fry Distribution and Survival (Fluctuation) - As a component of the "Flow Fluctuation" monitoring, field monitoring program(s) shall be funded to document the distribution and dislocation of salmon fry produced in the Tuolumne River as they move downstream in the Tuolumne River and San Joaquin River associated with flow fluctuations in late January, February, and early Multiple rotary screw traps and a mark and March. recapture program shall be established for four years during periods of large flow fluctuations within the spawning reach during the period January 15 - March 15 through 2005. A monitoring protocol shall be developed by the Districts and presented to the TAC for review and concurrence. If a pattern of high flows does prove effective in dislocating fry out of the Tuolumne River, the second phase (survival) of the monitoring program shall be designed and reviewed by the TAC and then implemented subject to available funding. The use of coded-wire tags or some other distinguishing mark will be needed to meet the objective of defining and survival rate/contribution rate of fry dislocated from the Tuolumne River associated with regulated flow

fluctuations. This monitoring shall be completed by the Districts and CDFG and be funded and scheduled as defined in Appendix A.

e. <u>Juvenile Distribution and Temperature Relationship</u> -The Districts shall perform and summarize beach seine survey results each year from March 15 - June 15, through 2005, to monitor the linear distribution of juvenile salmon. At least five thermographs will be deployed in the river. If determined necessary by the TAC, a weather station (air temps) will be deployed or local weather data during this same time period will be recorded. Fish and weather data will be summarized by the Districts annually. The monitoring will be funded and scheduled as defined in Appendix A.

f. <u>Smolt Survival Indices</u> - The CDFG will be funded to perform annual coded-wire tag monitoring of salmon smolt survival through 2005. A paired release of 150,000 to 200,000 CWT's total and a recovery effort (screw trap or trawl) will be performed each year that adequate numbers of hatchery fish are available.

In addition, a program of marking/tagging and replicate smolt release and recovery shall be funded annually through 2005 to monitor the relative effectiveness of the restoration measures in meeting the agreement goals. A protocol shall be prepared by CDFG and reviewed by the TAC prior to implementation. This monitoring program will be funded and scheduled as defined in Appendix A.

g. <u>Smolt Production</u> - The two monitoring procedures under the "Smolt Survival Indices" will provide extensive information on natural smolt outmigrants. The incremental addition of similar sampling effort (screw traps) extending before and after the CWT and mass marking releases can provide an index of smolt production. The TAC shall review methodologies and determine if this additional effort will result in significant results beneficial to monitoring the benefits of the restoration measures. This monitoring will be funded and scheduled as defined in Appendix A.

h. The TAC is authorized to modify the monitoring activities and studies specified in Section 13 (including, but not limited to, changes in the scope, protocols, number of years, and funding limits for an activity or study) so long as the total funding limit for monitoring is not exceeded. 14. TECHNICAL ADVISORY COMMITTEE: The above participants have established a valuable network of technical interaction and cooperation through the TAC. The Districts, FWS, CDFG, and the City agree to continue to exchange monitoring information for the Tuolumne and other subbasins so that progress in achieving the goals described herein may be evaluated.

<u>Management Committee</u>: The Management Committee is comprised of management representatives of MID, TID, CDFG, FWS, and the City. Their role is to oversee all TAC activities, to request and receive recommendations from the TAC, and to make policy decisions. The Management Committee will be responsible for resolving all issues elevated to it by the TAC. The Management Committee shall operate by consensus.

Under the direction of the Management Committee, the TAC will coordinate, by consensus, flow and non-flow measures for the fishery, monitoring activities, develop adaptive management strategies, and oversee their implementation. Any substantive disagreements among the TAC participants shall be elevated to the Management Committee for timely resolution.

The TAC members agree to continue to exchange information through the TAC. Exchange of information by all participants is encouraged and, to keep the exchange of technical information productive, any representative to the TAC should be a technical specialist in the aquatic sciences. Any party may send nontechnical representatives to audit TAC meetings.

The TAC is not subject to the provisions of the Ralph M. Brown Act (California Government Code section 54950 <u>et seq</u>.); however, the TAC shall provide notices of and agendas for formal TAC meetings consistent with the requirements of the Ralph M. Brown Act. Attendees at any TAC meeting will be given an opportunity to comment on any TAC agenda item.

<u>Resources Available to the TAC</u>: The Districts agree to provide the administrative, clerical, and support facilities for the TAC to fulfill its tasks.

15. **REPORTING:** The Districts, CDFG, and FWS agree to report the above monitoring information and other data relevant to the condition of the fishery resources in the Tuolumne River to the TAC, in a timely manner, to facilitate basin fishery management practices. Timely dissemination of data concerning each of the above items will be necessary for the TAC to effectively implement adaptive management techniques.

The above monitoring information is also to be documented in annual reports, filed by April 1 of each year with the Commission and to be available for public review to further the understanding and management of the chinook salmon.

16. FLOW FLUCTUATIONS: The Districts agree to operate the New Don Pedro Project to minimize abrupt or daily flow fluctuations in the Tuolumne River during salmon spawning, incubation, and fry rearing (generally, October 16 through March 15 or other 150-day period as may be slightly modified by the TAC).

Specifically, the Districts agree to follow the guidelines described below unless modified by the TAC or because of circumstances beyond the control of the Districts.

From October 16 through March 15 of each year, the Districts agree to the following ramping rates for decreasing the indicated flows at La Grange.

	Flow (Q)	<u>Ramping Rate</u>
	cfs	cfs/hr
	Q < 2,000	500
2,000	< Q < 2,700	700
2,700	< Q < 4,500	900

From October 16 through March 15, the Districts agree not to increase flows by more than 1,800 cfs per hour.

17. TUOLUMNE RIVER FLOWS ABOVE NEW DON PEDRO RESERVOIR: The City agrees to continue to work cooperatively with the organized and permitted recreational river users (rafters and kayakers) to schedule flows and to communicate daily flow schedules. If requested, the City will endeavor to inform the recreational river users of the amount of water it hopes to make available in the year for potential use by recreational river users. The parties agree that the amounts and schedule identified by the City will not be a legal obligation of the City, and further recognize that the City's obligation pursuant to the Raker Act or stipulations with the Department of the Interior are not increased or otherwise altered by this provision.

The Districts and the City agree to work with TRE to develop an understanding of the timing and amounts of flows needed by the recreational river users. TRE will provide the Districts and the City with its desired minimum flow volume and timing schedule. The City will, consistent with the above, attempt to provide the flows requested. The Districts and the City further agree to explore opportunities to improve flows available for recreational river users above New Don Pedro Reservoir, which do not have adverse impacts on either the water or power operations of the Districts or the City.

18. SUPPORT FOR ANCILLARY PROGRAMS: The participants to the settlement agree to support the following ancillary programs. Those participants with permitting, licensing, or approval authority agree to work with the applicant to develop acceptable options and to expedite the review and approval process. All other participants agree not to oppose or delay the following:

- Turlock Area Drinking Water Project, the diversion for which is proposed to be located between river miles 19 and 26. The project will be implemented so that it will not be injurious to MID's water rights.
- Flows proposed herein before the California State Water Resources Control Board and the California Central Valley Regional Water Quality Control Board for achieving the goals stated in this settlement agreement.
- Regulation of the salmon harvest rates to achieve the goals stated herein.
- Promotion of the return of 3 and 4 year old female chinook salmon.
- Coordinated system operation within San Joaquin River basin.
- Increased storage in Turlock Lake.
- Review of cattle grazing on public land adjacent to Tuolumne River with the intent of developing protective measures for riparian habitat.
- Encouragement of appropriate agencies to monitor water quality and maintain water quality standards in the Tuolumne basin.
- Management of the Tuolumne River to promote the natural chinook salmon population.
- Maintenance of any increased flow in the Tuolumne River.
- Environmentally acceptable water transfers (subject to applicable water quality standards).
- Change in flood control rule curve to provide for greater storage for fish releases and to better accommodate recreational boating above New Don Pedro Reservoir.
- Coordinated actions to reduce impact on hydropower generation.

19. RIPARIAN HABITAT AND RECREATION: The participants to the settlement agree that the flows described herein will help to provide adequate protection and to enhance the existing riparian habitat along the Tuolumne River. Many factors, primarily related to land use, have resulted in a vegetative mosaic ranging from lush habitat to areas where the riparian habitat has been

denuded. The participants to the settlement agree that improving the downstream riparian habitat would not only benefit the chinook salmon population, but also the multipurpose use of the Tuolumne River.

Recreation enhances public appreciation of the river and broadens the economic base of the local communities. Recreational opportunities consistent with the protection and maintenance of the chinook salmon fishery should be promoted. Additional boating access would improve recreational opportunities.

The City agrees to provide \$500,000 to an appropriate public agency or agencies mutually acceptable to the City, FOTT, and TRPT. This funding would be used directly to implement riparian improvement measures, recreational facilities, for acquisition of other funds (matching funds), or as otherwise described herein. The money provided by the City will not be used to fund salary or overhead to anyone administering this fund. All costs charged to this fund must be documented and their expenditure subject to audit if requested by the City.

20. CDFG STAFF POSITION: The City agrees to provide CDFG \$70,000 a year for ten years to fund a fishery biologist position on the CDFG staff for the Tuolumne River. In addition, the City agrees to provide a one-time contribution of \$30,000 as start-up costs related to this staff position. The City and CDFG agree to work cooperatively to negotiate an appropriate funding agreement.

21. FLOW ALLOCATION: The Districts agree to release the fishery flows described herein. The allocation of that water between the Districts and the City will be shared as they have negotiated.

22. COST SHARING BETWEEN THE DISTRICTS AND THE CITY: The Districts and the City agree that costs for non-flow measures shall be shared as prescribed in the FOURTH AGREEMENT, unless otherwise negotiated.

23. SECTION 7 CONSULTATION: When a consensual agreement is reached, the participants will initial the settlement and FERC staff will immediately provide the agreement to FWS for consultation under Section 7 of the Endangered Species Act (ESA). FERC staff will identify the mediation participants as designated non-federal representatives for the purpose of assisting FERC and FWS in evaluating the effects of the settlement on any listed species. Upon completion of ESA consultation, any consensual agreement will be signed by all participants.

24. REQUESTS FOR EXTENSION OF TIME: The participants agree not to request extensions of time for the requirements contained herein that are approved by the Commission, unless they have the concurrence of all participants to the settlement.

25. MODIFICATION OF TERMS AND CONDITIONS OF SETTLEMENT: Actions beyond the control of the participants may prevent or jeopardize a party's ability to fulfill a condition of the settlement. The participants to the settlement agree to work cooperatively to fulfill the terms and conditions of the settlement.

When a party to the settlement recognizes that it may have difficulty fulfilling a condition of the settlement, the affected party to the settlement agrees to notify, in writing, all other participants, as far in advance as possible, explaining the problem and requesting concurrence for an alternative schedule or an alternative activity to be performed by that party.

The participants to the settlement agree to respond within 30 days of the date of the initial letter with either their concurrence or a request for a meeting of the participants, to occur within 45 days from the date of the initial letter. Absent objection, the settlement will be amended as proposed.

If the participants to the settlement do not initially concur, the participants agree to meet and consider any alternatives presented. If they cannot concur on an alternative course of action, the party will be obligated, to the extent provided by law, to fulfill the original condition of the settlement.

26. NON-PRECEDENTIAL NATURE OF SETTLEMENT: Nothing in this settlement agreement, whether or not incorporated into the terms of the Commission license, is intended or shall be construed as a precedent or other basis for any argument that the paries which have signed this agreement have waived or compromised their rights which may be available under state or federal law except as to the matters addressed in this proceeding required by the Federal Power Act and in this settlement agreement. In addition, nothing in this settlement agreement establishes precedent regarding hydroelectric jurisdictional issues.

#### APPENDIX A

#### Proposed Amendment of Article 37

<u>Article 37</u>. The licensees shall maintain minimum streamflows in the Tuolumne River at La Grange bridge (river mile 50.5) for fish purposes in accordance with the table and schedules set forth below or with such schedules as may be agreed to among the licensees, the California Department of Fish and Game and the U.S. Fish and Wildlife Service. Any such schedules shall be available for public review at the licensees' offices. These flows may be temporarily modified if required by operating emergencies beyond the control of the licensees.

#### Water Year Classifications

Water Year Classification*	Cumulative Occurrence	Frequency ¥	60-20-20 Index (1906-1995)
Critical Water Year and below	< 6.4	6.4	<1500 TAF
Median Critical Water Year	6.4 - < 14.4	8.0	1500
Intermediate C-D Water Year	14.4 - < 20.5	6.1	2000
Median Drv	20.5 - < 31.3	10.8	2200
Intermediate D-BN	31.3 - < 40.4	9.1	2400
Median Below Normal	40.4 - < 50.7	10.3	2700
Intermediate BN-AN	50.7 - < 66.2	15.5	3100
Median Above Normal	66.2 - < 71.3	5.1	3100
Intermediate AN-W	71.3 - < 86.7	15.4	3100
Median Wet/Maximum	86.7 - 100	13.3	3100

\* The fish flow year is defined as April 15 through April 14 of the following year. The water year is defined as October 1 through September 30.

The water year classification shall be determined using the California State Water Resources Control Board's San Joaquin Basin 60-20-20 Water Supply Index and the California Department of Water Resources' (DWR) April 1 San Joaquin Valley unimpaired runoff forecast. The 60-20-20 index numbers used each year shall be updated to incorporate subsequent water years pursuant to standard DWR procedures so as to maintain approximately the same frequency distribution of water-year types. The volume of annual flow shall be periodically readjusted upon agreement among the licensees, the California Department of Fish and Game, and the U.S. Fish and Wildlife Service after April 1 of each year as more current unimpaired flow information becomes available.

Between a Median Critical Water Year and an Intermediate Below Normal-Above Normal Water Year, the precise volume of flow to be released by the licensees each fish flow year is to be determined using accepted methods of interpolation between index values given above. FLOW SCHEDULE

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Schedule Occurrence	Days	Critical & below 6.4 %	Median Critical 8.0 %	Intermediate C-D 6.1 %	Median Dry 10.8 %	Intermediate D-BN 9.1 %	Median Below Normal 10.3 %	Intermediate BN-AN 15.5 %	Median Above Normal 5.1 %	Intermediate AN-W 15.4 %	Median Wev/ Maximum 13.3 %
October 1 - October 15	15	100 cfs 2,975 ac-ft	100 cfs 2,975 ac-ft	150 cfs 4,463 ac-ft	150 cfs 4,463 ac-ft	180 cfs 5,355 ac-ft	200 cfs 5,950 ac-ft	300 cfs 8,926 ac-ft	300 cfs 8,926 ac-ft	300 cfs 8,926 ac-ft	300 cfs 8,926 ac-ft
Attraction Pulse Flow		none	Done	none	none	1,676 ac-ft	1,736 ac-ft	5,950 ac-fi	5,950 ac-ft	5,950 ac-fi	5,950 ac-ft
October 16 - May 31	228	150 cfs 67,835 ac-ft	150 cfs 67,835 ac-ft	150 cfs 67,835 ac-ft	150 cfs 67,835 ac-ft	180 cfs 81,402 ac-ft	175 cfs 79,140 ac-ft	300 cfs 135,669 ac-ft	300 cfs 135,669 ac-ft	300 cfs 135,669 ac-ft	300 cfs 135,669 ac-ft
Outmigration Pulse Flow		11,091 ac-ft	20,091 ac-ft	32,619 ac-ft	37,060 ac-ft	35,920 ac-ft	60,027 ac-ft	89,882 ac-ft	89,882 ac-ft	89,882 ac-ft	89,882 ac-ft
June 1 - September 30	122	50 cfs 12,099 ac-ft	50 cfs 12,099 ac-ft	50 cfs 12,099 ac-ft	75 cfs 18,149 ac-ft	75 cfs 18,149 ac-ft	75 cfs 18,149 ac-ft	250 cfs 60,496 ac-ft	250 cfs 60,496 ac-fi	250 cfs 60,496 ac-ft	250 cfs 60,496 ac-ft
Volume (ac-ft)	365	94,000	103,000	117,016	127,507	142,502	165,002	300,923	300,923	300,923	300,923

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#### Proposed Amendment of 1986 Agreement

On February 2, 1987, the Commission issued an order amending the license for the New Don Pedro Project. Article 58 approved a fish study plan filed on November 11, 1986, and set as June 30, 1998, or two years after completion of the Smolt Survival Index Study, whichever is later, for filing the results of the fishery studies.

This settlement requires monitoring to determine the effectiveness of the measures proposed herein. The fishery studies approved on February 2, 1987, should be amended to switch the emphasis from studies to determine what actions may be appropriate, to monitoring to determine the effectiveness of the measures implemented by this settlement.

The results of any fishery study, already completed pursuant to the fish study plan and not already filed with the Commission, should be filed by April 1, 2005. Article 58 should be amended accordingly.

<u>Article 58</u>. The licensees, after consulting with the California Department of Fish and Game and the U.S. Fish and Wildlife Service, shall implement a program to monitor chinook salmon populations and habitat in the Tuolumne River. The monitoring program shall conform to the monitoring schedule set forth below and shall include:

- Spawning Escapement Estimates
- Quality and Condition of Spawning Habitat
- Relative Fry Density/Female Spawners
- Fry Distribution and Survival
- Juvenile Distribution and Temperature Relationships
- Smolt Survival

The monitoring frequencies and methods shall be agreeable among the licensees and the consulted agencies. Any disagreements regarding the conduct of these studies, not resolved among the licensees and consulted entities, shall be filed with the Commission for determination.

The above monitoring information is to be documented in annual reports which will be filed with the Commission by April 1 of each year and be available for public review. The results of any fishery studies, already completed and not yet filed with the Commission, shall be filed by the licensees by April 1, 2005.

APPENDIX A MONITORING SCHEDULE
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	<u>I tem</u>	Action Entity	Cost	<u>lumber of Years</u>	<b>Total Cost</b>	<u>Funding Source</u>
4	Monitoring Salmon Spawning Escapement	CDFG	\$ 40,000/year	10, possibly 20	\$400,000 possibly to \$800,000	CDFG
e i	Monitoring Quality and Condition of Spawning Habitat	Districts	Base Year \$25,000 2nd Year \$10,000 3rd Year \$10,000 Final Year \$10,000	4	\$ 25,000 \$ 10,000 \$ 10,000 \$ 10,000	Districts, City
ರ	Monitoring Relative Fry Density/Female Spawners (Yrs immediately following Ite	Districts m B)	\$ 25,000/year	4	\$100,000	Districts, City
à	Monitoring Fry Distribution and Survival (Jan Mar. flow fluctuations)	Districts/CDFG	\$ 50,000/year	4	\$200,000	Districts, City
ங்	Monitoring Juvenile Distribution and Temperature Relationships (Real-time Management)	Districts	\$ 25,000/year	10	\$250,000	Districts, City
E.	Monitoring Smolt Survival (Real-time Management)	CDFG	\$ 75,000/year	10	\$750,000	Districts, City
ප්	Monitoring Smolt Production (Real-time Management)	TBD*	\$ 50,000/year	10	\$500,000	CVPIA**

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To be determined by the TAC The FWS agrees to seek external funding for this activity from various programs, including CVPIA. . ‡

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APPENDIX B

NEW DON PEDRO PROCEEDING - LIST OF INITIALS

The following initials reflect agreement to the settlement prior to Endangered Species Act consultation.



U.S. Fish and Wildlife Service

# NEW DON PEDRO PROCEEDING - SIGNATURE SHEET

The following signatures reflect agreement to the settlement.

Date										
Representative										
Organization	California Department of Fish and Game	California Sports Fishing Protection Alliance	City and County of San Francisco	Federal Energy Regulatory Commission staff	Friends of the Tuolumne	Modesto Irrigation District	Tuolumne River Expeditions	<b>Tuolumne River Preservation Trust</b>	Turlock Irrigation District	U.S. Fish and Wildlife Service

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NEW DON PEDRO The following signatures	PROCEEDING - SIGNATUI reflect agreement to the settlement.	RE SHEET
Organization	Representative	Date
California Department of Fish and Game		
California Sports Fishing Protection Alliance		
City and County of San Francisco		
Federal Energy Regulatory Commission staff		
Friends of the Tuolumne		
Modesto Irrigation District		
San Francisco Bay Area Water Users Association	Found M. Short	3/7/96
Tuolumne River Expeditions		
Tuolumne River Preservation Trust		
Turlock Irrigation District		
U.S. Fish and Wildlife Service		
		Signature page to New Don Pedro Settlement Agreement Project No. 2299-024

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# **EXHIBIT 2**

# EXHIBIT 3

### PUBLIC UTILITIES COMMISSION

City and County of San Francisco

# RESOLUTION NO. **08-0202**

WHEREAS, The San Francisco Public Utilities Commission determined the need for the WSIP to address various water system deficiencies including aging infrastructure; and achieve the goals of maintaining water quality, strengthening the system to avoid major damages and failures following earthquakes, improving delivery reliability and operational flexibility to accommodate planned and unplanned system outages, meeting customer demands, and providing drought protection; and

WHEREAS, San Francisco voters adopted Propositions A and E in November 2002, providing financing for water system improvements, and State Assembly Bill No. 1823 was also approved in 2002, requiring the City and County of San Francisco to adopt a capital improvement program designed to restore and improve the regional water system. The SFPUC prepared and presented a proposed WSIP to the Planning Department for environmental review; and

WHEREAS, On October 30, 2008, the Planning Commission reviewed and considered the Final Program Environmental Impact Report (consisting of the Draft Program Environmental Impact Report (PEIR) and the Comments and Responses document) and found that the contents of said report and the procedures through which the Final PEIR was prepared, publicized and reviewed complied with the provisions of the CEQA and the CEQA Guidelines and Chapter 31 of the San Francisco Administrative Code and found further that the Final PEIR reflects the independent judgment and analysis of the City and County of San Francisco, is adequate, accurate and objective, and that the Comments and Responses document contains no significant revisions to the Draft PEIR, and certified the completion of said Final PEIR in compliance with CEQA and the CEQA Guidelines in its Motion No. 17734; and

WHEREAS, On October 30, 2008, this Commission reviewed and considered the Final PEIR, adopted the CEQA Findings, including the Statement of Overriding Considerations, and the Mitigation Monitoring and Reporting Program by its Resolution No. 08-0200, including the attachments to that Resolution, all of which are incorporated herein as part of this Resolution by this reference thereto; and

WHEREAS, On October 30, 2008, this Commission approved the Phased Water System Improvement Program by its Resolution No. 08-0200, and

WHEREAS, In order to facilitate a comprehensive approach to financing implementation of the Phased Water System Improvement Program through June 2010, staff prepared forecasts of anticipated expenditures, and recommend a request for supplemental appropriation as described in the staff report and related attachments presented for Commission consideration and action on this Resolution; and WHEREAS, The requested supplemental appropriation funding will be placed on a Controller's Appropriation Reserve, so that, where required by law, expenditures will not be authorized until two conditions are satisfied: 1) the subsequent discretionary approval of the project by the Commission and Board, following review and consideration of project related environmental analysis, and adoption of Findings, pursuant to CEQA, the State CEQA Guidelines, and Chapter 31 of the San Francisco Administrative Code, and 2) the certification of funds availability, which may include proceeds of indebtedness (either commercial paper, short-term borrowing or long-term bonds); and

WHEREAS, in anticipation of the issuance of Water Bonds authorized under the City's Proposition A, approved by voters on November 5, 2002, the Commission and the Board of Supervisors previously authorized the issuance of not to exceed \$250,000,000 of commercial paper notes or bank notes, and in order to provide funds for the WSIP, the Commission desires to increase such authorization and authorize the issuance of an additional not to exceed \$250,000,000 of commercial paper notes or bank notes so that the Commission may have a total of \$500,000,000 of commercial paper notes or bank notes of so that notes outstanding at any one time for the Water Commercial Paper Program; and

WHEREAS, A supplemental appropriation in the amount of \$1,923,629,194 is requested to fund the Phased Water System Improvement Program (WSIP), as approved by this Commission in its Resolution No. 08-0200, through June 30, 2010; and

WHEREAS, \$1,551,454,144 is requested to fund the Regional Water Program projected expenditures and encumbrances; and

WHEREAS, \$119,528,912 is requested to fund the Local Water Program projected expenditures and encumbrances; and

WHEREAS, \$252,646,138 is requested to fund the program's financing costs for the period of January 2009 thru June 2010; now therefore be it

RESOLVED, That this Commission hereby adopts the CEQA Findings, including the Statement of Overriding Considerations, and the Mitigation Monitoring and Reporting Program (MMRP) previously adopted by the Commission by its Resolution No. 08-0200, including the attachments to that Resolution, all of which are incorporated herein as part of this Resolution by this reference thereto; and be it

FURTHER RESOLVED, That this Commission finds that the supplemental appropriation request is within the scope of the Program and activities evaluated in the Final PEIR, subject to the requirement that funding be placed on Controller's Appropriation Reserve, so that, where required by law, expenditures will not be authorized until two conditions are satisfied: 1) the subsequent discretionary approval of the project by the Commission and Board, following review and consideration of project related environmental analysis, and adoption of Findings, pursuant to CEQA, the State CEQA Guidelines, and Chapter 31 of the San Francisco Administrative Code, and 2) the certification of funds availability, which may include proceeds of indebtedness (commercial paper, short-term borrowing or long-term bonds); and be it

FURTHER RESOLVED, That this Commission authorizes the supplemental appropriation request based on the limitation that this Commission and the Board of Supervisors each reserve absolute discretion, following review and consideration of project related environmental analysis, if required, prepared pursuant to CEQA, the State CEQA Guidelines, and Chapter 31 of the San Francisco Administrative Code, to: (1) modify the Project to mitigate significant adverse environmental impacts, (2) select feasible alternatives that avoid significant adverse impacts of the Project, (3) require the implementation of specific measures to mitigate the significant adverse environmental impacts of the Project, as identified upon environmental evaluation in compliance with CEQA and San Francisco's Environmental Quality Regulations, (4) reject the Project as proposed if the economic and social benefits of the Project, or (5) approve the Project upon a finding that the benefits of the Project outweigh otherwise unavoidable significant adverse impacts by adopting a Statement of Overriding Considerations; and, be it

FURTHER RESOLVED, That this Commission authorizes the issuance of an additional not to exceed \$250,000,000 of commercial paper notes or bank notes so that together with the \$250,000,000 of commercial paper notes or bank notes previously authorized by the Commission and the Board of Supervisors, the Commission may have a total of \$500,000,000 of commercial paper notes or bank notes outstanding at any one time for the Water Commercial Paper Program and authorizes the SFPUC General Manager to cause the preparation of forms of such documents and agreements as necessary to effectuate the issuance of such commercial paper notes or bank notes, which forms shall be submitted for approval to this Commission prior to their execution; and, be it

FURTHER RESOLVED, That this Commission hereby authorizes the SFPUC General Manager to request the Mayor to recommend to the Board of Supervisor a supplemental appropriation in the amount of \$1,923,629,194 to fund the Phased WSIP through June 30, 2010, subject to the Controller's Appropriation Reserve and the conditions set forth herein, for the purposes described in the staff report and attachments presented to the Commission for consideration and action on this Resolution.

*I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of* October 30, 2008

Secretary, Public Utilities Commission

# ATTACHMENT A

## WATER SYSTEM IMPROVEMENT PROGRAM

# CALIFORNIA ENVIRONMENTAL QUALITY ACT FINDINGS: FINDINGS OF FACT, EVALUATION OF MITIGATION MEASURES AND ALTERNATIVES, AND STATEMENT OF OVERRIDING CONSIDERATIONS

# SAN FRANCISCO PUBLIC UTILITIES COMMISSION

In determining to approve the Phased Variant of the Water System Improvement Program ("Phased WSIP Variant" or the "Program"), the San Francisco Public Utilities Commission ("SFPUC") makes and adopts the following findings of fact and decisions regarding mitigation measures and alternatives, and adopts the statement of overriding considerations, based on substantial evidence in the whole record of this proceeding and under the California Environmental Quality Act ("CEQA"), California Public Resources Code Sections 21000 et seq., particularly Sections 21081 and 21081.5, the Guidelines for Implementation of CEQA ("CEQA Guidelines"), 14 California Code of Regulations Sections 15000 et seq., particularly Sections 15091 through 15093, and Chapter 31 of the San Francisco Administration Code.

This document is organized as follows:

Section I provides a description of the Program proposed for adoption (the Phased WSIP Variant), the environmental review process for the Program, the approval actions to be taken and the location of records;

Section II identifies the impacts found not to be significant that do not require mitigation;

Section III identifies potentially significant impacts that can be avoided or reduced to less-thansignificant levels through mitigation and describes the disposition of the mitigation measures;

Section IV identifies significant impacts that cannot be avoided or reduced to less-than significant levels and describes any applicable mitigation measures as well as the disposition of the mitigation measures;

Section V evaluates the different Program alternatives and the economic, legal, social, technological, and other considerations that support approval of the Phased WSIP Variant and the rejection of the alternatives, or elements thereof, analyzed; and

Section VI presents a statement of overriding considerations setting forth specific reasons in support of the Commission's actions and its rejection of the alternatives not incorporated into the Program.

The Mitigation Monitoring and Reporting Program ("MMRP") for the mitigation measures that have been proposed for adoption is attached with these findings as **Attachment B**. The MMRP is required by CEQA Section 21081.6 and CEQA Guidelines Section 15091. Attachment B

provides a table setting forth each mitigation measure listed in the Final Program Environmental Impact Report for the WSIP ("Final PEIR" or "PEIR") that is required to reduce or avoid a significant adverse impact. Attachment B also specifies the agency responsible for implementation of each measure and establishes monitoring actions and a monitoring schedule. The full text of the mitigation measures is set forth in Attachment B.

These findings are based upon substantial evidence in the entire record before the Commission. The references set forth in these findings to certain pages or sections of the Draft Program Environmental Impact Report ("Draft PEIR" or "DEIR") or the Comments and Responses document ("C&R") in the Final PEIR are for ease of reference and are not intended to provide an exhaustive list of the evidence relied upon for these findings.

# I. APPROVAL OF THE PROGRAM

# A. Program Description

By this action, the SFPUC adopts and implements substantially the Program identified as the Phased WSIP Variant in Chapter 13, Section 13.4 of the PEIR, to increase the reliability of the regional water system that serves 2.4 million people in San Francisco and the San Francisco Bay Area; the Phased WSIP Variant is a variation of the original WSIP described in Chapter 3 of the The Phased WSIP Variant involves full implementation of all proposed WSIP facility PEIR. improvement projects as described in Chapter 3 of the Draft EIR to insure that the public health, seismic safety and delivery reliability goals are achieved as soon as possible and phased implementation of a water supply program to meet projected water purchases through 2030. Under the Phased WSIP Variant, the SFPUC establishes an interim mid-term planning horizon -The Commission is making a decision about providing water supply to the water 2018. customers through 2018 only, and is deferring a decision regarding long-term water supply after 2018 and through 2030 until it undertakes further water supply planning and demand analysis. All non-water supply related goals and system performance objectives identified for the original WSIP would be achieved under the Phased WSIP Variant and all individual WSIP facility improvement projects proposed in the original WSIP would be constructed.

Under the Phased WSIP Variant, the SFPUC will construct and operate all the regional water system WSIP facility improvement projects while (1) limiting water sales to an average annual of 265 million gallons per day (mgd) from the watersheds through 2018; and (2) improving water supply reliability to meet the goals and objectives of the WSIP including no greater than 20 percent rationing systemwide in any one year of a drought. The Phased WSIP Variant would not provide water supply to meet 300 mgd average annual water sales in 2030 as proposed under the WSIP. Rather, the SFPUC would limit deliveries to no more than an annual average of 265 mgd from the watersheds through 2018, and the SFPUC and wholesale customers would collectively develop 20 mgd in conservation, recycled water, and groundwater to meet or offset the projected regional water system purchase request of 285 mgd in 2018. This 20 mgd of conservation, recycled water and groundwater in San Francisco as proposed under the WSIP and 10 mgd of conservation, recycled water and groundwater developed by the wholesale customers, which is in

addition to 15 mgd of conservation, recycled water and groundwater already assumed by the wholesale customers in preparing their regional water system purchase requests.

There is no change between the WSIP and the Phased WSIP Variant in the average annual water delivery proposed for the SFPUC's retail customers; the current average annual retail customer demand is approximately 91 mgd and this same amount would be provided to the retail customers through 2018, although 10 mgd of this amount would be provided through conservation, recycled water, and groundwater developed in San Francisco. While the WSIP proposed to provide the full 2030 projected wholesale customer average annual purchase requests of 209 mgd, the Phased WSIP Variant instead is designed to meet a projected 2018 wholesale customer average annual purchase requests of 194 mgd in 2018, although 10 mgd of this amount would be provided through conservation, recycled water, and groundwater requests of 194 mgd in 2018, although 10 mgd of this amount would be provided through conservation, recycled water, and groundwater projects.

Under the Phased WSIP Variant, the SFPUC also would implement the delivery and drought reliability elements of the WSIP, including the Westside Basin Conjunctive Use Project and proposed dry-year transfers from the Modesto Irrigation District ("MID") and the Turlock Irrigation District ("TID"), which would increase average annual diversions from the Tuolumne River by about 2 mgd over existing conditions.

Before 2018, the SFPUC would engage in a new planning process to re-evaluate water system demands and water supply options. As part of the process, San Francisco would conduct additional environmental studies and CEQA review as appropriate to address the SFPUC's recommendation regarding water supply and proposed water system deliveries after 2018. This Commission would review and consider approval of the terms of any new master Water Sales Agreement that would take effect after 2018.

As originally proposed, the WSIP established program goals for improvements to the regional water system and system performance objectives in the areas of water quality, seismic reliability, delivery reliability, and water supply through the year 2030. The facility improvement projects and the proposed water supply option included in the WSIP as originally proposed were designed to: (1) ensure compliance with existing and anticipated future water quality standards under all operating conditions; (2) upgrade the seismic standards of critical facilities to improve seismic reliability and to reduce the system's vulnerability to earthquakes; (3) improve water delivery reliability under a variety of operating conditions by improving overall operations of the system; and (4) assure that the SFPUC has an adequate supply of water available to deliver to customers during both non-drought and drought periods through 2030.

The SFPUC initially proposed the draft WSIP in early 2005 as the result of long-term planning and in response to legislative mandates, including a 2002 voter-approved bond measure. The draft WSIP is described in PEIR Chapter 3. For budgeting and management purposes, the SFPUC categorized as part of the WSIP all capital improvements and projects that will receive financing from the 2002 voter-approved bond measure. Some, but not all, of the activities and projects that the SFPUC has identified for financing purposes as part of the WSIP are analyzed in the Program EIR as explained in PEIR Section 3.4. (CEQA Guidelines section 15168.) Other proposed WSIP activities that are not evaluated in the PEIR are undergoing independent projectlevel CEQA review as explained in EIR Section 3.4.6. For purposes of these CEQA findings, the facility projects included under the "Program," "WSIP," or "Variant" refer only to the facility improvement projects included in the PEIR. WSIP facility improvement projects included in the PEIR will also undergo independent project-level CEQA review.

In March 2008, the SFPUC determined that it would like the option to consider approval and implementation of a variation of the WSIP. The program variation is called the Phased WSIP Variant and is a hybrid combination of the WSIP program as originally proposed and the No Purchase Request Increase Alternative analyzed in the Draft EIR at pages 9-7 through 9-16, 9-40 through 9-47 and 9-84 through 9-96, as well as the Modified WSIP Alternative analyzed in the Draft PEIR at pages 9-7 through 9-16 and 9-78 through 9-96 and in the C&R pages 14.10-1 through 14.10-26. The Phased WSIP Variant also includes some elements of the Aggressive Conservation and Recycling Alternative analyzed in the Draft EIR at pages 9-7 through 9-16, 9-47 through 9-59, and 9-84 through 9-96.

The Phased WSIP Variant includes the following key program elements:

- Full implementation of all of the 17 proposed WSIP facility improvement projects described in the PEIR (Draft EIR Sections 3.4.6 and 3.8; C&R Chapter 16, pages 16-14 to 16-17).
- Water supply delivery to regional water system customers through 2018 only of 265 mgd average annual target delivery originating from the Tuolumne, Alameda and Peninsula watersheds. This includes 184 mgd for the wholesale customers (including 9 mgd for the cities of San Jose and Santa Clara), and 81 mgd for the retail customers.
- Development of 20 mgd of conservation, recycled water and groundwater within the service area (10 mgd retail; 10 mgd wholesale).
- Dry year transfer from MID and/or TID of about 2 mgd coupled with the Westside Groundwater Basin conjunctive-use project to meet the drought year goal of limiting rationing to no more than 20 percent on a systemwide basis.
- Re-evaluation of 2030 demand projections, potential regional water system purchase requests, and water supply options by 2018 and a separate SFPUC decision in 2018 regarding regional water system water deliveries after 2018.
- Financial incentives to limit water sales to an annual average of 265 mgd from the watersheds.

The SFPUC will deliver to customers up to 265 mgd from the SFPUC watersheds on an average annual basis. While average annual deliveries from the SFPUC watersheds would be limited to 265 mgd such that there would be no increase in diversions from the Tuolumne River to serve additional demand, there would be a small increase in average annual Tuolumne River diversions of about 2 mgd over existing conditions in order to meet the delivery and drought reliability elements through 2018. As part of adoption of this Program, the SFPUC will implement the mitigation measures identified for the Phased WSIP Variant in the Final PEIR, including measures addressing interim impacts from potential increases in deliveries from the SFPUC watersheds over the total average annual of 265 mgd in the event that conservation, recycled water and groundwater projects are not completed prior to the increase in customers' demand.

The SFPUC must maintain water deliveries to all its customers for the protection of public health and safety. Therefore, the SFPUC will work with its customers to develop financial incentives to limit water sales to an average annual amount of 265 mgd from the watersheds through 2018.

With the projected 20 mgd of conservation, recycled water and groundwater projects, the system would meet average daily demand of 285 mgd in 2018.

Summaries of the WSIP facility improvement projects and the WSIP water supply under the Phased WSIP Variant are provided in the SFPUC staff memorandum dated September 30, 2008, and summaries of the WSIP facility improvement projects are set forth in PEIR Chapter 3, pages 3-48 through 3-73 and Appendix C, and are listed below. The projects are analyzed in the PEIR, Chapter 4. This approval action slightly modified the staff recommendation as set forth in the Resolution.

# Phased WSIP Variant Facility Improvement Projects

The size and design of the WSIP facility improvement projects are driven by the system performance objectives and would not change as a result of the water supply decision proposed in the Phased WSIP Variant. The SFPUC prepared a memorandum describing the factors affecting facilities capacity, dated July 29, 2008, and the information from that memorandum is incorporated by reference here. The draft WSIP included multiple program goals for improving seismic reliability and water delivery reliability, meeting current and future water quality regulations, and meeting water supply reliability goals through the year 2030. Design and capacity of the WSIP facility improvement projects is driven by all four of the WSIP objectives -- the need to improve system performance for seismic reliability and water delivery reliability as well as maintaining high water quality standards and meeting water supply goals. All four of these objectives are factored into the decision on how to size the WSIP's individual facilities. As is explained in the SFPUC memorandum, even if the goal of meeting projected increases in water supply demands were dropped from the mix of program objectives, the other program goals would cause the SFPUC to design WSIP facility improvement projects of the same size. The sizing of the facilities is necessary to reliably deliver an average annual amount up to 300 mgd in light of the regional system's needs for seismic and delivery reliability during both drought and non-drought periods, and to meet water quality requirements.

The Phased WSIP Variant includes the following facility improvement projects:

# San Joaquin Region

SJ-1, Advanced Disinfection SJ-2, Lawrence Livermore Supply Improvements SJ-3, San Joaquin Pipeline System SJ-5, Tesla Portal Disinfection Station

# **Sunol Valley Region**

SV-1, Alameda Creek Fishery Enhancement SV-2, Calaveras Dam Replacement SV-3, Additional 40-mgd Treated Water Supply SV-4, New Irvington Tunnel SV-5, SVWTP – Treated Water Reservoirs SV-6, San Antonio Back-Up Pipeline

# **Bay Division Region**

BD-1, Bay Division Pipeline Reliability Upgrade

# **Peninsula Region**

PN-2, Crystal Springs/San Andreas Transmission Upgrade PN-3, HTWTP Long-Term Improvements PN-4, Lower Crystal Springs Dam Improvement:

# San Francisco Region

SF-1, San Andreas Pipeline No. 3 Installation SF-2, Groundwater Projects SF-3, Recycled Water Projects

# **B. Program Objectives**

The SFPUC developed the WSIP to address several problems and issues that it had identified with its regional water system. In developing the WSIP goals and objectives, the SFPUC incorporated two fundamental principles pertaining to the existing regional system: (1) maintaining a clean, unfiltered water source from the Hetch Hetchy system, and (2) maintaining a gravity-driven system.

Among the considerations leading to identification of the WSIP were the following:

• *Aging Infrastructure*. The SFPUC regional water system is old. Many of its components were built in the 1800s and early 1900s; parts of the regional water system were built using now-outdated construction materials and/or methods and are currently in need of major repair. As the system ages, its reliability decreases and the risk of failure increases.

• *Exposure to Seismic and Other Hazards*. The 167-mile-long system crosses five active earthquake faults. Many of the SFPUC regional water system components are located on or in the immediate vicinity of major earthquake faults. Due to the age of the system, many facilities do not meet modern seismic standards. To protect public safety, the California Department of Water Resources, Division of Safety of Dams has imposed operating restrictions on Calaveras and Crystal Springs Reservoirs, reducing the local storage capacity and impairing normal system operations; this storage capacity needs to be restored.

• *Maintain Water Quality*. The regional water system currently meets or exceeds existing water quality standards. However, system upgrades are needed to improve the SFPUC's ability to continue to maintain compliance with current water quality standards and to meet anticipated future water quality standards under a range of operating conditions, including such events as a major earthquake, without reducing system reliability.

• *Improve Asset Management and Delivery Reliability.* In order to implement a feasible asset management program in the future that will provide continuous maintenance and repairs to facilities, the regional water system requires redundancy (i.e., backup) of some critical facilities necessary to meeting day-to-day customer water supply needs. Without adequate redundancy of

critical facilities, the SFPUC has limited operational flexibility in the event of an emergency or a system failure, as well as constraints on conducting adequate system inspection and maintenance.

• *Meet Customer Water Demands*. Additional supplies are needed to satisfy current demand in drought years and projected 2030 demand in all years. The experience of the last 150 years of record as well as recent studies on California's climate show the region is susceptible to droughts. Two of the most severe droughts occurred during the past 30 years. The regional water system currently has insufficient water supply to meet customer demand during a prolonged drought, and this situation will worsen in the future.

To address these challenges to the reliability of the regional water system, the SFPUC must replace or upgrade numerous components of the system and add some new components—thus the need for the WSIP and its associated facility improvement projects.

Goals and objectives were established for the WSIP described and analyzed in the PEIR. Because of the decision to phase implementation of a water supply program to meet projected water purchases through 2030, the water supply objective for the Phased WSIP Variant is slightly different from the water supply objective originally proposed, as revised below. The goals and objectives of the Phased WSIP Variant are presented below.

Program Goal	System Performance Objective
Water Quality – maintain high water quality	• Design improvements to meet current and foreseeable future federal and state water quality requirements.
	• Provide clean, unfiltered water originating from Hetch Hetchy Reservoir and filtered water from local watersheds.
	• Continue to implement watershed protection measures.
Seismic Reliability – reduce vulnerability to earthquakes	<ul> <li>Design improvements to meet current seismic standards.</li> <li>Deliver basic service to the three regions in the service area (East/ South Bay, Peninsula, and San Francisco) within 24 hours after a major earthquake. Basic service is defined as average winter-month usage, and the performance objective for design of the regional system is 229 mgd. The performance objective is to provide delivery to at least 70 percent of the turnouts in each region, with 104, 44, and 81 mgd delivered to the East/South Bay, Peninsula, and San Francisco, respectively.</li> </ul>
	• Restore facilities to meet average-day demand of up to 300 mgd within 30 days after a major earthquake.

# Phased WSIP GOALS AND OBJECTIVES

Program Goal	System Performance Objective
Delivery Reliability – increase delivery reliability and improve	• Provide operational flexibility to allow planned maintenance shutdown of individual facilities without interrupting customer service.
ability to maintain the system	• Provide operational flexibility to minimize the risk of service interruption due to unplanned facility upsets or outages.
	• Provide operational flexibility and system capacity to replenish local reservoirs as needed.
	• Meet the estimated average annual demand of up to 300 mgd under the conditions of one planned shutdown of a major facility for maintenance concurrent with one unplanned facility outage due to a natural disaster, emergency, or facility failure/upset.
Water Supply – meet customer water needs in non-drought and drought	• Meet average annual water demand of 265 mgd from the SFPUC watersheds for retail and wholesale customers during non -drought years for system demands through 2018.
periods	• Meet dry-year delivery needs through 2018 while limiting rationing to a maximum 20 percent system-wide reduction in water service during extended droughts.
	• Diversify water supply options during non-drought and drought periods.
	• Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers.
Sustainability – enhance sustainability in all	• Manage natural resources and physical systems to protect watershed ecosystems.
system activities	• Meet, at a minimum, all current and anticipated legal requirements for protection of fish and wildlife habitat.
	• Manage natural resources and physical systems to protect public health and safety.
Cost-effectiveness -	• Ensure cost-effective use of funds.
achieve a cost-effective,	• Maintain gravity-driven system.
juny operational system	• Implement regular inspection and maintenance program for all facilities.

# C. Environmental Review

In accordance with Sections 15063 and 15082 of the CEQA Guidelines, the San Francisco Planning Department, as lead agency, prepared a Notice of Preparation (NOP) of an EIR and conducted scoping meetings (see Draft PEIR, Appendix A). The NOP was circulated to local, state, and federal agencies and to other interested parties on September 6, 2005, initiating a public comment period that extended through October 24, 2005.

As indicated in the NOP, the Program EIR addresses the full range of environmental impacts of the WSIP. The NOP included a preliminary list of the potential environmental impacts related to the following resource topics: surface water resources; groundwater resources; fisheries and aquatic resources; terrestrial vegetation and wildlife; geology, soils, and seismicity; cultural resources; land use, plans, and policies; recreation; agricultural resources; traffic, transportation,

and circulation; air quality; noise and vibration; public services, utilities, and energy; hazards and public safety; visual quality; socioeconomics; growth-inducement potential and secondary effects of growth; and cumulative effects. The NOP provided a general description of the proposed action, the need for the program and program benefits, the proposed facilities, and the program location.

Pursuant to CEQA Guidelines Section 15083, the San Francisco Planning Department held five public scoping meetings, one each in Sonora, Modesto, Fremont, Palo Alto and San Francisco, between October 5, 2005 and October 19, 2005. The purpose of the meetings was to present the proposed WSIP to the public and receive public input regarding the proposed scope of the Program EIR analysis. Attendees were provided an opportunity to voice comments or concerns regarding potential effects of the WSIP.

A scoping report was prepared to summarize the public scoping process and the comments received in response to the NOP, and the main body of the report is included in Appendix A of the Draft Program EIR. Based on sign-in sheets at each of the meetings, 260 participants attended the scoping meetings, with 75 of those participants providing oral comments. Transcripts of each scoping meeting are included in the full scoping report on file with the San Francisco Planning Department.

The San Francisco Planning Department also held a scoping meeting for resource agencies on Thursday, November 3, 2005 in San Francisco. Representatives from the following agencies attended: U.S. Army Corps of Engineers, San Francisco Bay Regional Water Quality Control Board, California Department of Fish and Game, and U.S. Fish and Wildlife Service. Representatives of the U.S. Environmental Protection Agency and the National Marine Fisheries Service were invited but unable to attend. Additional coordination with public agencies through informal consultation and telephone interviews was conducted throughout the EIR process.

In addition to comments received during scoping meetings, comments on the NOP were received by letter sent via mail, email, or fax (104, including 5 form letters counted once each but submitted multiple times), orally by speakers at the scoping meetings (79), and by phone (187 voicemail messages left with the San Francisco Planning Department). The comments addressed concerns regarding the full range of potential environmental issues as well as program alternatives and the CEQA process.

The San Francisco Planning Department then prepared the Draft Program EIR, which describes the WSIP and the environmental setting for the proposed program, identifies potential impacts, presents mitigation measures for impacts found to be significant or potentially significant, and evaluates program alternatives. It also includes an analysis of three variants to the proposed WSIP, as requested by the SFPUC. The analysis of environmental impacts is divided into three main groups: (1) construction and operational impact of the WSIP facility improvement projects; (2) water supply and system operational impacts of the WSIP; and (3) growth-inducing impacts. In assessing construction and operational impacts of the facility improvement projects, the Program EIR considers impacts of individual projects, the "collective" construction and operational impacts associated with construction and operation of WSIP projects in combination with other past,

present, and future actions with potential for similar impacts on the same resources as those affected by the WSIP. Similarly, in assessing water supply and system operations impacts, the Program EIR includes analysis of cumulative impacts associated with the WSIP water supply and system operations in combination with other past, present, and future actions with potential for impacts on the same resources as those affected by the WSIP.

Each environmental issue presented in this Draft PEIR is analyzed with respect to significance criteria that are based on the San Francisco Planning Department Major Environmental Analysis Division (MEA) guidance regarding the environmental effects to be considered significant. MEA guidance is, in turn, based on CEQA Guidelines Appendix G with some modifications. In cases where potential environmental issues associated with the WSIP are identified but are not clearly addressed by MEA's standard Initial Study checklist, additional impact significance criteria are presented. (Draft EIR, Appendix B.)

The Draft EIR was circulated to local, state, and federal agencies and to interested organizations and individuals for review and comment on June 29, 2007 for a 90-day public review period, which was extended once and closed on October 15, 2007, for a total of 108 days. Six public hearings on the Draft PEIR to accept written or oral comments were held in Sonora, Modesto, Fremont, Palo Alto, and San Francisco (two hearings) between September 5, 2007 and October 11, 2007. During the public review period, the San Francisco Planning Department received approximately 1,500 written comments sent through the mail or by hand-delivery, fax, or email as well as approximately 200 oral comments made at six public hearings. A court reporter was present at each of the public hearings, transcribed the oral comments verbatim, and prepared written transcripts. Appendix J of the PEIR includes a summary of the Draft PEIR notification and public hearing process.

The Comments and Responses ("C&R") document was published on September 30, 2008 and it provides copies of all of the comments received on the Draft PEIR as well as individual responses to those comments. In some cases, the responses to individual comments are presented as master responses, which consist of comprehensive discussions of issues that received numerous comments. In addition, the C&R includes descriptions of changes in the WSIP that were proposed by the SFPUC after publication of the Draft PEIR, and it includes a description and analysis of the Phased WSIP Variant.

The C&R provided additional, updated information and clarification on issues raised by commenters, as well as consultant, SFPUC and Planning Department experts. The Final PEIR incorporates information obtained and produced after the Draft PEIR was completed, and contains additions, clarifications, and modifications, including a description and analysis of the Phased WSIP Variant. The Planning Commission reviewed and considered the Final PEIR and all of the supporting information. The Final PEIR provided augmented and updated information on many issues presented in the Draft PEIR, including (but not limited to) the following topics: revisions to the Hetch Hetchy/Local Simulation Model; additional analysis of the Tuolumne River impacts; changes and clarifications on the Pilarcitos Watershed analysis and impact conclusions; an analysis of the Alameda Creek Fisheries issues, including future potentially occurring steelhead in the Alameda Creek watershed; updated information on the San Joaquin River and the San Francisco Bay Delta; an update to the information provided on climate change

issues; and WSIP facility improvement projects updates. In certifying the Final PEIR, the Planning Commission found that the Final PEIR does not add significant new information to the Draft EIR that would require recirculation of the PEIR under CEQA because the Final PEIR contains no information revealing (1) any new significant environmental impact that would result from the Phased WSIP Variant or from a new mitigation measure proposed to be implemented, (2) any substantial increase in the severity of a previously identified environmental impact, (3) any feasible project alternative or mitigation measure considerably different from others previously analyzed that would clearly lessen the environmental impacts of the Phased WSIP Variant, but that was rejected by the project's proponents, or (4) that the Draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded. This Commission concurs in that determination.

# **D.** Environmental Analysis of the Phased WSIP Variant

The Final PEIR included a description and analysis of the Phased WSIP Variant, as discussed in the C&R, Chapter 13, Section 13.4. The C&R analysis concluded that the potential environmental effects of the Phased WSIP Variant fall within the range of impacts already evaluated in the Draft PEIR for the WSIP and the alternatives. This Variant is similar to the No Purchase Request Increase Alternative analyzed in the Draft EIR. Also relevant are the analyses of the No Program Alternative, the Aggressive Conservation/Water Recycling and Local Groundwater Alternative, and the Modified WSIP Alternative.

The Phased WSIP Variant would have the same impacts associated with proposed facility construction and operation as the WSIP. The 17 facility improvement projects proposed under the WSIP and analyzed in the Program EIR would also be implemented under the Phased WSIP Variant to meet the intent of the water quality, seismic reliability, delivery reliability, and water supply goals of the WSIP.

The Phased WSIP Variant would have impacts associated with its proposed water supply program similar to those described in the Draft PEIR for the alternatives where the wholesale customer purchase requests for 2030 would not be provided by the regional water system. Under those alternatives, the Draft PEIR assumed that the wholesale customers might pursue other types of projects to either reduce demand and/or to supplement the surface water supplies delivered by the regional water system from the SFPUC watersheds. The potential facility and operations impacts associated with such projects are discussed in the Draft EIR in Section 9.2.2, No Program Alternative (Vol. 4, Chapter 9, pp. 9-34 to 9-37), Section 9.2.3, No Purchase Request Increase Alternative (Vol. 4, Chapter 9, pp. 9-40 to 9-45), and Section 9.2.4, Aggressive Conservation/Water Recycling and Local Groundwater Alternative (Vol. 4, Chapter 9, pp. 9-55 to 9-57).

Similar to the Modified WSIP Alternative and the Aggressive Conservation/Water Recycling and Local Groundwater Alternative, the Phased WSIP Variant, which envisions developing additional local conservation, recycled water and groundwater projects, could result in construction and operation of additional recycled water and groundwater facilities in the wholesale customer service areas; thus, collective impacts in the Bay Division and Peninsula Regions and associated cumulative effects would occur. The types of impacts associated with implementation of the local recycled water and groundwater projects are summarized in Table 13.9 (which is the same as Draft EIR Table 9.12) in C&R Section 13.4 (C&R, page 13-34) and generally relate to construction of new infrastructure, water quality, and groundwater resources, and operational uses of energy and long-term air quality emissions.

In the event local conservation, recycled water or groundwater projects are not sufficient or cannot be developed in time to meet the demands of each of the wholesale customers, SFPUC customers could be expected to pursue alternative water supply sources. The types of impacts associated with water supply acquisition projects are summarized in Table 13.8 (which is the same as Draft EIR Table 9.10) in C&R Section 13.4 (C&R, pages 13-31 to 13-32). Depending on the facilities needed to convey the supplemental supplies to the wholesale customer service areas, the construction and operation of such facilities could result in a full range of construction and operational impacts similar to those described in Draft EIR Chapter 4 for the WSIP facility improvement projects in the South Bay and Peninsula areas (such as traffic, air quality, noise, energy use, waste disposal, and vibration). In general, certain types of impacts are common to water supply transfers/acquisition and include: the cessation of water application to lands irrigated by the water being transferred; changes related to flows, fisheries, and water quality; and impacts caused by the use of existing or the construction of new infrastructure. If water is transferred from agricultural customers, without implementation of agricultural conservation measures, the transfer can result in the conversion of agricultural land to nonagricultural land. Beneficial environmental effects (related to retiring drainage-impaired lands, reducing the application of pesticides, etc.) can also occur. The need for new facilities and/or changes in the operations of existing facilities depend on the source of supply (e.g., the Tuolumne River through transfers with TID and MID, water-rights holders north of the Delta, in the Delta, or south of the Delta), the quantity of supply, the means of conveyance, and any additional storage requirements. Construction or expansion of interties or connecting pipelines could be required, potentially resulting in impacts similar to those described for the WSIP pipeline projects.

If desalination technologies were used to supplement potable water supplies, implementation of a desalination project to augment wholesale customer water supplies would result in the full range of construction impacts at the proposed facility location (such as traffic, air quality, noise, and vibration) as well as operational impacts related to aquatic resources, water quality, energy consumption, air quality, visual resources, land use and planning, traffic, and greenhouse gas emissions. The programmatic impacts of construction and operation of a desalination facility are described in the Draft EIR under WSIP Variant 2, Regional Desalination for Drought (Draft EIR, Chapter 8, pp. 8-24 to 8-32).

The water supply impacts of the Phased WSIP Variant would be similar to those analyzed in Chapter 9 of the Draft PEIR for the No Purchase Request Increase Alternative, and overall the impacts of the Phased WSIP Variant through 2018 would be less than the water supply impacts of the WSIP set out in Chapter 5 of the PEIR. With a few exceptions, the water supply impacts identified as potentially significant and mitigable for the proposed WSIP remain potentially significant and mitigable for the Phased WSIP Variant. Two impacts on the lower Tuolumne River were determined to be less than significant as long as the SFPUC does not increase deliveries to customers above 265 mgd from the watersheds: Impact 5.3.6-4, effects on fishery resources along the Tuolumne River below La Grange Dam; and, Impact 5.3.7-6, impacts on terrestrial biological resources along the Tuolumne River below La Grange Dam. Although the

Phased WSIP Variant is designed to keep deliveries from exceeding an annual average level of about 265 mgd, in the event the SFPUC must deliver more than 265 mgd to its customers from the watersheds, the SFPUC shall implement the mitigation measures associated with these impacts in proportion to the extent of the exceedance. In implementing the Phased WSIP Variant, the need could arise to temporarily increase deliveries from the Tuolumne River and local watersheds over the 265 mgd average annual target levels to meet customer water delivery needs in the near term, because of public health and safety considerations and because it might not be possible to implement all of the local conservation, recycling and groundwater projects and actions in time to meet increasing customer demands. Although avoidance of these impacts on the lower Tuolumne River is not assured, the magnitude, frequency, and duration of the impacts are likely to be less than the originally proposed WSIP. The impact analysis for the Phased WSIP Variant recognized that, between now and 2018, deliveries from the Tuolumne River and local watersheds might increase above the 265 mgd average annual level (to a possible 275 mgd average annual) for up to a few years. By 2018, and perhaps well before, it is expected that local projects would provide sufficient local supply and conservation to bring SFPUC watershed deliveries back down to current levels, average annual 265 mgd.

Under the Phased WSIP Variant, the SFPUC would monitor sales to ensure that sales delivered from the SFPUC watersheds are limited to an average annual of 265 mgd through 2018. The SFPUC would measure and review average annual sales at the close of each fiscal year. Mitigation Measures 5.3.6-4a or 5.3.6-4b, as well as Mitigation Measure 5.3.7-6, will be implemented when the average annual sales exceed 265 mgd from the watersheds. The SFPUC would continue to implement the necessary measure(s) until the average annual SFPUC watershed deliveries are 265 mgd or less. Similar to the WSIP, implementation of Measure 5.3.6-4a is the preferred mitigation approach, and for the Phased WSIP Variant, the amount of conserved water required to reduce the impact to less than significant would be proportional to the amount of increased diversions from the Tuolumne River contributing to exceeding the 265 mgd deliveries restriction.

Four impacts in the Pilarcitos watershed were determined to be potentially significant and mitigable for the originally proposed WSIP, but are considered less than significant for the Phased WSIP Variant through 2018: Surface Water Quality Impact 5.5.3-2, effects on water quality in Pilarcitos Creek between Pilarcitos Reservoir and Stone Dam; Fisheries Impacts 5.5.5-4, effects on fishery resources in Pilarcitos Reservoir, and 5.5.5-5, effects on fishery resources along Pilarcitos Creek below Pilarcitos Reservoir and below Stone Dam; and, Terrestrial Biology Impact 5.5.6-4, impacts on biological resources in Pilarcitos Reservoir. With the Phased WSIP Variant, operations for Pilarcitos Reservoir and releases to Pilarcitos Creek will be similar to existing conditions resulting in a less than significant impact. Thus no mitigation is required. (DEIR pages 5.5.3-5 through 5.5.3-7; C&R pages 13-39 and 13-44; DEIR pages 5.5.6-17 through 5.5.6-22; C&R pages 13-39, 13-44 and 16-80 to 16-82.)

# E. Changes to Facility Improvement Projects in the Alameda Creek Watershed

Since publication of the Draft PEIR in June 2007, SFPUC staff proposed modifications to the project descriptions of two of the facility improvement projects—the Alameda Creek Fishery

Enhancement (SV-1) and Calaveras Dam Replacement (SV-2) projects—and these proposed changes would affect overall system operations.<sup>1</sup> These modifications were made due to the numerous comments received on the potential impacts on future steelhead fishery resources in the Alameda Creek watershed as well as to actions taken in July 2007 by other agencies in the watershed. The SFPUC has incorporated project revisions and protective measures into these two projects to reduce the WSIP's potential to affect habitat conditions for potential future-occurring steelhead in the upper watershed. The project revisions would occur regardless of steelhead presence or absence in the upper watershed, while the protective measures are designed to reduce the WSIP's potential to affect habitat conditions for potential, future-occurring steelhead in the alameda Creek watershed in the event that man-made barriers in Alameda Creek are removed and steelhead gain access to the upper watershed. The following project revisions have been incorporated into the Alameda Creek Fishery Enhancement (SV-1) and Calaveras Dam Replacement (SV-2) projects:

- The Calaveras Dam Replacement project would include facility modifications at the Alameda Creek Diversion Dam (ACDD) to construct a new bypass structure needed to implement bypass stream flows.
- If a structural alternative involving construction of a recapture facility is selected under the Alameda Creek Fishery Enhancement project, the recapture facility would be located at the downstream end of the reach of Alameda Creek between the lower Sunol Valley and the confluence with Arroyo de la Laguna. As an alternative to the recapture facility, the SFPUC may coordinate with other water agencies to develop and implement other means of recapturing fishery enhancement flows consistent with the 1997 California Department of Fish and Game Memorandum of Understanding (CDFG MOU).<sup>2</sup>

The project components designed to provide protective measures for future-occurring steelhead in the upper Alameda Creek watershed will include the following:

- An operational plan to provide minimum stream flows to support steelhead spawning below the ACDD to the confluence with Calaveras Creek when precipitation naturally generates runoff and flow in the creek, including the site-specific studies needed to determine the specific minimum stream flow requirements to support steelhead spawning in this reach of the creek.
- A detailed monitoring plan to survey and document steelhead spawning, subject to review and comment by the appropriate resource agencies.
- Interim minimum flows would be implemented consistent with the 1997 CDFG MOU, with the additional requirement that these flows would be achieved through bypass flows

<sup>&</sup>lt;sup>1</sup> See Memorandum from Michael Carlin to the Planning Department dated July 16, 2008.

<sup>&</sup>lt;sup>2</sup> Under the 1997 CDFG MOU, the SFPUC and CDFG reached agreement on the magnitude and timing of flows to be released from Calaveras Reservoir for the purposes of improving fishery habitat conditions. The MOU includes provisions for the SFPUC to divert flows from Alameda Creek to the SFPUC regional system at a suitable downstream location equivalent to the magnitude and timing of these releases; the MOU refers to this as "recapture."
at the ACDD at all times when flows are available in upper Alameda Creek, rather than through releases at Calaveras Dam, and with the following conditions:

- The SFPUC would provide seasonal flow bypasses at the ACDD and/or flow releases from Calaveras Dam, either (1) without recapture or (2) with recapture at a point approximately at the downstream end of the reach of Alameda Creek between the lower Sunol Valley and the confluence with Arroyo de la Laguna, below critical riffle locations or lower in the creek, between December 1 and June 30 (combined adult and juvenile migration period) in an amount equivalent to the flow release schedule provided in the 1997 CDFG MOU.
- □ As an alternative to the recapture facility, the SFPUC would coordinate with other water agencies to develop and implement other means of recapturing enhancement flows consistent with the 1997 CDFG MOU at a location downstream of the reach of Alameda Creek between the lower Sunol Valley and the confluence with Arroyo de la Laguna.

The C&R also proposed a minor revision to an existing mitigation measure (Mitigation Measure 5.4.5-3a, Minimum Flows for Resident Trout on Alameda Creek) to address other native stream species, including steelhead. The mitigation measures are set forth in the MMRP attached to these Findings as Attachment B. The project description modifications would generally reduce the impacts identified in the Draft PEIR, and, in some cases, would reduce impacts from potentially significant to less than significant (i.e., Impacts 5.4.7-1 and 5.4.7-2). Implementation of the project revisions and protective measures, along with the mitigation measures designed to reduce impacts on resident trout, would be effective in assuring that if in the future steelhead successfully migrate above the BART weir, that the Phased WSIP Variant will not result in a significant adverse effect on steelhead life stages and habitat in Alameda Creek.

## F. Approval Actions

# **1. Planning Commission Actions**

On October 30, 2008, the Planning Commission certified the Final PEIR.

# 2. Public Utilities Commission Actions

The San Francisco Public Utilities Commission is taking the following actions and approvals to implement the Program.

- Adopt these CEQA findings and the attached Mitigation Monitoring and Reporting Program.
- Approve the Water System Improvement Program, the Phased WSIP Variant, as described herein.
- Endorse the selected Water Supply Elements of a new Water Sales Agreement ("Elements") and authorize the General Manager to negotiate such Agreement with the wholesale customers in substantial conformance with the water supply principles.

# 3. San Francisco Board of Supervisors Actions

- The Planning Commission's certification of the EIR may be appealed to the Board of Supervisors. If appealed, the Board of Supervisors will determine whether to uphold the certification or to remand the EIR to the Planning Department for further review.
- The San Francisco Board of Supervisors approves an allocation of bond monies to pay for mitigation measures necessary to implement the Program.

# 4. Other -- Federal, State, and Local Agencies

Implementation of the water supply mitigation measures will involve consultation with/required approvals by other local, state and federal regulatory agencies, including:

- Modesto Irrigation District
- Turlock Irrigation District
- California Water Resources Control Board
- California Department of Fish and Game
- California Department of Health Services (for approval and permits required for drinking water source assessments for groundwater wells)
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- NOAA Fisheries- National Marine Fisheries Service
- U.S. Department of the Interior, National Park Service, Yosemite National Park (for consultation on and sharing data from ongoing studies in the Poopenaut Valley)

To the extent that the identified mitigation measures require consultation or approval by these other agencies, this Commission urges these agencies to assist in implementing, coordinating or approving the mitigation measures, as appropriate to the particular measure.

There will be further project approvals following project-specific environmental review, for each of the individual WSIP projects. The actions described herein contemplate only the approval and implementation of the Program as a whole and not each and every project-specific approval.

# G. Content and Location of Record

The record upon which all findings and determinations related to the Program are based includes the following:

- The draft Water System Improvement Program and the Phased WSIP Variant.
- The PEIR, and all documents referenced in or relied upon by the PEIR. (The references in these findings to the Program EIR or the PEIR include both the Draft EIR and the C&R documents.)

• All information (including written evidence and testimony) provided by City staff to the SFPUC and the Planning Commission relating to the PEIR, the WSIP, the proposed Program, and the alternatives set forth in the PEIR.

• All information (including written evidence and testimony) presented to the SFPUC and the Planning Commission by the environmental consultant and sub-consultants who prepared the PEIR, or incorporated into reports presented to the SFPUC.

• All information (including written evidence and testimony) presented to the City from other public agencies relating to the WSIP, the Program or the PEIR.

• All information (including written evidence and testimony) presented at any public hearing or workshop related to the WSIP, the Program and the PEIR.

• For documentary and information purposes, all locally-adopted land use plans and ordinances, including, without limitation, general plans, specific plans and ordinances, together with environmental review documents, findings, mitigation monitoring programs and other documentation relevant to planned growth in the area.

- The Mitigation Monitoring and Reporting Program.
- All other documents available to the SFPUC and the public, comprising the administrative record pursuant to Public Resources Code Section 21167.6(e).

The Public Utilities Commission has relied on all of the documents listed above in reaching its decision on the Program, even if not every document was formally presented to the Commission. Without exception, any documents set forth above not so presented fall into one of two categories. Many of them reflect prior planning or legislative decisions with which the Commission was aware in approving the Program. Other documents influenced the expert advice provided to Planning Department and PUC staff or consultants, who then provided advice to the Commission. For that reason, such documents form part of the underlying factual basis for the Commission's decisions relating to the adoption of the Program.

The public hearing transcript, a copy of all letters regarding the Draft EIR received during the public review period, the administrative record, and background documentation for the Final PEIR, as well as additional materials concerning approval of the Phased WSIP Variant and adoption of these findings are contained in SFPUC files, located at the SFPUC, 1155 Market Street, San Francisco. **Kelley Capone** is the custodian of records for the SFPUC. CEQA files are also available at the San Francisco Planning Department, 1650 Mission Street, San Francisco. **Linda Avery** is the Custodian of Records for the Planning Department. All files have been available to the SFPUC and the public for review in considering these findings and whether to approve the Program.

## H. Findings About Significant Environmental Impacts And Mitigation Measures

The following Sections II, III and IV set forth the SFPUC's findings about the Final PEIR's determinations regarding significant environmental impacts and the mitigation measures proposed to address them. These findings provide the written analysis and conclusions of the SFPUC regarding the environmental impacts of the Phased WSIP Variant and the mitigation measures included as part of the Final PEIR and adopted by the SFPUC as part of the Phased WSIP Variant. To avoid duplication and redundancy, and because the SFPUC agrees with, and hereby adopts, the conclusions in the Final PEIR, these findings will not repeat the analysis and conclusions in the Final PEIR, but instead incorporates them by reference herein and relies upon them as substantial evidence supporting these findings.

In making these findings, the SFPUC has considered the opinions of SFPUC staff and experts, other agencies and members of the public. The SFPUC finds that the determination of significance thresholds is a judgment decision within the discretion of the City and County of San Francisco; the significance thresholds used in the PEIR are supported by substantial evidence in the record, including the expert opinion of the PEIR preparers and City staff; and the significance thresholds used in the PEIR provide reasonable and appropriate means of assessing the significance of the adverse environmental effects of the Program. Thus, although, as a legal matter, the SFPUC is not bound by the significance determinations in the PEIR (see Pub. Resources Code, § 21082.2, subd. (e)), the SFPUC finds them persuasive and hereby adopts them as its own.

These findings do not attempt to describe the full analysis of each environmental impact contained in the Final PEIR. Instead, a full explanation of these environmental findings and conclusions can be found in the Final PEIR and these findings hereby incorporate by reference the discussion and analysis in the Final PEIR supporting the Final PEIR's determination regarding the Phased WSIP Variant's impacts and mitigation measures designed to address those impacts. In making these findings, the SFPUC ratifies, adopts and incorporates in these findings the determinations and conclusions of the Final PEIR relating to environmental impacts and mitigation measures, except to the extent any such determinations and conclusions are specifically and expressly modified by these findings.

As set forth below, the SFPUC adopts and incorporates all of the mitigation measures set forth in the Final PEIR and the attached MMRP to substantially lessen or avoid the potentially significant and significant impacts of the Phased WSIP Variant. In adopting these mitigation measures, the SFPUC intends to adopt each of the mitigation measures proposed in the Final PEIR for the Phased WSIP Variant. Accordingly, in the event a mitigation measure recommended in the Final EIR has inadvertently been omitted in these findings or the MMRP, such mitigation measure is hereby adopted and incorporated in the findings below by reference. In addition, in the event the language describing a mitigation measure set forth in these findings or the MMRP fails to accurately reflect the mitigation measures in the Final PEIR due to a clerical error, the language of the policies and implementation measures as set forth in these findings reflect the impact and mitigation measure numbers used in these findings reflect the impact and mitigation measure as set forth in these findings reflect the impact and mitigation measure numbers used in these findings reflect the impact and mitigation measure numbers used in the Final PEIR.

In the sections II, III and IV below, the same findings are made for a category of environmental impacts and mitigation measures. Rather than repeat the identical finding dozens of times to

address each and every significant effect and mitigation measure, the initial finding obviates the need for such repetition because in no instance is the SFPUC rejecting the conclusions of the Final PEIR or the mitigation measures recommended in the Final PEIR for the Phased WSIP Variant. There are determinations of significance regarding the originally proposed WSIP and proposed mitigation measures identified in the PEIR that are not applicable to the Phased WSIP Variant, and therefore, those impacts and mitigation measures are not included in these findings.

# II. IMPACTS FOUND TO BE LESS THAN SIGNIFICANT AND THUS REQUIRING NO MITIGATION

## A. WSIP Water Supply Impacts

Under CEQA, no mitigation measures are required for impacts that are less than significant. (Pub. Resources Code, § 21002; CEQA Guidelines, §§ 15126.4, subd. (a)(3), 15091.) The Phased WSIP Variant diverts less water than the proposed WSIP and therefore the water supply impacts are generally the same as or less than those of the originally proposed WSIP. (See C&R section 13.4, pp. 13-29 through 13-44.) Based on substantial evidence in the whole record of this proceeding, the SFPUC finds that implementation of the water supply portion of the Phased WSIP Variant will not result in any significant impacts in the following areas and that these impact areas therefore do not require mitigation:

## 1. Tuolumne River System and Downstream Water Bodies

- Stream Flow (Impacts 5.3.1-1, effects on flow along the river below O'Shaughnessy Dam; 5.3.1-2; effects of flow along Cherry Creek below Cherry Dam; 5.3.1-3; effects of flow along Eleanor Creek below Eleanor Dam; 5.3-1-4; effects of flow along the river below La Grange Dam; 5-.3-1-5, effects of flow along the San Joaquin River and the Sacramento-San Joaquin Delta) (DEIR pages 5.3.1-20 through 5.3.1-39; C&R pages 14.6-8 to 14.6-10, 14.7-12 to 14.7-14, 14.8-2 to 14.8-9 and 16-47);
- **Geomorphology** (**Impacts 5.3.2-1**, effects on sediment transport and channel characteristics between O'Shaughnessy Dam and Don Pedro Reservoir; **5.3.2-2**, effects on sediment transport and channel characteristics below La Grange Dam) (DEIR pages 5.3.2-5 through 5.3.2-7; C&R pages 14.6-10 to 14.6-12 and 14.7-15 to 14.7-16);
- Surface Water Quality (Impacts 5.3.3-1, effects on quality in Hetch Hetchy Reservoir and along the Tuolumne River below O'Shaughnessy Dam; 5.3.3-2, effects on quality in Don Pedro Reservoir and along the Tuolumne River below La Grange Dam; 5.3.3-3, effects on quality along the San Joaquin River and the Sacramento-San Joaquin Delta) (DEIR pages 5.3.3-13 through 5.3.3-20; C&R pages 14.6-12 to 14.6-13, 14.7-10 to 14.7-11, and 14.8-2 to 14.8-16);
- Surface Water Supplies (Impacts 5.3.4-1, effects on Tuolumne River, San Joaquin River, and Stanislaus River water users; 5.3.4-2, effects on Delta water users) (DEIR pages 5.3.4-5 through 5.3.4-11; C&R pages 14.8-9 to 14.8-16, 15-4-217 to 15.4-218, and 16-48);
- Groundwater (Impacts 5.3.5-1, alteration of stream flows along the Tuolumne River, which could affect local groundwater recharge and levels; 5.3.5-2, alteration of stream

flows along the Tuolumne River, which could affect local groundwater quality) (DEIR pages 5.3.5-3 through 5.3.5-5);

- Fisheries (Impacts 5.3.6-1, impacts on effects on fishery resources in Hetch Hetchy Reservoir; 5.3.6-2, effects on fishery resources along the Tuolumne River between Hetch Hetchy Reservoir and Don Pedro Reservoir; 5.3.6-3, effects on fishery resources in Don Pedro Reservoir; 5.3.6-5, fishery resources along the San Joaquin River) (DEIR pages 5.3.6-24 through 5.3.6-28 and 5.3.6-32 through 5.3.6-33; C&R pages 15.4-226 to 15.4-227 and 16-49);
- **Terrestrial Biology** (**Impacts 5.3.7-1**, impacts on riparian habitat and related biological resources in Hetch Hetchy Reservoir and along the bedrock channel portions of the Tuolumne River from O'Shaughnessy Dam to Don Pedro Reservoir; **5.3.7-3**, impacts on biological resources in Lake Eleanor and along Eleanor Creek; **5.3.7-4**, biological resources in Lake Lloyd and along Cherry Creek; **5.3.7-5**, biological resources in Don Pedro Reservoir; **5.3.7-7**, conflicts with the provisions of adopted conservation plans or other approved biological resource plans for the Tuolumne Wild and Scenic River) (DEIR pages 5.3.7-14 through 5.3.7-27);
- Recreational and Visual Resources (Impact 5.3.8-1, effects on reservoir recreation due to changes in water system operations; 5.3.8-2, effects on river recreation due to changes in water system operations; 5.3.8-3, effects on the aesthetic values of the Tuolumne Wild and Scenic River.) (DEIR pages 5.3.8-23 through 5.3.8-35; C&R pages 16-49);
- Energy Resources (Impact 5.3.9-1, Effects on hydropower generation at facilities along Tuolumne River (beneficial).) (DEIR pages 5.3.9-2 through 5.3.9-3);
- **Cumulative Impacts (Impacts 5.7.2-1**, cumulative effects on the Tuolumne River from Hetch Hetchy Reservoir to Don Pedro Reservoir; **5.7.2-2**, cumulative effects on the Tuolumne River from Don Pedro Reservoir to the San Joaquin River; and **5.7.2-3**, cumulative effects on the San Joaquin River, Stanislaus River, and Delta) (DEIR pages 5.7-22 through 5.7-52).

# 2. Alameda Creek Watershed

- Stream Flow (Impacts 5.4.1-1, effects on flow along Calaveras Creek below Calaveras Reservoir; 5.4.1-3, effects in San Antonio Reservoir and along San Antonio Creek; 5.4.1-4, effects on flow along Alameda Creek below the confluence of San Antonio Creek) (DEIR pages 5.4.1-19 through 5.4.1-25 and 5.4.1-35 through 5.4.1-43; C&R pages 16-50 through 16-57);
- **Geomorphology** (**Impacts 5.4.2-1**, effects on channel formation and sediment transport along Calaveras Creek; **5.4.2-2**, effects on channel formation and sediment transport along Alameda Creek downstream of the diversion dam and downstream of the San Antonio Creek confluence; **5.4.2-3**, effects on channel formation and sediment transport along San Antonio Creek downstream of San Antonio Reservoir) (DEIR pages 5.4.2-3 and -4; C&R pages 15.2-29 to 15.2-34, 15.3-15 to 15.3-17 and 16-57 to 16-58);
- Surface Water Quality (Impacts 5.4.3-1, effects on water quality in Calaveras Reservoir; 5.4.3-2, effects on water quality in San Antonio Reservoir; 5.4.3-3, changes in water quality along Calaveras, San Antonio, and Alameda Creeks) (DEIR pages 5.4.3-6 through 5.4.3-12; C&R pages 15.2-34 to 15.2-38 and 16-59 to 16-60);

- **Groundwater Bodies** (**Impact 5.4.4-1**, changes in groundwater levels, flows, quality, and supplies) (DEIR pages 5.4.4-5 through 5.4.4-7; C&R pages15.3-19 and 16-60);
- Fisheries (Impacts 5.4.5-1, effects on fishery resources in Calaveras Reservoir (beneficial); 5.4.5-2, Effects on fishery resources along Calaveras Creek below Calaveras Dam and along Alameda Creek below confluence with Calaveras Creek (beneficial); 5.4.5-4, effects on fishery resources in San Antonio Reservoir (beneficial); 5.4.5-5, effects on fishery resources along San Antonio Creek below San Antonio Reservoir; 5.4.5-6, effects on fishery resources along Alameda Creek below confluence with San Antonio Creek) (DEIR pages 5.4.5-16 through 5.4.5-18 and 5.4.5-21 and 22);
- Terrestrial Biology (Impacts 5.4.6-1 Other Species of Concern/Common Habitats and Species, effects on riparian habitat and related biological resources in Calaveras Reservoir; 5.4.6-2, Sensitive Habitats/Others Species of Concern, effects on riparian habitat and related biological resources along Alameda Creek, from below the diversion dam to the confluence with Calaveras Creek; 5.4.6-3, Sensitive Habitats/Other Species of Concern/Common Habitats and Species, effects on riparian habitat and related biological resources along Calaveras Creek, from Calaveras Reservoir to the confluence with Alameda Creek; 5.4.6-4, Sensitive Habitats/Other Species of Concern/Common Habitats and Species, effects on riparian habitat and related biological resources along Alameda Creek, from the confluence with Calaveras Creek to the confluence with San Antonio Creek; 5.4.6-5, effects on riparian habitat and related biological resources in San Antonio Reservoir; 5.4.6-6, effects on riparian habitat and related biological resources along San Antonio Creek between Turner Dam and the confluence with Alameda Creek; **5.4.6-7**, effects on riparian habitat and related biological resources along Alameda Creek below the confluence with San Antonio Creek; 5.4.6-8, conflicts with the provisions of adopted conservation plans or other approved biological resource plans) (DEIR pages 5.4.6-14 through 5.4.6-26; C&R pages 5.2-13 to 15.2-14, 16-62 to 16-64);
- Recreational and Visual Impact -- (Impacts 5.4.7-1, effects on recreational facilities and/or activities; and 5.4.7-2, visual effects on scenic resources or visual character of water bodies (DEIR, pp. 5.4.7-5 and 5.4.7-6; C&R pp. 13-5 and 16-65 to 16-66). Operations under the Phased WSIP Variant would substantially reduce flows along Alameda Creek in the Sunol Regional Wilderness during winter and early spring months and could affect the recreational experience for hikers. However, protective measures included in the Calaveras Dam Replacement project would include bypass flows at the Alameda Creek Diversion Dam when flow is available, thereby retaining flowing water in the creek and maintain the recreational and visual qualities. On July 16, 2008 the SFPUC revised the project description for the Calaveras Dam Replacement project. The revised project description includes specific operational protocols for seasonal bypass flows at the Alameda Creek Diversion Dam (ACDD) and the Calaveras Dam. Bypassing flow from the ACDD, when such flows are present, results in water in Alameda Creek below the ACDD to the confluence with Calaveras Creek. The addition of the flow releases from ACDD resulted in a determination that this impact is now less than significant for recreation and visual effects.
- **Cumulative Impacts (Impact 5.7.3-1**, cumulative effects on the Alameda Creek watershed). (DEIR, pages 5.7-61 through 5.7-67; C&R, pages 14.9-24 through 14.9-50).

### 3. Peninsula Watersheds

- Stream Flow (Impacts 5.5.1-1, effects on flow along the San Mateo Creek; 5.5.1-2, effects on flow along Pilarcitos Creek) (DEIR pages 5.5.1-12 through 5.5.1-22; C&R pages 16-61 to 16-73);
- **Geomorphology** (**Impact 5.5.2-1**, changes in sediment transport and channel morphology in the Peninsula watershed) (DEIR pages 5.5.2-2 through 5.5.2-4);
- Surface Water Quality (Impacts 5.5.3-1, effects on water quality in Crystal Springs Reservoir, San Andreas Reservoir, and San Mateo Creek; 5.5.3-2, effects on water quality in Pilarcitos Creek between Pilarcitos Reservoir and Stone Dam.) (DEIR pages 5.5.3-5 through 5.5.3-7; C&R pages 13-39 and 13-44). (Note: The PEIR determined Impact 5.5.3-2 to be potentially significant and mitigable for the WSIP, but this impact determination is less than significant for the Phased WSIP Variant through 2018.) With the Phased WSIP Variant, operations for Pilarcitos Reservoir and releases to Pilarcitos Creek will be similar to existing conditions, resulting in a less than significant impact;
- **Groundwater** (**Impact 5.5.4-1**, alteration of stream flows along Pilarcitos Creek, which could affect groundwater levels and water quality) (DEIR pages 5.5.4-1 through 5.5.4-3);
- Fisheries (Impacts 5.5.5-2, effects on fishery resources in San Andreas Reservoir; 5.5.5-3, effects on fishery resources along San Mateo Creek; 5.5.5-4, effects on fishery resources in Pilarcitos Reservoir; 5.5.5-5, effects on fishery resources along Pilarcitos Creek below Pilarcitos Reservoir and below Stone Dam) (DEIR page 5.5.5-7; C&R pages 13-39 and 13-44). (Note: The PEIR determined Impacts 5.5.5-4 and 5.5.5-5 to be potentially significant and mitigable for the WSIP, but these impact determinations are less than significant for the Phased WSIP Variant through 2018.) Proposed operations under the Phased WSIP Variant would be within the same range as existing conditions, resulting in a less than significant impact);
- Terrestrial Biology (Impacts 5.5.6-2, impacts on biological resources in San Andreas Reservoir; 5.5.6-3, impacts on biological resources along San Mateo Creek below Lower Crystal Springs Dam; 5.5.6-4, impacts on biological resources in Pilarcitos Reservoir; 5.5.6-5, impacts on biological resources along Pilarcitos Creek below Pilarcitos Reservoir; 5.5.6-6, impacts on biological resources along Pilarcitos Creek below Stone Dam; 5.5.6-7, conflicts with the provisions of adopted conservation plans or other approved biological resource plans) (DEIR pages 5.5.6-17 through 5.5.6-22; C&R pages 13-39, 13-40, 13-44 and 16-80 to 16-82). (Note: The PEIR determined Impact 5.5.6-4 to be potentially significant and mitigable for special status species for the originally proposed WSIP with implementation of a mitigation measure for the originally proposed WSIP. Since the Phased WSIP Variant does not result in impacts that require mitigation, this impact is less than significant for the Phased WSIP Variant through 2018);
- Recreational and Visual Resources (Impact 5.5.7-1, effects on recreational facilities and/or activities; 5.5.7-2, visual effects on scenic resources or the visual character of water bodies.) (DEIR pages 5.5.7-4 through 5.5.7-6);
- Cumulative Impacts (Impacts 5.7.4-1, cumulative effects on the San Mateo Creek watershed, 5.7.4-2, cumulative effects on the Pilarcitos Creek watershed). (DEIR, pages 5.7-74 through 5.7-84).

## 4. South Westside Groundwater Basin

• **Groundwater** -- **Impacts 5.6-1** -- basin overdraft due to pumping from the Westside Groundwater Basin; **5.6-3** -- seawater intrusion due to decreased groundwater levels in the Westside Groundwater Basin. (DEIR pages 5.6-25 through 5.6-27 and 5.6-29)

## 5. North and South Westside Groundwater Basin

- **Groundwater -- Impacts 5.6-4,** land subsidence due to decreased groundwater levels in the Westside Groundwater Basin if the historical low water levels are exceeded; **Impact 5.6-6**, drinking water contaminants above maximum contaminant levels and adverse effects of adding treated groundwater to the distribution system.) (DEIR pages 5.6-23 through 5.6-27 and 5.6-28 through 5.6-32)
- **Cumulative Impacts (Impacts 5.7.5-1**, cumulative effects on the North Westside Groundwater Basin, **5.7.5-2**, cumulative effects on the South Westside Groundwater Basin). (DEIR pages 5.7-89 to 5.7-91.)

Each of these topics is analyzed and discussed in detail in the record, including in, but not limited to, the Draft PEIR at Chapter 5, Sections 5.3, 5.4, 5.5, and 5.6 and in the C&R Chapter 13, Section 13.4.

## **B.** WSIP Facility Construction and Operation Impacts

Under CEQA, no mitigation measures are required for impacts that are less than significant. (Pub. Resources Code, § 21002; CEQA Guidelines, §§ 15126.4, subd. (a)(3), 15091.) The Phased WSIP Variant will have the same facility construction and operation impacts as the originally proposed WSIP because the Phased WSIP Variant implements all the same projects as the originally proposed WSIP. (See C&R pages 13-17, 13-30 through 33.) Based on substantial evidence in the whole record of this proceeding, the SFPUC finds that implementation of the Facility Construction and Operations portion of the Phased WSIP Variant will not result in any significant impacts in the following areas and that these impact areas therefore do not require mitigation:

- Land Use and Visual Quality (Impact 4.3-3, Temporary construction impacts on scenic vistas or visual character) (DEIR, pp. 4.3-28 to 4.3-29);
- Geology, Soils, and Seismicity (Impacts 4.4-2, Erosion during construction; 4.4-3, Substantial alteration of topography; 4.4-5, Surface fault rupture; 4.4-6, Seismically induced ground shaking; 4.4-7, Seismically induced ground failure, including liquefaction and settlement; 4.4-8 Seismically induced landslides or other slope failures) (DEIR, pp. 4.4-27 to 4.4-29, 4.4-31 to 4.4-41);
- Hydrology and Water Quality (Impacts 4.5-1, Degradation of water bodies as a result of erosion and sedimentation or a hazardous materials release during construction; 4.5-3a, Degradation of water quality due to dewatering discharges; 4.5-3b, Degradation of water quality due to construction-related discharges of treated water; 4.5-5, Degradation of water quality and increased flows due to discharges to surface water during operation) (DEIR, pp. 4.5-21 to 4.5-28, 4.5-31 to 4.5-37, 4.5-41 to 4.5-49);

- **Traffic, Transportation and Circulation** (Impact **4.8-6**, Long-term traffic increases during facility operation) (DEIR, pp. 4.8-28 to 4.8-31);
- Air Quality (Impacts 4.9-4, Air pollutant emissions during project operation; 4.9-5, Odors generated during project operation; 4.9-6, Secondary emissions at power plants; 4.9-7, Conflict with implementation of applicable regional air quality plans addressing criteria air pollutants and state goals for reducing greenhouse gas emissions) (DEIR, pp. 4.9-37 to 4.9-47);
- Noise and Vibration (Impact 4.10-4, Disturbance due to long-term noise increases) (DEIR, pp. 4.10-33 to 4.10-38);
- Hazards (Impacts 4.14-3, Risk of fires during construction; 4.14-4, Gassy conditions in tunnels; 4.14-6, Accidental hazardous materials release from construction equipment; 4.14-7, Increased use of hazardous materials during operation; 4.14-8, Emission or use of hazardous materials within ¼ mile of a school) (DEIR, pp. 4.14-26 to 4.14-31, 4.14-35 to 4.14-42);
- **Collective** (Impacts **4.16-2**, Collective exposure of people or structures to geologic and seismic hazards; **4.16-9**, Collective impacts on utilities and landfill capacity) (DEIR, pp. 4.16-13, 4.16-33);
- Cumulative (Impacts 4.17-1, Cumulative disruption of established communities, changes in existing land use patterns, and impacts on the existing visual character; 4.17-2, Cumulative exposure of people or structures to geologic and seismic hazards; 4.17-3, Cumulative impacts related to the degradation of water quality, alteration of drainage patterns, increased surface runoff, and flooding hazards; 4.17-4, Cumulative loss of sensitive biological resources; 4.17-9, Cumulative impacts related to disruption of utility service or relocation of utilities; 4.17-10, Cumulative effects on recreational resources during construction; 4.17-11, Cumulative conversion of farmland to nonagricultural uses; 4.17-12, Cumulative effects related to hazardous conditions and exposure to or release of hazardous materials; 4.17-13, Cumulative increases in the use of nonrenewable energy resources) (DEIR, pp. 4.17-46 to 4.17-52, 4.17-60 to 4.17-64).

Each of these topics is analyzed and discussed in detail in the record, including in, but not limited to, the Draft PEIR at Chapter 4, Sections 4.3, 4.4, 4.5, 4.8, 4.9, 4.10, 4.14, 4.16, and 4.17.

## III. FINDINGS OF POTENTIALLY SIGNIFICANT IMPACTS THAT CAN BE AVOIDED OR REDUCED TO A LESS-THAN-SIGNIFICANT LEVEL

CEQA requires agencies to adopt mitigation measures that would avoid or substantially lessen a project's identified significant impacts or potential significant impacts if such measures are feasible (unless mitigation to such levels is achieved through adoption of a project alternative). The findings in this Section III and in Section IV concern mitigation measures set forth in the PEIR. These findings discuss mitigation measures as proposed in the PEIR and recommended for adoption by the SFPUC, which can be implemented by the SFPUC. The mitigation measures proposed for adoption in this section are the same as the mitigation measures identified in the Final PEIR for the Phased WSIP Variant. The full explanation of the potentially significant environmental impacts is contained in Chapters 4, 5, and 13 of the Final PEIR. The full text of the mitigation measures is contained in the Final PEIR and in **Attachment B**, the Mitigation Monitoring and Reporting Program.

As explained previously, **Attachment B** contains the Mitigation Monitoring and Reporting Program required by CEQA Section 21081.6 and CEQA Guidelines Section 15091. It provides a table setting forth each mitigation measure listed in the PEIR that is required to reduce or avoid a significant adverse impact. **Attachment B** also specifies the agency responsible for implementation of each measure, establishes monitoring actions and a monitoring schedule.

The SFPUC adopts all of the mitigation measures proposed for the Phased WSIP Variant. The SFPUC will implement all of the water supply and system operations mitigation measures as part of adoption of the Phased WSIP Variant. The SFPUC will implement the programmatic mitigation measures identified to address WSIP facility improvement projects impacts as part of approval and adoption of individual WSIP projects, and these programmatic mitigation measures will be re-evaluated as part of the project-level CEQA review and will be confirmed, refined or replaced with an equivalent measure, as applicable. The SFPUC finds that all the mitigation measures are appropriate and feasible, and that changes or alterations will be required in, or incorporated into, the Program and the projects that mitigate or avoid the significant environmental effect as identified in the PEIR. Based on the analysis contained in the PEIR, other considerations in the record, and the standards of significance, the SFPUC finds that implementation of all of the proposed mitigation measures will reduce potentially significant impacts to a *less-than-significant* level, discussed in this Section III.

## A. WSIP Water Supply and System Operations Impacts

## 1. Tuolumne River System and Downstream Water Bodies

#### Fisheries

**Impact 5.3.6-4** – Fisheries: Effects on fishery resources along the Tuolumne River below La Grange Dam in the event diversions from the Tuolumne River substantially increase over existing conditions. (DEIR, pp. 5.3.6-28 to 5.3.6-32; C&R pp. 14.7-2 to 14.7-7 and 13-43 to 13-44.) Under the Phased WSIP Variant, there may be a short-term increase in deliveries to customers from the watersheds above the existing level of 265 mgd, while the SFPUC and/or BAWSCA and wholesale customers implement the local conservation, recycled water and projects needed to meet demands through 2018. In this interim period, there is a potential for increased diversions from Hetch Hetchy Reservoir to serve SFPUC customers, which in turn would result in flow reductions below La Grange Dam and infrequent water temperature increases, which could adversely affect habitat conditions for juvenile salmonids. Flow changes with the Phased WSIP Variant with the 265 mgd delivery limitation and a small increase in average annual diversions from the Tuolumne River of 2 mgd in order to implement delivery and drought reliability elements of the WSIP through 2018 were determined to be less than significant. However, it is recognized that under the Phased WSIP Variant, deliveries could exceed 265 mgd while the SFPUC and/or wholesale customers implement the local conservation, recycled water and groundwater projects needed to meet increasing demands. Therefore, it was conservatively assumed that total water deliveries above 265 mgd could cause potentially significant impacts on the lower Tuolumne River during these periods until average annual deliveries were reduced to 265 mgd. This impact is less than significant if the annual average

deliveries to customers does not exceed 265 mgd from the watersheds and does not require mitigation.

#### Mitigation Measure 5.3.6-4a, Avoidance of Flow Changes by Reducing Demand for Don Pedro Reservoir Water, <u>OR</u> Mitigation Measure 5.3.6-4b, Fishery Habitat Enhancement

This Commission recognizes that mitigation measure 5.3.6-4a is partially within the jurisdiction of MID and TID. The Commission urges MID and TID to assist in implementing this mitigation measure, and finds that MID and TID can and should participate in implementing this mitigation measure.

This Commission also recognizes that mitigation measure 5.3.6-4b is partially within the jurisdiction of other agencies, including the California Department of Fish and Game. The Commission urges this agency to assist in implementing this mitigation measure, and finds that this agency can and should participate in implementing this mitigation measure if measure 5.3.6-4a is determined to be infeasible.

### **Terrestrial Biological Resources**

Impact 5.3.7-2 – Terrestrial Biology: Impacts on alluvial features that support meadow and riparian habitat along the Tuolumne River from O'Shaughnessy Dam to Don Pedro Reservoir. (DEIR, pp. 5.3.7-21 to 5.3.7-22; C&R pages 14.6-4 to 14.6-7.) The alluvial area supporting the largest wetland complex in this section of the Tuolumne River is the Poopenaut Valley, although smaller alluvial areas downstream, where larger tributaries empty into the Tuolumne River, also support riparian and/or wetland habitats. Delayed snowmelt releases, reductions in flow, and the resulting reduction in groundwater recharge would result in an incremental reduction in the extent and diversity of wetland and riparian habitats, including sensitive wetland and riparian habitats in the Poopenaut Valley. A reduction in wetland and riparian habitat would reduce suitable breeding habitat for key special-status species potentially occurring along this reach (e.g., foothill yellow-legged frog, California red-legged frog, and willow flycatcher), the populations of which are already critically reduced in the Sierra Nevada. A reduction in the extent and diversity of wetland and riparian habitats would reduce habitat quality and extent for animal and plant species of concern. All natural habitats affected by the Program are considered sensitive. The Program could affect a large number of common animal species that depend on sensitive meadows and larger riparian areas for food and cover.

# Mitigation Measure 5.3.7-2, Controlled Releases to Recharge Groundwater in Streamside Meadows and Other Alluvial Deposits.

**Impact 5.3.7-6** – Terrestrial Biology: Impacts on biological resources along the Tuolumne River below La Grange Dam in the event that diversions from Hetch Hetchy Reservoir substantially increase over existing conditions (DEIR, pages 5.3.7-25 to 5.3.7-26; C&R pages 14.4-13 and 13-43 to 13-44). Under the Phased WSIP Variant, there may be a short-term increase in deliveries to customers from the watersheds above the existing level of 265 mgd, while the SFPUC and/or BAWSCA and wholesale customers implement the local conservation, recycled water and projects needed to meet demands through 2018. In this interim period, there is a potential for increased diversions from Hetch Hetchy Reservoir to serve SFPUC customers,

which in turn would result in flow reductions below La Grange Dam. Delayed spring releases and reductions in average and total flow (particularly during and following an extended drought) below La Grange Dam would reduce or eliminate suitable conditions for the recruitment of some riparian species along the river. Because of the known presence of key special-status species and the very limited amount of remaining suitable habitat along this reach of the Tuolumne River, this incremental impact would be potentially significant. Flow changes with the Phased WSIP Variant with the 265 mgd delivery limitation and a small increase in average annual diversions from the Tuolumne River of 2 mgd in order to implement delivery and drought reliability elements of the WSIP through 2018 were determined to be less than significant. However, it is recognized that under the Phased WSIP Variant, deliveries could exceed 265 mgd while the SFPUC and/or wholesale customers implement the local conservation, recycled water and groundwater projects needed to meet increasing demands. Therefore, it was conservatively assumed that deliveries above 265 mgd could cause potentially significant impacts on the lower Tuolumne River during these periods until average annual deliveries were reduced to 265 mgd. Species of concern that would be adversely affected by changes in the extent and quality of suitable riparian habitat include western pond turtle, several bat species, and a wide variety of riparian- and marsh-associated bird species. The populations of common species that depend on riparian habitat could be adversely affected by the alteration of habitat. This impact is less than significant if the annual average deliveries to customers does not exceed 265 mgd from the watersheds, and would not require mitigation.

## Mitigation Measure 5.3.6-4a, Avoidance of Flow Changes by Reducing Demand for Don Pedro Reservoir Water <u>OR</u> Mitigation Measure 5.3.7-6, Lower Tuolumne River Riparian Habitat Enhancement

This Commission recognizes that mitigation measure 5.3.6-4a is the preferred mitigation approach but implementation is partially within the jurisdiction of MID and TID or other water agencies. The Commission urges MID and TID or other water agencies to assist in implementing this mitigation measure, and finds that MID and TID or other water agencies can and should participate in implementing this mitigation measure.

This Commission also recognizes that mitigation measure 5.3.7-6 is partially within the jurisdiction of other agencies, depending on the selected action and could include the California Department of Fish and Game, U. S. Fish and Wildlife Service and U.S. Army Corps of Engineers. The Commission urges these agencies to assist in implementing this mitigation measure, and finds that these agencies can and should participate in implementing this mitigation measure if measure 5.3.6-4a is determined to be infeasible.

## 2. Alameda Creek Watershed

#### Fisheries

**Impact 5.4.5-3** – Fisheries: Effects on fishery resources along Alameda Creek downstream of Alameda Creek Diversion Dam. (DEIR, pp. 5.4.5-18 to 5.4-20 and C&R, pp. 13-37 and 13-38; 13-44; 16-61 and 16-62.) Following implementation of the Calaveras Dam Replacement project (SV-2) as one of the WSIP facility improvement projects, operation of Calaveras Reservoir and the Alameda Creek Diversion Dam would be restored to pre-2002 conditions. A substantial

increase in diversions from Alameda Creek to Calaveras Reservoir would reduce flows in this stretch of the creek, despite proposed bypass flows at the diversion dam. Diversion of most or all flows during late winter and spring months would reduce the ability of resident rainbow trout to spawn and for eggs to incubate; additional monitoring would be needed to determine the effectiveness of proposed bypass flows to sustain trout population. In addition, the increased diversion of flows to the reservoir would prevent fish passage to downstream reaches of the creek, and increase the potential for fish entrainment since there are currently no screens on the diversion dam. If monitoring indicates that resident trout populations are not being sustained, the SFPUC shall either modify the minimum stream flow or implement mitigation measure 5.4.5-3b.

## Mitigation Measure 5.4.5-3a, Minimum Flows for Resident Trout on Alameda Creek Mitigation Measure 5.4.5-3b, Alameda Diversion Dam Diversion Restrictions or Fish Screens

This Commission recognizes that mitigation measures 5.4.5-3a and 5.4.5-3b are partially within the jurisdiction of other agencies, including the California Department of Fish and Game, the California Regional Water Quality Control Board and the U.S. Army Corps of Engineers. The Commission urges these agencies to assist in implementing this mitigation measure, and finds that these agencies can and should participate in implementing this mitigation measure.

## **Terrestrial Biological Resources**

**Impact 5.4.6-1** – Terrestrial Biology: Effects on riparian habitat and related biological resources in Calaveras Reservoir. (DEIR, pp. 5.4.6-14 to 5.4.6-17; C&R pp. 13-37 and 13-38; 13-44.) Increased reservoir storage elevations would result in inundation and permanent loss of seasonal wetlands, seeps, perennial freshwater marsh, and riparian habitat that have established since 2002. Since 2002, foothill yellow-legged frogs have occupied approximately 10,000 linear feet of stream channel along Arroyo Hondo between the maximum reservoir elevation mandated by the Division of Safety of Dams and the spillway elevation. Higher maintained reservoir levels would reduce the length of this high-quality habitat along the creek and adversely affect existing populations of foothill yellow-legged frog.

## Mitigation Measure 5.4.6-1, Compensation for Impacts on Terrestrial Biological Resources

This Commission recognizes that mitigation measure 5.4.6-1 is partially within the jurisdiction of other agencies, including the California Department of Fish and Game, the California Regional Water Quality Control Board, and the U.S. Army Corps of Engineers. The Commission urges these agencies to assist in implementing this mitigation measure, and finds that these agencies can and should participate in implementing this mitigation measure.

**Impact 5.4.6-2** – Terrestrial Biology: Effects on riparian habitat and related biological resources along Alameda Creek, from below the diversion dam to the confluence with Calaveras Creek. (DEIR, pp. 5.4.6.2-18 to 5.4.6-19; C&R pp. 13-37 and 13-38; 13-44; 15.2-12.) A reduction in the frequency, duration, and magnitude of flows below the diversion dam would reduce the total available aquatic breeding habitat and food sources for California red-legged frog and foothill yellow-legged frog populations that currently occupy this reach of Alameda Creek.

## Mitigation Measure 5.4.1-2, Diversion Tunnel Operation Mitigation Measure 5.4.5-3a, Minimum Flows for Resident Trout on Alameda Creek

This Commission recognizes that mitigation measures 5.4.5-3a and 5.4.1-2 are partially within the jurisdiction of other agencies, including the California Department of Fish and Game. The Commission urges these agencies to assist in implementing this mitigation measure, and finds that these agencies can and should participate in implementing this mitigation measure.

**Impact 5.4.6-3** – Terrestrial Biology: Effects on riparian habitat and related biological resources along Calaveras Creek, from Calaveras Reservoir to the confluence with Alameda Creek. (DEIR, pp. 5.4.6-19 to 5.4.6-22; C&R pp. 13-37 and 38; 13-44.) Future outlet work at Calaveras Dam would have the capacity to make higher-volume releases than under existing conditions. Depending on the timing and volume of operational releases, they could adversely affect the reproductive success of special-status amphibian species along this reach (e.g., California red-legged frog and foothill yellow-legged frog).

## Mitigation Measure 5.4.6-3, Operational Procedures for Calaveras Dam Releases

**Impact 5.4.6-4** – Terrestrial Biology: Effects on riparian habitat and related biological resources along Alameda Creek, from the confluence with Calaveras Creek to the confluence with San Antonio Creek. (DEIR, pp. 5.4.6-22 to 5.4.6-23; C&R pp. 13-37 and 13-38; 13-44.) Depending on annual rainfall and localized site conditions along this creek segment, changes in winter and summer flows along this reach could result in both beneficial and adverse impacts on habitat for California red-legged frog and foothill yellow-legged frog populations.

## Mitigation Measure 5.4.6-3, Operational Procedures for Calaveras Dam Releases Mitigation Measure 5.4.5-3a, Minimum Flows for Resident Trout on Alameda Creek

This Commission recognizes that mitigation measures 5.4.6-3 and 5.4.5-3a are partially within the jurisdiction of other agencies, including the California Department of Fish and Game. The Commission urges this agency to assist in implementing this mitigation measure, and finds that this agency can and should participate in implementing this mitigation measure.

## 3. Peninsula Watersheds

## **Terrestrial Biological Resources**

1. **Impact 5.5.6-1** – Terrestrial Biology: Impacts on biological resources in upper and Lower Crystal Springs Reservoirs. (DEIR, pp. 5.5.6-14 to 5.5.6-17; C&R pp. 13-39 to 13-41; 13-44.) Implementation of the Lower Crystal Springs Dam Improvements project (PN-4) would raise average monthly water levels in Crystal Springs Reservoir and result in a short-term reduction in the overall extent of freshwater marsh as the reservoir fills. Proposed changes in operations would maintain maximum reservoir levels during summer for longer periods than under existing conditions, which could affect the composition and structure of riparian habitats. In addition, sensitive upland habitats that are unable to tolerate these longer periods of inundation would be lost. Elevated reservoir levels would inundate existing populations of special-status plant species, including serpentine-associated fountain thistle and Marin western

flax, and their habitat could be permanently lost. The extent of available habitat for San Francisco garter snake and California red-legged frog would be temporarily reduced during reservoir refill, but wetland habitat that would establish at higher elevations could be more extensive. Raised reservoir levels would provide greater opportunities for largemouth bass and other predators to access frogs and snakes. Periodic drawdown during planned maintenance could adversely affect San Francisco garter snake foraging habitat. Changes in wetland habitat due to reservoir refill and proposed operations would adversely affect reptile and bird species of concern, particularly if permanent changes in the composition of wetland vegetation occur. Permanent loss of upland habitat, including upland trees, grassland, and coastal scrub, would result in significant impacts on several bird and mammal species of concern. Serpentine- and grassland-associated plant species unable to tolerate extended periods of inundation would be lost. Due to the extent of area involved, impacts on common habitats and species would be significant.

#### Mitigation Measure 5.5.6-1a, Adaptive Management of Freshwater Marsh and Wetlands at Upper and Lower Crystal Springs Reservoirs

- Mitigation Measure 5.5.6-1b, Compensation for Impacts on Terrestrial Biological Resources
- Mitigation Measure 5.5.6-1c, Compensation for Serpentine Seep-Related Special-Status Plants

This Commission recognizes that mitigation measure5.5.6-1 is partially within the jurisdiction of other agencies, including the California Department of Fish and Game, the California Regional Water Quality Control Board, the U.S. Army Corps of Engineers and possibly the National Marine Fisheries Service. The Commission urges these agencies to assist in implementing this mitigation measure, and finds that these agencies can and should participate in implementing this mitigation measure.

#### 4. North Westside Groundwater Basin

Impact 5.6-1 – Groundwater: Basin overdraft due to pumping from the Westside 1. Groundwater Basin. (DEIR, pp. 5.6-23 to 5.6-24; C&R pp. 13-10; 13-29 and 13-30.) The proposed water supply option would include installation of up to four primary production and deep aquifer production wells in San Francisco to provide a total of 2 mgd of annualized production rate, as implemented through Local Groundwater Projects (part of SF-2). With implementation of the Phased WSIP Variant, production of up to 4 mgd (4,500 afy) under the Local Groundwater Projects (SF-2) and continued nonpotable pumping of 0.5 mgd (560 afy) would be the major groundwater use in the North Westside Groundwater Basin once irrigation pumping is replaced with recycled water at the San Francisco Zoo and Golden Gate Park; thus, the maximum total annual pumping by 2018 is estimated to be 5,060 afy. Based on water years 1987 and 1988, the annual recharge to this basin was estimated at 4,850 afy. However, this analysis was done during the first two-years of an on-going drought and therefore is considered to be a low estimate of groundwater recharge to the North Westside Groundwater Basin relative to average conditions. Estimates of recharge to the basin are being refined as part of ongoing groundwater modeling efforts on behalf of the SFPUC, and this analysis indicates that recharge to the basin could range from about 4,850 afy to 6,950 afy. The total proposed pumping rate of 4.5 mgd (5,060 afy) would be within the range of recharge to the groundwater basin. However, because it exceeds the lower end of the range, and the studies indicating the range have not been completed at this program-level of analysis, potential impacts related to depletion of groundwater resources in the North Westside Groundwater Basin would be considered potentially significant.

## Mitigation Measure 5.6-1, Groundwater Monitoring to Determine Basin Safe Yield

**Impact 5.6-2** – **Surface water**: changes in water levels in Lake Merced and other surface water features, including Pine Lake, due to decreased groundwater levels in the Westside Groundwater Basin. (DEIR, pp. 5.6-27 to 5.6-28; C&R pp. 13-10; 13-29 and 30.) Because the primary production aquifer is not in direct hydraulic connection with the shallow aquifer in the Lake Merced vicinity or with Lake Merced, proposed pumping from the primary production aquifer under Local Groundwater Projects is not expected to have a direct effect on lake levels, but could potentially cause an indirect effect. Shallow groundwater levels could decline due to flow from the shallow aquifer under Lake Merced toward the primary production aquifer in which future production wells would be completed under the proposed program. Therefore, the potential to adversely affect water levels in Lake Merced and other surface water features would be *potentially significant*.

## Mitigation Measure 5.6-1, Groundwater Monitoring to Determine Basin Safe Yield Mitigation Measure 5.6-2, Implementation of a Lake Level Management Plan

**Impact 5.6-3** – **Groundwater**: Seawater intrusion due to decreased groundwater levels in the Westside Groundwater Basin. (DEIR, pp. 5.6-28 to 5.6-29; C&R pp. 13-10; 13-29 and 13-30.) In the North Westside Groundwater Basin, the shallow aquifer is in direct connection with the ocean from approximately Lake Merced to the north. Because the shallow aquifer is in direct connection with the ocean and groundwater pumping would lower groundwater levels, impacts related to the potential to cause seawater intrusion in the North Westside Groundwater Basin would be *potentially significant*.

# Mitigation Measure 5.6-1, Groundwater Monitoring to Determine Basin Safe Yield

## 5. North and South Westside Groundwater Basins

Impact 5.6-5 – Groundwater: Contamination of drinking water due to groundwater • pumping in the Westside Groundwater Basin. (DEIR, pp. 5.6-31 to 5.6-32; C&R pp. 13-10; 13-29 and 30.) During operation, groundwater production wells constructed under the Local and Regional Groundwater Projects could induce migration of chemical or microbiological contamination from sources surrounding the wells, potentially resulting in an exceedance of drinking water standards in the groundwater. However, under the California Department of Public Health Drinking Water Source Assessment Protection (DWSAP) program, the SFPUC would develop a drinking water source assessment. The second step in the DWSAP program is the voluntary development and implementation of a source water protection program. Development of this program is not mandated under the DWSAP program, but protection of water quality is an important component of a complete wellhead protection program for the protection of drinking water quality. Until production well locations are selected and a drinking water source assessment performed, the potential for contamination of a drinking water well cannot be fully evaluated. Therefore, impacts related to potential contamination of a drinking water source are

considered *potentially significant* for the Local and Regional Groundwater Projects (SF-2)

## Mitigation Measure 5.6.5, Drinking Water Source Assessments for Groundwater Wells

### **B.** WSIP Facility Improvement Projects Construction and Operation Impacts

The Phased WSIP Variant will have the same impacts as the originally proposed WSIP because it implements all facility improvement projects as the originally proposed WSIP. (C&R pp. 13-17; 13-30-33.)

### 1. Land Use and Visual Quality

**Impact 4.3-1** – Land Use: Temporary Disruption or Displacement of Existing Land Uses During Construction. Potentially significant land use impacts were identified in association with the following facility improvement projects: SJ-3, BD-1, BD-2, SF-1, SF-2, and SF-3. (DEIR, pp. 4.3-9 to 4.3-20, 6-4 to 6-6, 6-30 to 32, 6-34 to 6-42, 6-44.)

Mitigation Measure 4.8-1a, Traffic Control Plan Measures

Mitigation Measure 4.8-1b, Coordination of Individual Traffic Control Plans

Mitigation Measure 4.9-1a, SJVAPCD Dust Control Measures

Mitigation Measure 4.9-1b, SJVAPCD Exhaust Control Measures

Mitigation Measure 4.9-1c, BAAQMD Dust Control Measures

Mitigation Measure 4.9-1d, BAAQMD Exhaust Control Measures

Mitigation Measure 4.9-2a, Health Risk Screening or Use of Soot Filters

Mitigation Measure 4.9-2b, Vacate SFPUC Land Managers' Residences in Sunol Valley

Mitigation Measure 4.10-1a, Noise Controls

Mitigation Measure 4.10-1b, Vacate SFPUC Caretaker's Residence at Tesla Portal

Mitigation Measure 4.10-2a, Limit Hourly Truck Volumes

Mitigation Measure 4.10-2b, Restrict Truck Operations

Mitigation Measure 4.10-2c, Vacate SFPUC Land Manager's Residence

Mitigation Measure 4.10-3a, Vibration Controls to Prevent Cosmetic or Structural Damage Mitigation Measure 4.10-3b, Limit Vibration Levels at or Below Vibration Perception

Threshold

Mitigation Measure 4.10-3c, Limit Tunnel-Related Detonation to Daylight Hours Mitigation Measure 4.12-1, Coordination with Golf Course/Recreational Facility Managers

**Impact 4.3-4** – Visual Quality: Permanent Adverse Impacts on Scenic Vistas or Visual Character. Potentially significant visual quality impacts were identified in association with the following facility improvement projects: SJ-1, SJ-5, SV-1, SV-4, BD-1, BD-2, PN-2, PN-3, PN-4, SF-1, SF-2, and SF-3. (DEIR, pp. 4.3-29 to 4.3-43, 6-7 to 6-8.)

Mitigation Measure 4.3-4a, Architectural Design Mitigation Measure 4.3-4b, Landscaping Plans Mitigation Measure 4.3-4c, Landscape Screens Mitigation Measure 4.3-4d, Minimize Tree Removal **Impact 4.3-5** – Visual Quality: New Permanent Sources of Light and Glare. Potentially significant glare impacts were identified in association with all of the facility improvement projects. (DEIR, pp. 4.3-43 to 4.3-44, 6-8.)

## Mitigation Measure 4.3-5, Reduce Lighting Effects

## 2. Geology, Soils, and Seismicity

**Impact 4.4-1** – Geology, Soils, and Seismicity: Slope instability during construction. Potentially significant geology, soils, and seismicity impacts were identified in association with the following facility improvement projects: SJ-2, SV-1, SV-2, SV-3, SV-4, SV-5, PN-3, SF-2, and SF-3. (DEIR, pp. 4.4-23 to 4.4-27, 6-4, 6-9.)

## Mitigation Measure 4.4-1, Quantified Landslide Analysis

**Impact 4.4-4** – Geology, Soils and Seismicity: Squeezing Ground and Subsidence During Tunneling. Potentially significant geology, soils and seismicity impacts were identified in association with the following facility improvement projects: SV-4 and BD-1. (DEIR, pp. 4.4-29 to 4.4-31, 6-9.)

## Mitigation Measure 4.4-4, Subsidence Monitoring Program

**Impact 4.4-9** – Geology, Soils and Seismicity: Expansive or Corrosive Soils. Potentially significant geology, soils and seismicity impacts were identified in association with all of the facility improvement projects. (DEIR, pp. 4.4-42 to 4.4-47, 6-4, 6-9.)

## Mitigation Measure 4.4-9, Characterize Extent of Expansive and Corrosive Soil

# 3. Hydrology and Water Quality

**Impact 4.5-2** – Hydrology and Water Quality: Depletion of Groundwater Resources. Potentially significant hydrology and water quality impacts were identified in association with the following facility improvement projects: SV-4. (DEIR, pp. 4.5-28 to 4.5-30, 6-9 to 6-10.)

## Mitigation Measure 4.5-2, Site Specific Groundwater Analysis and Identified Measures

**Impact 4.5-4** – Hydrology and Water Quality: Flooding or water quality impacts associated with impeding or redirecting flood flows. Potentially significant hydrology and water quality impacts were identified in association with the following facility improvement projects: SJ-3, SV-1, SV-4, BD-1, BD-2, and SF-2. (DEIR, pp. 4.5-37 to 4.5-41, 6-10.)

#### Mitigation Measure 4.5-4a, Flood Flow Protection Measures Mitigation Measure 4.5-4b, Site Specific Flooding Analysis and Identified Measures

**Impact 4.5-5** – Hydrology and Water Quality: Degradation of water quality and increased flows due to discharges to surface water during operation. Potentially significant hydrology and water quality impacts were identified in association with the following facility improvement projects: SF-2. (DEIR, pp. 4.5-41 to 4.5-49, 6-10.)

## Mitigation Measure 4.5-5, Stormwater Treatment and Groundwater Monitoring

**Impact 4.5-6** – Hydrology and Water Quality: Degradation of water quality as a result of alteration of drainage patterns or an increase in impervious surfaces. Potentially significant hydrology and water quality impacts were identified in association with the following facility improvement projects: SJ-2. (DEIR, pp. 4.5-49 to 4.5-54, 6-6, 6-10.)

### Mitigation Measure 4.5-6, Appropriate Source Control and Site Design Measures

### 4. Biological Resources

**Impact 4.6-1** – Biological Resources: Impacts on wetlands and aquatic resources. Potentially significant impacts to biological resources were identified in association with the following facility improvements: SJ-1, SJ-2, SJ-3, SJ-5, SV-1, SV-2, SV-3, SV-4, SV-5, BD-1, BD-2, PN-2, PN-4, SF-1, SF-2, and SF-3. (DEIR, pp. 4.6-43 to 4.6-51, 6-4 to 6-6, 6-11 to 21.)

## Mitigation Measure 4.6-1a, Wetlands Assessment Mitigation Measure 4.6-1b, Compensation for Wetlands and Other Biological Resources

**Impact 4.6-2** – Biological Resources: Impacts on Sensitive Habitats, Common Habitats, and Heritage Trees. Potentially significant impacts to biological resources were identified in association with the following facility improvements: SJ-1, SJ-2, SJ-3, SJ-5, SV-1, SV-2, SV-3, SV-4, SV-5, BD-1, BD-2, PN-2, PN-4, SF-1, SF-2, and SF-3. (DEIR, pp. 4.6-52 to 4.6-59, 6-4 to 6-6, 6-12 to 6-13.)

### Mitigation Measure 4.6-1b, Compensation for Wetlands and Other Biological Resources Mitigation Measure 4.6-2, Habitat Restoration/Tree Replacement

**Impact 4.6-3** – Biological Resources: Impacts on key special status species – direct mortality and/or habitat effects. Potentially significant impacts to biological resources were identified in association with the following facility improvements: SJ-1, SJ-2, SJ-3, SJ-5, SV-1, SV-2, SV-3, SV-4, SV-5, BD-1, BD-2, PN-2, and PN-4. (DEIR, pp. 4.6-59 to 4.6-68, 6-4 to 6-6, 6-11 to 6-13.)

#### Mitigation Measure 4.6-1b, Compensation for Wetlands and Other Biological Resources Mitigation Measure 4.6-3a, Protection Measures During Construction for Key Special-Status Species and Other Species of Concern

Mitigation Measure 4.6-3b, Standard Mitigation Measures for Specific Plants and Animals

**Impact 4.6-4** – Biological Resources: Water discharge effects on riparian and/or aquatic resources. Potentially significant impacts to biological resources were identified in association

with the following facility improvements: SJ-3, SV-4, BD-1, and BD-2. (DEIR, pp. 4.6-69 to 4.6-73, 6-13.)

# Mitigation Measure 4.6-4, Pipeline and Water Treatment Plant Treated Water Discharge Restrictions

**Impact 4.6-5** – Biological Resources: Conflicts with adopted conservation plans, or other approved biological resources plans. Potentially significant impacts to biological resources were identified in association with the following facility improvements: SJ-3. (DEIR, pp. 4.6-73 to 4.6-74, 6-11 to 6-13.)

Mitigation Measure 4.6-1a, Wetlands Assessment

Mitigation Measure 4.6-1b, Compensation for Wetlands and Other Biological Resources Mitigation Measure 4.6-2, Habitat Restoration/Tree Replacement

Mitigation Measure 4.6-3a, Protection Measures During Construction for Key Special-Status Species and Other Species of Concern

Mitigation Measure 4.6-3b, Standard Mitigation Measures for Specific Plants and Animals

### 5. Cultural Resources

**Impact 4.7-1** – Cultural Resources: Impacts on paleontological resources. Potentially significant impacts to cultural resources were identified in association with the following facility improvements: SJ-1, SJ-3, SJ-5, SV-1, SV-2, SV-3, SV-4, SV-5, PN-3, SF-1, SF-2, and SF-3. (DEIR, pp. 4.7-47 to 4.7-55, 6-4 to 6-6, 6-22.)

# Mitigation Measure 4.7-1, Suspend Construction Work if Paleontological Resource is Identified

**Impact 4.7-2** – Cultural Resources: Impacts on unknown and known prehistoric and historic archaeological resources. Potentially significant impacts to cultural resources were identified in association with all of the facility improvements. (DEIR, pp. 4.7-55 to 4.7-63, 6-4 to 6-6, 6-22 to 6-26.)

## Mitigation Measure 4.7-2a, Archeological Testing, Monitoring, and Treatment of Human Remains

#### Mitigation Measure 4.7-2b, Accidental Discovery Measures

**Impact 4.7-3** – Cultural Resources: Impacts on the historical significance of a historic district or a contributor to a historic district. Potentially significant impacts to cultural resources were identified in association with the following facility improvements: SJ-1, SJ-3, SV-4, BD-1, BD-2, PN-4, and SF-1. (DEIR, pp. 4.7-69 to 4.7-75, 6-26 to 6-30.)

## Mitigation Measure 4.7-3, Protection of Historic Districts Mitigation Measure 4.7-4a, Alternatives Identification and Resource Relocation Mitigation Measure 4.7-4b, Historical Resources Documentation

Mitigation Measure 4.7-4c, Secretary of the Interior's Standards for Treatment of Historic Properties
Mitigation Measure 4.7-4d, Historic Resources Survey and Redesign
Mitigation Measure 4.7-4e, Historic Resources Protection Plan
Mitigation Measure 4.7-4f, Descentor end Vibertien Menitoring

Mitigation Measure 4.7-4f, Preconstruction Surveys and Vibration Monitoring

**Impact 4.7-4** – Cultural Resources: Impacts on the historical significance of individual facilities resulting from demolition or alteration. Potentially significant impacts to cultural resources were identified in association with the following facility improvements: SJ-1, SJ-3, BD-1, BD-2, and SF-1. (DEIR, pp. 4.7-76 to 4.7-83, 6-4 to 6-6, 6-26 to 6-30.)

Mitigation Measure 4.7-4a, Alternatives Identification and Resource Relocation
Mitigation Measure 4.7-4b, Historical Resources Documentation
Mitigation Measure 4.7-4c, Secretary of the Interior's Standards for Treatment of Historic Properties
Mitigation Measure 4.7-4d, Historic Resources Survey and Redesign
Mitigation Measure 4.7-4e, Historic Resources Protection Plan
Mitigation Measure 4.7-4f, Preconstruction Surveys and Vibration Monitoring

**Impact 4.7-5** – Cultural Resources: Impacts on adjacent historic architectural resources. Potentially significant impacts to cultural resources were identified in association with the following facility improvements: SJ-3, SJ-5, SV-2, SV-4, BD-1, BD-2, PN-2, PN-4, SF-1, and SF-3. (DEIR, pp. 4.7-83 to 4.7-86, 6-4 to 6-6, 6-26 to 6-30.)

Mitigation Measure 4.7-4a, Alternatives Identification and Resource Relocation
Mitigation Measure 4.7-4b, Historical Resources Documentation
Mitigation Measure 4.7-4c, Secretary of the Interior's Standards for Treatment of Historic Properties
Mitigation Measure 4.7-4d, Historic Resources Survey and Redesign
Mitigation Measure 4.7-4e, Historic Resources Protection Plan
Mitigation Measure 4.7-4f, Preconstruction Surveys and Vibration Monitoring

6. Traffic, Transportation, and Circulation

**Impact 4.8-1** – Traffic, Transportation, and Circulation: Temporary reduction in roadway capacity and increased traffic delays. Potentially significant impacts to traffic, transportation, and circulation were identified in association with the following facility improvements: SJ-3, SV-2, BD-1, PN-2, PN-4, SF-1, SF-2, and SF-3. (DEIR, pp. 4.8-10 to 4.8-15, 6-4 to 6-6, 6-30 to 6-31.)

## Mitigation Measure 4.8-1a, Traffic Control Plan Measures Mitigation Measure 4.8-1b, Coordination of Individual Traffic Control Plans

**Impact 4.8-2:** Short-term traffic increases on roadways due to construction related vehicle trips. Potentially significant impacts to traffic, transportation, and circulation were identified in association with the following facility improvements: SJ-1, SJ-2, SJ-3, SJ-5, SV-1, SV-2, SV-3,

SV-4, SV-5, BD-1, BD-2, PN-2, PN-3, PN-4, SF-1, and SF-3. (DEIR, pp. 4.8-15 to 4.8-20, 6-4 to 6-6, 6-30 to 6-32.)

## Mitigation Measure 4.8-1a, Traffic Control Plan Measures Mitigation Measure 4.8-1b, Coordination of Individual Traffic Control Plans

**Impact 4.8-3** – Traffic, Transportation, and Circulation: Impaired access to adjacent roadways and land uses. Potentially significant impacts to traffic, transportation, and circulation were identified in association with the following facility improvements: SJ-3, SV-2, BD-1, BD-2, PN-4, SF-1, SF-2, and SF-3. (DEIR, pp. 4.8-20 to 4.8-24, 6-4 to 6-6, 6-30 to 6-32.)

### Mitigation Measure 4.8-1a, Traffic Control Plan Measures

**Impact 4.8-4** – Traffic, Transportation, and Circulation: Temporary displacement of on-street parking. Potentially significant impacts to traffic, transportation, and circulation were identified in association with the following facility improvements: BD-1, PN-4, SF-1, SF-2, and SF-3. (DEIR, pp. 4.8-24 to 4.8-27. 6-4 to 6-6, 6-30 to 6-32.)

#### Mitigation Measure 4.8-1a, Traffic Control Plan Measures

## Mitigation Measure 4.8-4, Accommodation of Displaced Public Parking Supply for Recreational Visitors

**Impact 4.8-5** – Traffic, Transportation, and Circulation: Increased potential traffic safety hazards during construction. Potentially significant impacts to traffic, transportation, and circulation were identified in association with all of the facility improvements. (DEIR, pp. 4.8-27 to 4.8-28, 6-4 to 6-6, 6-30 to 6-31.)

#### Mitigation Measure 4.8-1a, Traffic Control Plan Measures

## 7. Air Quality

**Impact 4.9-1** – Air Quality: Construction emissions of criteria pollutants. Potentially significant impacts to air quality were identified in association with the following facility improvements: SJ-1, SJ-2, SJ-3, SJ-5, SV-1, SV-2, SV-3, SV-4, SV-5, BD-1, and BD-2. (DEIR, pp. 4.9-21 to 4.9-27, 6-4 to 6-6, 6-34 to 6-37.)

#### Mitigation Measure 4.9-1a, SJVAPCD Dust Control Measures Mitigation Measure 4.9-1b, SJVAPCD Exhaust Control Measure Mitigation Measure 4.9-1c, BAAQMD Dust Control Measures Mitigation Measure 4.9-1d, BAAQMD Exhaust Control Measures

**Impact 4.9-2** – Air Quality: Exposure to diesel particulate matter (DPM) during construction. Potentially significant impacts to air quality were identified in association with the following facility improvements: SV-2, SV-5, and BD-1. (DEIR, pp. 4.9-27 to 4.9-34, 6-37 to 6-38.)

#### Mitigation Measure 4.9-2a, Health Risk Screening or Use of Soot Filters

## Mitigation Measure 4.9-2b, Vacate SFPUC Land Managers' Residences in Sunol Valley

**Impact 4.9-3** – Air Quality: Exposure to emissions (possibly including asbestos) from tunneling. Potentially significant impacts to air quality were identified in association with the following facility improvements: SJ-3, SV-4, BD-1, PN-2, SF-1, SF-2, and SF-3. (DEIR, pp. 4.9-34 to 4.9-36, 6-38.)

### Mitigation Measure 4.9-3, Tunnel Gas Odor Control

### 8. Noise and Vibration

**Impact 4.10-2, Noise and Vibration**: Temporary Noise Disturbance Along Construction Haul Routes. Potentially significant noise impacts were identified in association with the following facility improvement project: SV-4. (DEIR, pp. 4.10-23 to 4.10-26, 6-41 to 6-42.)

### Mitigation Measure 4.10-2c, Vacate SFPUC Land Manager's Residence

**Impact 4.10-3** – Noise and Vibration: Disturbance due to construction related vibration. Potentially significant vibration impacts were identified in association with the following facility improvement project: SV-4. (DEIR, pp. 4.10-27 to 4.10-33, 6-42.)

#### Mitigation Measure 4.10-1a, Noise Controls Mitigation Measure 4.10-3a, Vibration Controls to Prevent Cosmetic or Structural Damage

## 9. Public Services and Utilities

**Impact 4.11-1** – Public Services and Utilities: Potential temporary damage to, or disruption of existing regional or local public utilities. Potentially significant impacts to public services and utilities were identified in association with the following facility improvement projects: SJ-3, SV-1, SV-2, SV-3, SV-4, BD-1, BD-2, PN-2, PN-4, SF-1, SF-2, and SF-3. (DEIR, pp. 4.11-10 to 4.11-15, 6-4 to 6-6, 6-43 to 6-44.)

Mitigation Measure 4.11-1a, Notify Neighbors of Potential Utility Service Disruption
Mitigation Measure 4.11-1b, Locate Utility Lines Prior to Excavation
Mitigation Measure 4.11-1c, Confirmation of Utility Line Information
Mitigation Measure 4.11-1d, Safeguard Employees from Potential Accidents Related to Underground Utilities
Mitigation Measure 4.11-1e, Notify Local Fire Departments
Mitigation Measure 4.11-1f, Emergency Response Plan
Mitigation Measure 4.11-1g, Prompt Reconnection of Utilities
Mitigation Measure 4.11-1h, Coordinate Final Construction Plans with Affected Utilities

**Impact 4.11-2** – Public Services and Utilities: Temporary Solid Waste Effects on Solid Waste Landfill Capacity. Potentially significant impacts to public services and utilities were identified in association with all of the facility improvement projects. (DEIR, pp. 4.11-15 to 4.11-21, 6-44.)

#### Mitigation Measure 4.11-2, Waste Reduction Measures

**Impact 4.11-3** – Public Services and Utilities: Impacts related to compliance with federal, state, and local statutes and regulations related to solid waste. Potentially significant impacts to public services and utilities were identified in association with all of the facility improvement projects. (DEIR, pp. 4.11-22, 6-44.)

### Mitigation Measure 4.11-2, Waste Reduction Measures

**Impact 4.11-4** – Public Services and Utilities: Impacts related to the relocation of utilities. Potentially significant impacts to public services and utilities were identified in association with all of the facility improvement projects. (DEIR, pp. 4.11-22 to 4.11-23, 6-4 to 6-6, 6-43 to 6-44.)

Mitigation Measure 4.11-1a, Notify Neighbors of Potential Utility Service Disruption
Mitigation Measure 4.11-1b, Locate Utility Lines Prior to Excavation
Mitigation Measure 4.11-1c, Confirmation of Utility Line Information
Mitigation Measure 4.11-1d, Safeguard Employees from Potential Accidents Related to Underground Utilities
Mitigation Measure 4.11-1e, Notify Local Fire Departments
Mitigation Measure 4.11-1f, Emergency Response Plan
Mitigation Measure 4.11-1g, Prompt Reconnection of Utilities
Mitigation Measure 4.11-1h, Coordinate Final Construction Plans with Affected Utilities

#### **10. Recreational Resources**

**Impact 4.12-1** – Recreational Resources: Temporary Conflicts with established recreational uses during construction. Potentially significant impacts to recreational resources were identified in association with the following facility improvement projects: SJ-3, SV-4, BD-1, BD-2, PN-2, SF-1, SF-2, and SF-3. (DEIR, pp. 4.12-18 to 4.12-27, 6-4 to 6-6, 6-30 to 6-32, 6-34 to 6-44.)

Mitigation Measure 4.12-1, Coordination with Golf Course/Recreational Facility Managers Mitigation Measure 4.8-1a, Traffic Control Plan Measures

Mitigation Measure 4.8-1b, Coordination of Individual Traffic Control Plans

Mitigation Measure 4.9-1a, SJVAPCD Dust Control Measures

Mitigation Measure 4.9-1b, SJVAPCD Exhaust Control Measure

Mitigation Measure 4.9-2a, Health Risk Screening or Use of Soot Filters

Mitigation Measure 4.9-2b, Vacate SFPUC Land Managers' Residences in Sunol Valley

Mitigation Measure 4.10-1a, Noise Controls

Mitigation Measure 4.10-1b, Vacate SFPUC Caretaker's Residence at Tesla Portal

Mitigation Measure 4.10-2a, Limit Hourly Truck Volumes

Mitigation Measure 4.10-2b, Restrict Truck Operations

Mitigation Measure 4.10-2c, Vacate SFPUC Land Manager's Residence

Mitigation Measure 4.10-3a, Vibration Controls to Prevent Cosmetic or Structural Damage

Mitigation Measure 4.10-3b, Limit Vibration Levels at or Below Vibration Perception Threshold **Impact 4.12-2** – Recreational Resources: Conflicts with established recreational uses due to facility siting and project operation. Potentially significant impacts to recreational resources were identified in association with the following facility improvement projects: SF-1, SF-2, and SF-3. (DEIR, pp. 4.12-27 to 4.12-28, 6-7 to 6-8, 6-44.)

Mitigation Measure 4.3-4a, Architectural Design Mitigation Measure 4.3-4b, Landscaping Plans Mitigation Measure 4.3-4c, Landscape Screens Mitigation Measure 4.3-4d, Minimize Tree Removal Mitigation Measure 4.12-2, Appropriate Siting of Proposed Facilities

## **11. Agricultural Resources**

**Impact 4.13-1** – Agricultural Resources: Temporary conflicts with established agricultural resources. Potentially significant impacts to agricultural resources were identified in association with the following facility improvement projects: SJ-3, SV-1, SV-2, SV-3, and SV-4. (DEIR, pp. 4.13-11 to 4.13-15, 6-4 to 6-6, 6-45.)

## Mitigation Measure 4.13-1a, Supplemental Noticing and Soil Stockpiling Mitigation Measure 4.13-1b, Avoidance or Soil Stockpiling

**Impact 4.13-2** - Agricultural Resources: Conversion of farmlands to non-agricultural uses. Potentially significant impacts to agricultural resources were identified in association with the following facility improvement projects: SJ-3, SV-3, and SV-5. (DEIR, pp. 4.13-15 to 4.13-17, 6-45.)

## Mitigation Measure 4.13-2, Siting Facilities to Avoid Prime Farmland

## 12. Hazards

**Impact 4.14-1** – Hazards: Potential to encounter hazardous materials in soil or groundwater. Potentially significant hazards impacts were identified in association with the following facility improvement projects: BD-1, BD-2, SF-1, SF-2, and SF-3. (DEIR, pp. 4.14-16 to 4.14-22, 6-4 to 6-6, 6-45 to 6-46.)

#### Mitigation Measure 4.14-1a, Site Health and Safety Plan Mitigation Measure 4.14-1b, Materials Disposal Plan Mitigation Measure 4.14-1c, Coordination with Property Owners and Regulatory Agencies

**Impact 4.14-2** – Hazards: Exposure to naturally occurring asbestos. Potentially significant hazards impacts were identified in association with the following facility improvement project: BD-1. (DEIR, pp. 4.14-23 to 4.14-26, 6-46.)

## Mitigation Measure 4.14-2, Health Risk Screening and Airborne Asbestos Monitoring Plan

**Impact 4.14-5** – Hazards: Exposure to hazardous building materials. Potentially significant hazards impacts were identified in association with the following facility improvement projects: SJ-3, SJ-5, SV-2, SV-4, BD-1, PN-2, PN-3, PN-4, SF-1, SF-2, and SF-3. (DEIR, pp. 4.14-31 to 4.14-35, 6-46.)

#### Mitigation Measure 4.14-5, Hazardous Building Materials Surveys and Abatement

### **13. Energy Resources**

**Impact 4.15-1** – Energy Resources: Construction related energy use. Potentially significant energy impacts were identified in association with all of the facility improvement projects. (DEIR, p. 4.15-8, 6-34 to 6-37, 6-47.)

## Mitigation Measure 4.9-1b, SJVAPCD Exhaust Control Measure Mitigation Measure 4.9-1d, BAAQMD Exhaust Control Measures

**Impact 4.15-2** – Energy Resources: Long-term energy use during operation. Potentially significant energy impacts were identified in association with the following facility improvement projects: SJ-1, SJ-2, SJ-3, SJ-5, SV-1, SV-3, SV-5, BD-1, BD-2, PN-2, PN-3, SF-1, SF-2, and SF-3. (DEIR, pp. 4.15-8 to 4.15-14, 6-47.)

### Mitigation Measure 4.15-2, Incorporation of Energy Efficient Measures

### **14. Collective Facilities Impacts**

**Impact 4.16-1a** – Collective temporary and permanent impacts on existing land uses in the vicinity of the proposed facility site. Potentially significant collective land use impacts were identified in association with the following facility improvement project regions: Peninsula Region Improvements. (DEIR, pp. 4.16-8 to 4.16-11, 6-32.)

### Mitigation Measure 4.8.-4, Accommodation of Displaced Public Parking Supply for Recreational Visitors

**Impact 4.16-1b** – Collective temporary and permanent impacts on the visual character the surrounding area. Potentially significant collective visual quality impacts were identified in association with the following facility improvement project regions: San Joaquin Region, Bay Division Region, Peninsula Region, San Francisco Region. (DEIR, pp. 4.16-11 to 4.16-12, 6-7 to 6-8.)

## Mitigation Measure 4.3-4a, Architectural Design Mitigation Measure 4.3-4b, Landscaping Plans Mitigation Measure 4.3-4c, Landscaping Screens

**Impact 4.16-3** – Collective WSIP impacts related to the degradation of surface waters and flooding hazards. Potentially significant collective hydrology and water quality impacts were identified in association with multi-regional effects as well as the following facility improvement

project regions: San Joaquin Region, Sunol Valley Region, Bay Division Region, Peninsula Region and San Francisco Region. (DEIR, pp. 4.16-13 to 4.16-16, 6-10.)

Mitigation Measure 4.5-4a, Flood Flow Protection Measures Mitigation Measure 4.5-4b, Site-Specific Flooding Analysis and Identified Measures Mitigation Measure 4.5-5, Stormwater Treatment and Groundwater Monitoring Mitigation Measure 4.5-6, Appropriate Source Control and Site Design Measure

**Impact 4.16-4** – Collective loss of sensitive biological resources. Potentially significant collective biological resource impacts were identified in association with multi-regional effects as well as the following facility improvement project regions: San Joaquin Region and Bay Division Region. (DEIR, pp. 4.16-16 to 4.16-19, 6-11 to 6-21.)

Mitigation Measures 4.6-1a, Wetlands Assessment

Mitigation Measure 4.6-1b, Compensation for Wetlands and Other Biological Resources Mitigation Measure 4.6-2, Habitat Restoration/Tree Replacement

Mitigation Measure 4.6-3a, Protection Measures During Construction for Key Special-Status Species and Other Species of Concern

Mitigation Measure 4.6-3b, Standard Mitigation Measures for Specific Plants and Animals Mitigation Measure 4.16-4a, Bioregional Habitat Restoration Measures Mitigation Measure 4.16-4b, Coordination of Construction Staging and Access

**Impact 4.16-5** – Collective increase in impacts related to archaeological, paleontological and historical resources. Potentially significant collective cultural resource impacts were identified in association with multi-regional effects as well as the following facility improvement project regions: San Joaquin Region and Bay Division Region. (DEIR, pp. 4.16-19 to 4.16-22, 6-26 to 6-30.)

Mitigation Measure 4.7-4a, Alternatives Identification and Resource Relocation

Mitigation Measure 4.7-4b, Historical Resources Documentation

Mitigation Measure 4.7-4c, Secretary of the Interior's Standards for Treatment of Historic Properties

Mitigation Measure 4.7-4d, Historic Resources Survey and Redesign

Mitigation Measure 4.7-4e, Historic Resources Protection Plan

Mitigation Measure 4.7-4f, Preconstruction Surveys and Vibration Monitoring

**Impact 4.16-6** – Collective traffic increases on local and regional roads. Potentially significant collective traffic impacts were identified in association with the following facility improvement project regions: San Joaquin Region, Sunol Valley Region, Bay Division Region, Peninsula Region and San Francisco Region. (DEIR, pp. 4.16-23 to 4.16-26, 6-30 to 6-33.)

Mitigation Measure 4.8-1a, Traffic Control Plan Measures

Mitigation Measure 4.8-1b, Coordination of Individual Traffic Control Plans Mitigation Measure 4.16-6a, SFPUC WSIP Projects Construction Coordinator Mitigation Measure 4.16-6b, Combined San Joaquin Traffic Control Plan Mitigation Measure 4.16-6c, Combined Sunol Valley Traffic Control Plan **Impact 4.16-7** – Collective increases in construction and/or operational emission in the region. Potentially significant collective air quality impacts were identified in association with the following facility improvement project regions: San Joaquin Region, Sunol Valley Region, and Bay Division Region. (DEIR, pp. 4.16-26 to 4.16-29, 6-37 to 6-39.)

### Mitigation Measure 4.9-2a, Health Risk Screening or Use of Soot Filters

Mitigation Measure 4.9-2b, Vacate SFPUC Land Managers' Residences in Sunol Valley Mitigation Measure 4.16-7a, Dust and Exhaust Control Measures for All WSIP Projects Mitigation Measure 4.16-7b, Health Risk Screening or Use of Soot Filters for All Projects in the San Joaquin and Sunol Valley Regions

# Mitigation Measure 4.16-7c, Vacate SFPUC Land Managers' Residences for All Projects in the Sunol Valley Region

**Impact 4.16-8** – Collective increases in construction-related and operational noise. Potentially significant collective noise impacts were identified in association with the following facility improvement project regions: Sunol Valley Region. (DEIR, pp. 4.16-30 to 4.16-33, 42 to 6-43.)

# Mitigation Measure 4.16-8b, Vacate Land Manager's Residence for All Projects in Sunol Valley Region

**Impact 4.16-9** – Collective impacts on landfill capacity. Potentially significant impacts on landfill capacity were identified in association with all of the facility improvement project regions (Draft PEIR, p. 4.16-33.)

## Mitigation Measure 4.11-2, Waste Reduction Measures

**Impact 4.16-10** – Collective effect on recreational resources during construction. Potentially significant collective recreational resource impacts were identified in association with the following facility improvement project regions: San Joaquin Region, Sunol Valley Region, Bay Division Region, Peninsula Region and San Francisco Region. (DEIR, pp. 4.16-33 to 4.16-34, 6-44.)

### Mitigation Measure 4.12-1, Coordination with Golf Course/Recreational Facility Managers Mitigation Measure 4.12-2, Appropriate Siting of Proposed Facilities

**Impact 4.16-11** – Collective conversion of farmland to nonagricultural uses. Potentially significant collective agricultural resource impacts were identified in association with the following facility improvement project regions: San Joaquin Region and Sunol Valley Region. (DEIR, p. 4.16-34, 6-45.)

#### Mitigation Measure 4.13-2, Siting Facilities to Avoid Prime Farmland

**Impact 4.16-12** – Collective effects related to hazardous conditions and exposure to ore release of hazardous materials. Potentially significant collective hazard impacts were identified in association with the following facility improvement project regions: San Joaquin Region, Sunol

Valley Region, Bay Division Region, Peninsula Region and San Francisco Region. (DEIR, pp. 4.16-35 to 4.16-36, 6-30 to 6-32, 6-46.)

### Mitigation Measure 4.8-1a, Traffic Control Plan Measures Mitigation Measure 4.8-1b, Coordination of Individual Traffic Control Plans Mitigation Measure 4.14-1b, Materials Disposal Plan

**Impact 4.16-13** – Collective increases in the use of nonrenewable energy resources. Potentially significant collective energy resource impacts were identified in association with multi-regional effects as well as the following facility improvement project regions: San Joaquin Region, Sunol Valley Region, Bay Division Region, Peninsula Region, and San Francisco Region. (DEIR, pp. 4.16-36 to 4.16-38, 6-35 to 6-37, 6-47.)

## Mitigation Measure 4.9-1b, SJVAPCD Exhaust Control Measures Mitigation Measure 4.9-1d, BAAQMD Exhaust Control Measures Mitigation Measure 4.15-2, Incorporation of Energy Efficiency Measures

<u>Conservation, Recycling and Groundwater Programs</u>: The Final PEIR also identified possible impacts and mitigation strategies for facilities potentially developed by the wholesale customers to decrease demand for water or to supplement water supply as well. (See C&R pages 13-30 - 34; see also DEIR pp. 9-34 to 9-37; 9-55 to 9-57.) While it is difficult to predict what facilities will be implemented by the wholesale customers, any decisions to approve new projects or programs will undergo further CEQA review and will be approved by the individual customer or by BAWSCA. This Commission recommends that the wholesale customers approve projects that incorporate the mitigation strategies set forth in the Final PEIR, and finds that the wholesale customers can and should adopt applicable mitigation measures and strategies.

# IV. SIGNIFICANT IMPACTS THAT CANNOT BE AVOIDED OR REDUCED TO A LESS THAN SIGNIFICANT LEVEL

Based on substantial evidence in the whole record of these proceedings, the SFPUC finds that, where feasible, changes or alterations have been required, or incorporated into, the Phased WSIP Variant to reduce the significant environmental impacts listed below as identified in the FEIR. The SFPUC finds that the mitigation measures in the PEIR and described below are appropriate, and that changes have been required in, or incorporated into, the Phased WSIP Variant that, to use the language of Public Resources Code section 21002 and CEQA Guidelines section 15091, may substantially lessen, but do not avoid (i.e., reduce to less than significant levels), the potentially significant environmental effect associated with implementation of the individual WSIP facility improvement projects, as described in the Program EIR Chapter 4, and the potentially significant or significant environmental effects associated with implementation of the water supply program, as described in the Program EIR, Chapter 13. The SFPUC adopts all of the mitigation measures proposed in the Program EIR that are relevant to the Phased WSIP Variant and set forth in the MMRP, attached hereto as Attachment B. The SFPUC further finds, however, for the impacts listed below, that no mitigation is currently available to render the effects less than significant. The effects therefore remain significant and unavoidable. Based on the analysis contained within the Program EIR, other considerations in the record, and the

standards of significance, the SFPUC finds that because some aspects of the Phased WSIP Variant would cause potentially significant impacts for which feasible mitigation measures are not available to reduce the impact to a less-than-significant level, the impacts are *significant and unavoidable*.

With respect to the facility improvement projects impacts and those water supply/system operations impacts directly related to one of the WSIP projects, the PEIR provides a programlevel of analysis based on preliminary project information. Due to the lack of site-specific details, the impacts are based on reasonable worst-case assumptions, and the feasibility of many mitigation measures is uncertain. Thus, to be conservative, these impacts are considered *potentially significant and unavoidable*. However, subsequent environmental review and analysis of all WSIP facility improvement projects will occur when more detailed, site-specific information is available, and it may be determined that either the impacts no longer apply or that feasible mitigation measures may be available.

The SFPUC determines that the following significant impacts on the environment, as reflected in the Program EIR, are unavoidable, but under Public Resources Code Section 21081(a)(3) and (b), and CEQA Guidelines 15091(a)(3), 15092(b)(2)(B), and 15093, the SFPUC determines that the impacts are acceptable due to the overriding considerations described in Section VII below. This finding is supported by substantial evidence in the record of this proceeding.

# A. WSIP Water Supply and System Operations Impacts

## 1. Alameda Creek Stream Flow

Impact 5.4.1-2 – Stream Flow: Effects on flow along Alameda Creek below the Alameda Creek Diversion Dam. (DEIR, pp. 5.4.1-25 to 5.4.1-33, C&R page 13-37.) Restoring the levels of the Calaveras Dam reservoir under the Calaveras Dam Replacement Project would increase diversions from Alameda Creek to Calaveras Reservoir, nearly eliminating the low and moderate (1 to 650 cfs) flows in Alameda Creek downstream of the diversion dam that currently occur when the diversion gates are closed, and substantially reducing many higher (greater than 650 cfs) flows. Under the Phased WSIP Variant, flows in Alameda Creek in the reach below the diversion dam to the Calaveras Creek confluence and in the reach below the confluence would be substantially reduced compared to the conditions in existence since December 2001, when the California Department of Water Resources, Division of Safety of Dams imposed storage capacity restrictions on Calaveras Reservoir. This reduction of stream flows and alteration of the stream hydrograph is considered a substantial hydrologic effect and, as a result, this impact is significant and unavoidable. Implementation of Measure 5.4.1-2 would reduce the impact by requiring the SFPUC to close the diversion dam and cease Alameda Creek diversions to Calaveras Reservoir as soon as possible each year, once the reservoir is at desired levels, such that the later-season storm flows not needed to refill Calaveras Reservoir are allowed to flow down Alameda Creek past the diversion dam to the lower reaches. This measure would help reduce the impact, but not to a less than significant level.

# Mitigation Measure 5.4.1-2, Diversion Tunnel Operation

## 2. San Francisco Peninsula Fisheries

**Impact 5.5.5-1** –Fisheries: Effects on fishery resources in Crystal Springs Reservoir (Upper and Lower). (DEIR, pp. 5.5.5-6 to 5.5.5-7; C&R, pp. 15.2-15 and 15.2-16.) Restoring the levels of the reservoir under the Lower Crystal Springs Dam Improvements project (PN-4) could cause a potential loss of stream channel and potential spawning area in San Mateo Creek. However, upstream areas may provide suitable replacement habitat to support the population and this prospect is currently under evaluation in the project-level CEQA review for the Lower Crystal Springs Dam Improvements project. Thus, implementation of Measure 5.5.5-1, Create New Spawning Habitat Above Crystal Springs Reservoir, if feasible, may reduce this impact to less than significant. The project-level CEQA review for the Lower Crystal Springs Dam Improvements project will further evaluate the severity of this impact and the feasibility and efficacy of Measure 5.5.5-1. To be conservative, at the program-level of analysis, this impact is considered *potentially significant and unavoidable*.

### Mitigation Measure 5.5.5-1, Create New Spawning Habitat Above Crystal Springs Reservoir

### **B.** Growth Inducing Impacts

CEQA Guidelines section 15126.2, subdivision (d) requires a discussion of the ways in which projects could be growth inducing, including the ways in which "the proposed project could foster economic and population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment." CEQA also requires a discussion of ways in which a project may remove obstacles to growth, as well as ways in which a project may set a precedent for future growth or encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. PEIR Chapter 7 and Appendix E provide detailed analysis of the growth-inducing effects of the originally proposed WSIP in the Draft PEIR and concluded in the C&R document, page 13-45, that the Phased WSIP Variant would have similar growth-inducing impacts through 2018.

**Impact 7-1** – By removing the lack of a reliable water supply system as one potential obstacle to growth within the SFPUC service area and providing, and assisting in development of, additional water supply sources such as recycled water and groundwater projects as well as promotion of more efficient use of water through conservation measures, the Phased WSIP Variant would have an indirect growth-inducing effect according to the CEQA definition above. The Phased WSIP Variant would support planned growth in the SFPUC service area through 2018, although it appears that some growth would occur irrespective of the Phased WSIP Variant due to increased water delivery efficiencies (e.g., plumbing code changes), conservation, and other water supply sources. Growth would in turn result in indirect effects. In most cases, the effects of planned population and employment growth have been identified and addressed in the EIRs for the general plans and associated area plans and specific plans adopted by the jurisdictions in the service area. Some of the identified indirect effects of growth are significant and unavoidable; others are significant but can be mitigated.

Potentially significant and unavoidable impacts as a result of planned growth in the SFPUC service area have been identified in the following areas: traffic congestion, air pollution, traffic noise, construction noise, increased demand for public schools and other public services, loss of

recreational opportunities and impacts on visual quality resulting from the loss of open space, cumulative effects on over-utilized parks, loss of wildlife habitat and wetlands and impacts on other biological resources, cumulative impacts on cultural resources, increased flooding potential, increased urban runoff pollutants, seismic hazards, induced population growth, failure to meet housing demand for projected population growth, exposure of new development to contaminated soil or groundwater, insufficient water supply, insufficient wastewater disposal capacity, loss of agricultural resources, land use conflicts, conflicts with existing land use plans or policies, and changes in density, scale, and character of an area.

The Phased WSIP Variant would have the same growth-inducement potential through 2018 as the WSIP because the SFPUC (with the cooperation of BAWSCA and the wholesale customers) would provide the additional water supply to meet 2018 purchase requests. The Phased WSIP Variant would support much of the planned growth through 2018 in the jurisdictions served by the SFPUC regional water system. In general, development planned and approved through the general plan process in the SFPUC service area would have environmental impacts. The environmental consequences of this planned growth have been largely addressed in local plans and the associated CEQA review as well as in other, project-specific documentation. In a number of jurisdictions, negative declarations or mitigated negative declarations were prepared for general plans and related planning documents that were found not to have significant environmental effects. (DEIR, pp. 7-1 to 7-78; C&R page 13-45.)

With the exception of the No Purchase Request Alternative, all of the alternatives analyzed in the PEIR contribute in similar ways to growth inducement impacts, since each of the Alternatives provides alternative ways of meeting future water supply demand as one of the WSIP objectives. It is also likely that the water customers would find alternate sources of water to meet future demand under the alternatives that are not effective in meeting demand like the Aggressive Conservation and Recycling Alternative. Under this scenario, the Alternative itself may not be growth-inducing, but growth could still occur. There are no mitigation measures proposed for implementation by the SFPUC that could substantially decrease or eliminate growth-inducing impacts because the SFPUC does not have control over the decisions that each local agency will make with respect to growth in their jurisdictions. Individual agencies' general plans and environmental documents contain actions, limitations and mitigation measures that will be implemented in the individual jurisdictions with local development project or program approvals. These kinds of mitigation measures were identified in the PEIR pages 7-67 through 7-78 and in PEIR Appendix E, Section E.5 and Table E.5.1. This Commission urges the local agencies to implement those mitigation measures already identified as feasible, and finds that these agencies can and should implement those mitigation measures

## **B.** WSIP Facility Construction and Operation Impacts

## **1.** Land Use and Visual Quality

**Impact 4.3-1** – Land Use: Temporary disruption or displacement of existing land uses during construction. Potentially significant and unavoidable land use impacts were identified in

association with the following facility improvement project: SV-4. (DEIR, pp. 4.3-9 to 4.3-16, 6-4 to 6-6, 6-8, 6-30 to 6-32, 6-34 to 6-42.)

Mitigation Measure 4.16-1a, Construction Coordination at Irvington Portal Mitigation Measure 4.8-1a, Traffic Control Plan Measures Mitigation Measure 4.8-1b, Coordination of Individual Traffic Control Plans Mitigation Measure 4.9-1c, BAAQMD Dust Control Measures Mitigation Measure 4.9-1d, BAAQMD Exhaust Control Measures Mitigation Measure 4.9-2a, Health Risk Screening or Use of Soot Filters Mitigation Measure 4.9-2b, Vacate SFPUC Land Managers' Residences in Sunol Valley Mitigation Measure 4.10-1a, Noise Controls Mitigation Measure 4.10-2a, Limit Hourly Truck Volumes Mitigation Measure 4.10-2b, Restrict Truck Operations Mitigation Measure 4.10-2c, Vacate SFPUC Land Manager's Residence Mitigation Measure 4.10-3a, Vibration Controls to Prevent Cosmetic or Structural Damage Mitigation Measure 4.10-3b, Limit Vibration Levels at or Below Vibration Perception Threshold Mitigation Measure 4.10-3c, Limit Tunnel-Related Detonation to Daylight Hours

**Impact 4.3-2** – Land Use: Permanent Displacement or Long-Term Disruption of Existing Land Uses. Potentially significant and unavoidable land use impacts were identified in association with the following facility improvement projects: SJ-3, SV-3, BD-1, PN-2, SF-2, and SF-3. (DEIR, pp. 4.3-20 to 4.3-28, 6-7.)

## Mitigation Measure 4.3-2, Facility Siting Studies

**Impact 4.3-4** – Visual Quality: Permanent Adverse Impacts on Scenic Vistas or Visual Character. Potentially significant and unavoidable visual quality impacts were identified in association with the following facility improvement project: SV-2. (DEIR, pp. 4.3-29 to 4.3-39, 6-7 to 6-8.)

Mitigation Measure 4.3-4a, Architectural Design Mitigation Measure 4.3-4b, Landscaping Plans Mitigation Measure 4.3-4c, Landscape Screens Mitigation Measure 4.3-4d, Minimize Tree Removal

## 2. Cultural Resources

**Impact 4.7-3** – Cultural Resources: Impacts on historical significance of a district or a contributor to a historic district. Potentially significant and unavoidable cultural resource impacts were identified in association with the following facility improvement projects: SV-2 and PN-2. (DEIR, pp. 4.7-69 to 4.7-75, 6-7 to 6-8, 6-26, 6-29 to 6-30.)

Mitigation Measure 4.7-3, Protection of Historic Districts Mitigation Measure 4.7-4a, Alternatives Identification and Resource Relocation Mitigation Measure 4.7-4b, Historical Resources Documentation Mitigation Measure 4.7-4c, Secretary of the Interior's Standards for Treatment of Historic Properties
Mitigation Measure 4.7-4d, Historic Resources Survey and Redesign
Mitigation Measure 4.7-4e, Historic Resources Protection Plan
Mitigation Measure 4.7-4f, Preconstruction Surveys and Vibration Monitoring

**Impact 4.7-4** – Cultural Resources: Impacts on the historical significance of individual facilities resulting from demolition or alteration. Potentially significant and unavoidable cultural resource impacts were identified in association with the following facility improvement projects: SV-2, SV-4, PN-2, and PN-4. (DEIR, pp. 4.7-76 to 4.7-82, 6-4 to 6-6, 6-26 to 6-30.)

Mitigation Measure 4.7-4a, Alternatives Identification and Resource Relocation
Mitigation Measure 4.7-4b, Historical Resources Documentation
Mitigation Measure 4.7-4c, Secretary of the Interior's Standards for Treatment of Historic Properties
Mitigation Measure 4.7-4d, Historic Resources Survey and Redesign
Mitigation Measure 4.7-4e, Historic Resources Protection Plan
Mitigation Measure 4.7-4f, Preconstruction Surveys and Vibration Monitoring

### 3. Noise and Vibration

**Impact 4.10-1** –Noise: Disturbance from temporary construction-related noise increases. Potentially significant and unavoidable noise impacts were identified in association with all of the facility improvement projects. (DEIR, pp. 4.10-10 to 4.10-23, 6-4 to 6-6, 6-39 to 6-41.)

#### Mitigation Measure 4.10-1a, Noise Controls Mitigation Measure 4.10-1b, Vacate SFPUC Caretaker's Residence at Tesla Portal

**Impact 4.10-2** – Noise: Temporary noise disturbance along construction haul routes. Potentially significant and unavoidable noise impacts were identified in association with the following facility improvement projects: SJ-1, SJ-3, SJ-5, BD-1, BD-2, PN-3, SF-1, SF-2, and SF-3. (DEIR, pp. 4.10-23 to 4.10-26, 6-41 to 6-42.)

## Mitigation Measure 4.10-2a, Limit Hourly Truck Volumes Mitigation Measure 4.10-2b, Restrict Truck Operations

**Impact 4.10-3** –Vibration: Disturbance due to construction-related vibration. Potentially significant and unavoidable vibration impacts were identified in association with the following facility improvement projects: SJ-3, SV-3, BD-1, BD-2, SF-1, SF-2, and SF-3. (DEIR, pp. 4.10-27 to 4.10-33, 6-42.)

Mitigation Measure 4.10-3a, Vibration Controls to Prevent Cosmetic or Structural Damage Mitigation Measure 4.10-3b, Limit Vibration Levels at or Below Vibration Perception Threshold

Mitigation Measure 4.10-3c, Limit Tunnel-Related Detonation to Daylight Hours

## 4. Collective Facilities Impacts

**Impact 4.16-1a** – Collective temporary and permanent impacts on existing land uses in the vicinity of the proposed facility site. Potentially significant and unavoidable collective land use impacts were identified in association with the following facility improvement project regions: Bay Division Region. (DEIR, pp. 4.16-8 to 4.16-11, 6-32.)

## Mitigation Measure 4.16-1a, Construction Coordination at Irvington Portal

**Impact 4.16-4** – Collective loss of sensitive biological resources. Potentially significant and unavoidable collective biological resource impacts were identified in association with the following facility improvement project regions: Sunol Valley Region and Peninsula Region. (DEIR, pp. 4.16-16 to 4.16-19, 6-11 to 6-21.)

Mitigation Measure 4.6-1a, Wetlands Assessment

Mitigation Measure 4.6-1b, Compensation for Wetlands and Other Biological Resources Mitigation Measure 4.6-2, Habitat Restoration/Tree Replacement

Mitigation Measure 4.6-3a, Protection Measures During Construction for Key Special-Status Species and Other Species of Concern

Mitigation Measure 4.6-3b, Standard Mitigation Measures for Specific Plants and Animals Mitigation Measure 4.16-4b, Coordination of Construction Staging and Access

**Impact 4.16-5** – Collective increase in impacts related to archaeological, paleontological and historical resources. Potentially significant and unavoidable collective cultural resource impacts were identified in association with the following facility improvement project regions: Sunol Valley Region and Peninsula Region. (DEIR, pp. 4.16-19 to 4.16-22, 6-26 to 6-30.)

Mitigation Measures 4.7-4a, Alternatives Identification and Resource Relocation

Mitigation Measure 4.7-4b, Historical Resources Documentation

Mitigation Measure 4.7-4c, Secretary of the Interior's Standards for Treatment of Historic Properties

Mitigation Measure 4.7-4d, Historic Resources Survey and Redesign

Mitigation Measure 4.7-4e, Historic Resources Protection Plan

Mitigation Measure 4.7-4f, Preconstruction Surveys and Vibration Monitoring

**Impact 4.16-6** – Collective impact from multi-regional effects on traffic, transportation, and circulation were identified as potentially significant and unavoidable due to multiple roadways affected by construction activities within one or more regions and/or when construction vehicles use regional roadways. (DEIR, pp. 4.16-23 and 6-32)

## Mitigation Measure 4.16-6a, SFPUC WSIP Projects Construction Coordinator

**Impact 4.16-7** – Collective impact from multi-regional effects on air quality was identified as potentially significant and unavoidable due to residual contributions to ozone and particulate matter emissions during construction. (DEIR, pp. 4.16-26, 6-34 to 6-38)
#### Mitigation Measure 4.16-7a, Dust and Exhaust Control Measures for All WSIP Projects

**Impact 4.16-8** – Collective increases in construction-related and operational noise. Potentially significant and unavoidable collective noise impacts were identified in association with the following facility improvement project regions: San Joaquin Region, Bay Division Region, Peninsula Region and San Francisco Region. (DEIR, pp. 4.16-30 to 4.16-33, 6-42 to 6-43.)

Mitigation Measure 4.10-1a, Noise Controls

Mitigation Measure 4.10-1b, Vacate SFPUC Caretaker's Residence at Tesla Portal

Mitigation Measure 4.10-2a, Limit Hourly Truck Volumes

Mitigation Measure 4.10-2b, Restrict Truck Operations

Mitigation Measure 4.16-8a, Limiting Hourly Truck Volumes and Restricting Truck Operations on Haul Routes for Multiple WSIP Projects

- Mitigation Measure 4.16-8b, Vacate Land Manager's Residence for All Projects in Sunol Valley Region
  - 5. Cumulative Facilities Impacts

**Impact 4.17-5** – Cumulative increase in impacts on archaeological, paleontological, and historical resources. Potentially significant and unavoidable cumulative cultural resource impacts were identified in association with all of the following facility improvement project regions. (DEIR, pp. 4.17-52 to 4.17-53, 6-26 to 6-30.)

Mitigation Measure 4.7-4a, Alternatives Identification and Resource Relocation
Mitigation Measure 4.7-4b, Historical Resources Documentation
Mitigation Measure 4.7-4c, Secretary of the Interior's Standards for Treatment of Historic Properties
Mitigation Measure 4.7-4d, Historic Resources Survey and Redesign
Mitigation Measure 4.7-4e, Historic Resources Protection Plan
Mitigation Measure 4.7-4f, Preconstruction Surveys and Vibration Monitoring

**Impact 4.17-6** – Cumulative traffic increases on local and regional roads. Potentially significant and unavoidable cumulative traffic impacts were identified in association with all of the following facility improvement project regions. (DEIR, pp. 4.17-54 to 4.17-57, 6-33.)

Mitigation Measure 4.8-1a, Traffic Control Plan Measures

Mitigation Measure 4.8-1b, Coordination of Individual Traffic Control Plans

Mitigation Measure 4.16-6a, SFPUC WSIP Projects Construction Coordinator

Mitigation Measure 4.16-6b, Combined San Joaquin Traffic Control Plan

Mitigation Measure 4.16-6c, Combined Sunol Valley Traffic Control Plan

## Mitigation Measure 4.17-6, SFPUC WSIP Projects Construction Coordinator – Other Agencies

**Impact 4.17-7** – Cumulative increases in construction and/or operational emissions in the region. Potentially significant and unavoidable cumulative air quality impacts were identified in

association with all of the following facility improvement project regions. (DEIR, pp. 4.17-57 to 4.17-59, 6-34 to 6-38.)

Mitigation Measure 4.9-1a, SJVAPCD Dust Control Measures
Mitigation Measure 4.9-1b, SJVAPCD Exhaust Control Measure
Mitigation Measure 4.9-1c, BAAQMD Dust Control Measures
Mitigation Measure 4.9-1d, BAAQMD Exhaust Control Measures
Mitigation Measure 4.11-2, Waste Reduction Measures
Mitigation Measure 4.15-2, Incorporation of Energy Efficient Measures
Mitigation Measure 4.16-7a, Dust and Exhaust Control Measures for All WSIP Projects
Mitigation Measure 4.17-6, SFPUC WSIP Projects Construction Coordinator – Other Agencies

**Impact 4.17-8** – Cumulative increases in construction-related and operational noise. Potentially significant and unavoidable cumulative noise impacts were identified in association with all of the following facility improvement project regions. (DEIR, pp. 4.17-59 to 4.17-60, 6-43.)

#### Mitigation Measure 4.10-2a, Limit Hourly Truck Volumes Mitigation Measure 4.10-2b, Restrict Truck Operations Mitigation Measure 4.17-8, Coordination of Truck Traffic on Local Streets

#### V. EVALUATION OF PROGRAM ALTERNATIVES

This Section describes the Phased WSIP Variant as well as the Program Alternatives and the reasons for approving the Phased WSIP Variant and for rejecting the Alternatives. This Article also outlines the Phased WSIP Variant's purposes and provides a context for understanding the reasons for selecting or rejecting alternatives.

CEQA mandates that an EIR evaluate a reasonable range of alternatives to the Project or the Project location that generally reduce or avoid potentially significant impacts of the Project. CEQA requires that every EIR also evaluate a "No Project" alternative. Alternatives provide a basis of comparison to the Project in terms of their significant impacts and their ability to meet Program objectives. This comparative analysis is used to consider reasonable, potentially feasible options for minimizing environmental consequences of the Project.

#### A. Reasons for Selection of the 2018 Phased Project Variant

The overall goals of the Phased WSIP Variant for the regional water system are to:

- Maintain high-quality water and a gravity-driven system
- Reduce vulnerability to earthquakes
- Increase delivery reliability
- Meet customer water supply needs through 2018
- Enhance sustainability
- Achieve a cost-effective, fully operational system

The SFPUC staff recommended this Variant in order to fully implement all proposed WSIP facility improvement projects to insure that the public health, seismic safety and delivery reliability goals of the WSIP are achieved as soon as possible while phasing implementation of a water supply program to meet projected water purchases through 2030. Deferring a decision on the 2030 water supply element of the WSIP until 2018 allows the SFPUC and its wholesale customers to focus first on implementing additional local recycled water, groundwater and demand management actions while minimizing additional diversions from the Tuolumne River. Under the Phased WSIP Variant, the SFPUC would establish an interim mid-term planning horizon – 2018. By adopting this Variant, the SFPUC is deferring a decision regarding longterm water supply until 2018 in light of then-current information and updated analysis. Because it remains at present unclear whether in 2018 the SFPUC will approve a water supply scenario for 2030 with adverse environmental effects beyond those associated with the Phased WSIP Variant, the Phased WSIP Variant may, in the long run, have a lesser level of environmental effect than the original WSIP. All non-water supply related WSIP goals and level of service objectives would be achieved under this Variant and all individual WSIP facility improvement projects proposed in the original WSIP would be constructed.

It is necessary to implement all of the WSIP facility improvement projects in order to achieve the program goals of the Phased WSIP Variant, as set forth in Section I of these findings, above. The Phased WSIP Variant is superior to the Alternatives in achieving the urgent goals of the WSIP; it allows the SFPUC to meet its water quality, seismic safety and water delivery reliability goals while minimizing effects on the SFPUC watersheds through 2018. The Phased WSIP Variant also focuses efforts on conservation, recycling and groundwater projects before deciding whether to increase deliveries from the watersheds.

As discussed above, impacts from Phased WSIP Variant would be less than those for the original WSIP because (1) the impact on Tuolumne River would be less and likely of shorter duration, and (2) certain impacts in the Pilarcitos watershed and in the Alameda Creek watersheds would not occur with Phased WSIP Variant.

#### **B.** Alternatives Rejected and Reasons for Rejection

The Commission rejects the Alternatives set forth in the Final PEIR and listed below because the Commission finds that there is substantial evidence, including evidence of economic, legal, social, technological, and other considerations described in this Section in addition to those described in Section VII below under CEQA Guidelines 15091(a)(3), that make infeasible such Alternatives. In making these determinations, the Commission is aware that CEQA defines "feasibility" to mean "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, legal, and technological factors." The Commission is also aware that under CEQA case law the concept of "feasibility" encompasses (i) the question of whether a particular alternative promotes the underlying goals and objectives of a project. and (ii) the question of whether an alternative is "desirable" from a policy standpoint to the extent that desirability is based on a reasonable balancing of the relevant economic, environmental, social, legal, and technological factors.

In addition, adoption of the Phased WSIP Variant will reduce many of the water supply impacts associated with increased diversions until at least 2018, and the additional water conservation,

recycling and groundwater projects will have the effect of reducing the projected demand for water to be diverted from the SFPUC watersheds through 2018 and beyond. Some of the alternatives are less effective in reducing environmental impacts associated with water supply than the Phased WSIP Variant and are not environmentally superior to the Phased WSIP Variant because they do not attempt to reduce projected demand for water but would look to development of alternative sources of water, each of which has environmental effects. While some of the other alternatives would avoid or lessen certain WSIP impacts, they would also result in substantial additional impacts that the Phased WSIP Variant would not generate, because these alternatives would require substantial additional major facilities and affect other environmental resources in different geographic locations in addition to those affected by the Phased WSIP Variant. There would thus be no basis under CEQA for selecting a particular alternatives, the No Purchase Request Alternative, the Aggressive Conservation/Water Recycling and Groundwater Alternative, and the Modified WSIP Alternative, as described below. Therefore, the Commission is not rejecting those alternatives in their entirety.

#### **1. No Program Alternative**

Under the No Program Alternative, the SFPUC would implement only those facility improvement projects driven by regulatory requirements or existing agreements with regulatory agencies. The system would meet the water quality goals of the WSIP, but it would fail to meet the seismic and delivery reliability goals and would have limited ability to serve the increase in customer purchase requests through 2018, as both the magnitude and frequency of rationing would increase in response to droughts. The SFPUC would endeavor to meet increasing customer purchase requests by diverting additional Tuolumne River water only when available. It would not secure an additional dry-year supply transfer of Tuolumne River water, implement the Westside Basin groundwater conjunctive-use program, or develop the proposed recycled water and groundwater projects in San Francisco or the wholesale customer service area. The wholesale customers may decide to pursue supplemental supply sources and/or conservation measures to make up for the reduced reliability and the supply shortfall under this alternative, but this would occur outside of and independent of the WSIP. Compared to the Phased WSIP Variant, this alternative would develop less in terms of new water supplies for the regional system and would implement far fewer of the proposed facility improvement projects. (DEIR, pages 9-23 to 9-40.)

Although it appears that fewer facility improvement projects would be implemented under the No Program Alternative and that, as a result, there would be fewer facility construction and operation impacts, it is expected that there would be much more emergency facility repair and replacement projects under this alternative as the system continues to age without proactive improvement. Ultimately, through required repair and replacement efforts, a similar level of facility improvement projects as that proposed under the Phased WSIP Variant might have to be conducted under the No Program Alternative, resulting in much of the same facility impacts as the Phased WSIP Variant; however, these repair and replacement projects would likely occur over a longer period of time and in a less coordinated and comprehensive manner. In addition, implementing system improvements through a piecemeal and largely emergency response approach could result in greater environmental impacts and less mitigation for such impacts;

when projects are implemented under emergency conditions, they often require little or no environmental review (see Pub. Resources Code, § 21080, subds. (b)(2), (b)(4)) and thus could be implemented without the same level of mitigation and mitigation compliance monitoring that would be required for the Phased WSIP Variant. Furthermore, piecemeal implementation could also increase the cumulative effects of multiple, sequential facility repair and replacement projects throughout the system.

The Commission rejects this Alternative because it will not meet the fundamental and most pressing needs of the water system - to improve the seismic safety and reliability of the water system as a means of saving human life and property under a catastrophic earthquake scenario or even a disaster scenario not rising to the level of catastrophic. As the system ages, its reliability decreases and the risk of failure increases. The 167-mile-long system crosses five active earthquake faults. Many of the SFPUC regional water system components are located on or in the immediate vicinity of major earthquake faults. Due to the age of the system, many facilities do not meet modern seismic standards. In order to implement a feasible asset management program in the future that will provide continuous maintenance and repairs to facilities, the regional water system requires redundancy (i.e., backup) of some critical facilities necessary to meeting day-to-day customer water supply needs. Without adequate redundancy of critical facilities, the SFPUC has limited operational flexibility in the event of an emergency or a system failure, as well as constraints on conducting adequate system inspection and maintenance. This Alternative would place the water system at significant risk to seismic hazards, increased facility failures, and increased supply shortages on a day-to-day basis, as well as result in prolonged service disruptions to many customers in the event of an earthquake or other emergency due to inadequate facility redundancy and operational flexibility. This Alternative is rejected as infeasible because it meets none of the vitally important Program objectives.

#### 2. No Purchase Request Increase Alternative

As described in the PEIR, the No Purchase Request Increase Alternative is designed to serve wholesale customers only the amount of water required under the existing Master Water Sales Agreement between the City and County of San Francisco and each of the wholesale customers through 2030. Under the No Purchase Request Increase Alternative, the SFPUC would implement all of the proposed WSIP facility improvement projects. It is expected that the wholesale customers would pursue supplemental supply sources and/or conservation measures to make up the supply shortfall under this alternative, but this would occur outside of and independent of the WSIP. This alternative was included in the alternatives analysis in an effort to avoid or minimize the potential growth-inducing effects and secondary effects of growth associated with providing more water to the regional customers, and the PEIR evaluates the effects of this water supply approach on the SFPUC watersheds.

This Commission acknowledges that the Phased WSIP Variant is similar to this Alternative through the 2018 planning period. However, unlike the No Purchase Request Alternative, the Phased WSIP Variant includes financial incentives to induce the wholesale customers to limit water use and thus minimize increases in diversions from the SFPUC watersheds or other locations, and instead, emphasizes the development of alternative sources of water, including

conservation measures, recycling projects and local groundwater development. This Commission adopts those portions of the No Purchase Request Increase Alternative that are the same as those included within the Phased WSIP Variant and rejects the remaining aspects of the No Purchase Request Increase Alternative as infeasible, as they do not incorporate the mitigation measures, the financial incentives or the re-evaluation of the customer demands in 2018. The Commission finds that the Phased WSIP Variant is similar to this Alternative, but the Variant provides a mechanism to re-evaluate the long term water demands and the need to divert more water from the SFPUC watersheds in 2018. The Phased WSIP Variant also provides that the SFPUC and the customers will develop the most effective and financially feasible methods of providing recycled water and implementing conservation measures as a priority in the next ten years.

To the extent that the No Purchase Request Increase Alternative would fail to increase SFPUC water deliveries through 2030 and not just through 2018, the Commission rejects the alternative as infeasible for that reason alone. It is foreseeable that, within the next 22 years, the population and economic trends within the SFPUC service area will create a substantial demand for new water supplies, even with aggressive conservation efforts. Under the Phased WSIP Variant, the SFPUC would wait until 2018 to determine whether and how to address demands arising between 2018 and 2030. This latter approach is more realistic and responsible from a public policy standpoint, in that it (i) acknowledges the likelihood of increasing customer demands between 2018 and 2030 and (ii) does not essentially force existing SFPUC customers to seek other sources for their needed new long-term water supplies, some of which may be more environmentally damaging than increasing the yield from the SFPUC system from averages of 265 mgd annually to an average of 300 mgd annually. Compared with the No Purchase Increase Alternative, the Phased WSIP Variant delays a decision on supply needs between 2018 and 2030 for a decade in order to give SFPUC customers the chance to maximize their conservation efforts and identify any available, environmentally sustainable source alternatives, while not making any irrevocable decision to deny SFPUC supply increases after 2018. In short, after balancing competing policy considerations and the extent to which the No Purchase Request Increase Alternative would address the SFPUC's long-term water supply objective, the Commission rejects as infeasible within the meaning of CEQA those portions of the No Purchase Request Increase Alternative not included within the Phased WSIP Variant.

#### 3. Aggressive Conservation/Water Recycling and Local Groundwater Alternative

As described in the PEIR, under this alternative, the SFPUC would implement all of the proposed WSIP facility improvement projects, but would endeavor to serve the projected increase in customer purchase requests through 2030 using only additional conservation, water recycling, and local groundwater projects. It does not appear feasible, however, to fully meet the 2030 purchase requests with reasonably foreseeable conservation, recycled water, and groundwater projects within the service area. Therefore, under the Aggressive Conservation/Water Recycling and Local Groundwater Alternative, the SFPUC would have to either: (a) limit future customer purchase deliveries to the level that can be met, short of the 2030 requests (approximately 294 mgd under the most optimistic scenario instead of 300 mgd average annual) and increase the level of rationing to 25 percent or more during droughts, or (b) provide a supplemental supply to make up the delivery shortfall to meet the 300 mgd.

The Phased WSIP Variant incorporates the most important elements of this Alternative through 2018. The Variant establishes financial incentives to induce the wholesale customers to develop conservation, recycled water and groundwater projects and thus limit deliveries from the SFPUC watersheds to an average annual 265 mgd. The Phased WSIP Variant allows the SFPUC to re-evaluate water demands and the efficacy of the conservation, recycling and groundwater programs in 2018. In the Phased WSIP Variant, the SFPUC will implement 10 mgd of conservation, recycling and groundwater projects in San Francisco, and the wholesale customers will develop an additional 10 mgd of conservation, recycling and groundwater projects this Alternative insofar as it makes a water supply decision to attempt to meet demand of 300 mgd through 2030 (although it may be ineffective in meeting that demand and force customers to seek water from other entities); instead, the Phased WSIP Variant focuses the SFPUC and the customers on implementation of conservation, recycling and local groundwater projects before 2018. The SFPUC will then re-evaluate the water supply decision in 2018.

To the extent that the Aggressive Conservation/Water Recycling and Local Groundwater Alternative does not include sufficient supplies to deal with foreseeable customer demand through 2030, the Commission rejects those portions of the Aggressive Conservation/Water Recycling and Local Groundwater Alternative not included within the Phased WSIP Variant as infeasible for that reason alone. Under the Phased WSIP Variant, unlike the Aggressive Conservation/Water Recycling and Local Groundwater Alternative, the SFPUC has not refused to supply the amounts of water predicted to be needed by customers in 2030, but rather has delayed any such decision until 2018. The Phased WSIP Variant thus has the virtues of being more realistic and responsible from a public policy standpoint, in that it (i) acknowledges the likelihood of increasing customer demands between 2018 and 2030 and (ii) does not essentially force existing SFPUC customers to seek other sources for their needed new long-term water supplies, some of which may be more environmentally damaging than increasing the yield from the SFPUC system to the levels predicted to be needed in 2030. Compared with the Aggressive Conservation/Water Recycling and Local Groundwater Alternative, the Phased WSIP Variant delays a decision on supply needs between 2018 and 2030 for a decade in order to give all SFPUC customers the chance to maximize their conservation efforts and identify any available, environmentally sustainable source alternatives, while not making any irrevocable decision to deny SFPUC supply increases after 2018. In short, after balancing competing policy considerations and the extent to which the Aggressive Conservation/Water Recycling and Local Groundwater Alternative would address the SFPUC's long-term water supply objective, the Commission rejects as infeasible within the meaning of CEQA those portions of the Aggressive Conservation/Water Recycling and Local Groundwater Alternative not included within the Phased WSIP Variant.

#### 4. Lower Tuolumne River Diversion Alternative

As described in the PEIR, under the Lower Tuolumne River Diversion Alternative, the SFPUC would implement all of the proposed facility improvement projects and would serve the projected increase in customer purchase requests through 2030 through diversions from the lower Tuolumne River near its confluence with the San Joaquin River, assuming it could reach

agreement with TID and MID. This alternative would include construction and operation of additional conveyance and treatment facilities to divert, transport, treat, and blend the new supply into the regional system. This Alternative represented an alternative source of supply and was evaluated to address impacts on the Tuolumne River and related resources.

This Commission rejects this Alternative as infeasible. The ability to implement this Alternative is uncertain, given the number of agreements and approvals that would be required to construct the diversion and treatment facilities. Because the Phased WSIP Variant proposes to limit sales of water from the SFPUC watersheds to 265 mgd through 2018, the effects on the Tuolumne River would be substantially less since much less water would be diverted from the Tuolumne River watershed. Through 2018, the Phased WSIP Variant will divert an average annual 2 mgd more than SFPUC currently diverts from the Tuolumne River to meet its delivery and drought reliability objectives. There will be no need to construct additional conveyance and treatment facilities to divert, transport, treat, and blend the new supply into the regional system and incur the financial or the environmental costs that such construction will necessitate, as analyzed by the SFPUC in its Report (SFPUC, Water Supply Options, 2007 [Appendix C, *WSIP Alternative Water Supply Option 3*, prepared by SFPUC and Parsons, June 2006).

The analysis in the Draft PEIR concluded that the environmental impacts of this alternative would result in greater impacts on the Tuolumne River resources than the original WSIP or the Phased WSIP Variant. This Alternative would not meet the SFPUC's most basic objective of maintaining a gravity-driven system. This Alternative would require construction of pumping and treatment facilities in order to divert water from the lower Tuolumne River. This Alternative will result in far more impacts than the Phased WSIP Variant on the watershed and its resources, including fisheries, due to the construction and operation of the facilities that must be constructed to implement this Alternative. The Phased WSIP Variant is superior to this Alternative because the Phased WSIP Variant focuses first on developing more conservation, water recycling and groundwater projects before determining to divert more water from the Tuolumne River on a long-term, extended basis. Therefore, there should be no need to construct a diversion structure prior to 2018.

In short, after balancing competing policy considerations and the extent to which the Lower Tuolumne River Diversion Alternative would result in greater environmental impacts and address the SFPUC's long-term water supply objective, the Commission rejects the Lower Tuolumne River Diversion Alternative as infeasible within the meaning of CEQA.

#### **5.** Year-round Desalination at Oceanside Alternative

As described in the PEIR, under the Year-round Desalination at Oceanside Alternative, the SFPUC would implement all of the proposed WSIP facility improvement projects and would construct a 25-mgd desalination plant in San Francisco to serve the projected increase in customer purchase requests through 2030. This alternative would not involve increased levels of diversions from the Tuolumne River. The desalination plant would provide year-round supplies during all hydrologic year types to blend into the regional system at the Sunset Reservoir in San Francisco. Compared to the originally proposed WSIP, this alternative represents an alternative source of supply and was evaluated to address the potential impacts on the Tuolumne River,

Alameda Creek, and Peninsula watersheds, including Pilarcitos Creek, and related resources. (DEIR, pp. 9-66 to 9-74.) Compared to the Phased WSIP Variant, it provides a supply of water that is not yet needed but has significant environmental effects of its own, as discussed below.

This Commission rejects this Alternative as infeasible at this time for the following reasons. Construction and operation of a desalination facility raises unresolved environmental issues, including questions about protecting aquatic resources, water quality and brine disposal issues. The plant would require significant increases in long-term energy use compared to the Phased WSIP Variant. Because in California today, such energy generation typically involves the use of fossil fuels, the energy demands of a desalination facility will exacerbate global climate change by increasing emissions of greenhouse gases (GHGs), in contravention of state policy as embodied in the California Global Warming Solutions Act of 2006, also known as AB 32. This Alternative is also likely to be quite costly for the SFPUC, as analyzed by the SFPUC in its Report (SFPUC, Water Supply Options, 2007 [Appendix C, WSIP Alternative Water Supply Option 3, prepared by SFPUC and Parsons, June 2006). Feasibility of the desalination plant is also uncertain at this time; it would require numerous additional permits and approvals from, among other agencies, the California Department of Health Services, the U.S. Army Corps of Engineers, the RWQCB and the California Coastal Commission. It is unlikely that this facility can be approved and constructed in time to meet demand projections in the next 10 years. Thus the Phased WSIP Variant is not only more feasible from technological and timing perspectives but also will have fewer environmental impacts because of its focus on conservation, recycling and local groundwater projects. Instead, this Commission believes that efforts should be made to implement conservation measures, recycling projects and groundwater projects to meet additional water supply demands in the relative short term; following those efforts, demand for water supply can be reassessed in 2018.

In short, after balancing competing policy considerations and the extent to which the Year-round Desalination at Oceanside Alternative would add a great deal of complexity and uncertainty to the satisfaction of the SFPUC's long-term water supply objective, the Commission rejects the Year-round Desalination at Oceanside Alternative as infeasible within the meaning of CEQA.

#### 6. Regional Desalination for Drought Alternative

As described in the PEIR, under the Regional Desalination for Drought Alternative, the SFPUC would implement all of the proposed WSIP facility improvement projects and would partner with other Bay Area water agencies to construct and operate a regional desalination plant that would provide the SFPUC with supplemental supply during drought years. Compared to the originally proposed WSIP, this alternative represents an alternative source of water supply and was evaluated to address the potential impacts on the Tuolumne River.

This Commission does not fully reject this Alternative because the SFPUC is currently exploring a regional desalination plant for drought, as a partial long-term solution to water supply and demand. The SFPUC is participating in the development of feasibility studies and pilot testing to determine the viability of the regional desalination plant. If found to be feasible, the SFPUC would contribute funds towards environmental review, project construction and operation of the plant. Development of this Alternative would require construction of multiple components,

cooperation agreements with other agencies, and local, state and federal regulatory approvals. There are many unresolved environmental issues, including questions about protecting aquatic resources, water quality and brine disposal issues. The plant would require significant increases in long-term energy use compared to the Phased WSIP Variant. Because in California today, such energy generation typically involves the use of fossil fuels, the energy demands of a desalination facility will exacerbate global climate change by increasing GHG emissions, in contravention of state policy as embodied in AB 32. Depending on the agreements with other participating agencies, this Alternative could also be quite costly for the SFPUC as analyzed by the SFPUC in the Bay Area Regional Desalination Project Pre-feasibility Study, Final Report, prepared by URS Corporation, 2003. While the desalination may provide a partial solution to diverting more water from the SFPUC watersheds, it does not appear to be environmentally superior to the Phased WSIP Variant through 2018. Instead, this Commission believes that a combination of efforts to be made under the Phased WSIP Variant to limit deliveries from the SFPUC watersheds to approximately 265 mgd, average annual, as well as implementation of conservation measures, recycled water projects and groundwater projects to meet additional water supply demands in the relative short term, presents a better approach to water system management. In the near-term, this Commission considers this Alternative to be infeasible to fulfill dry year or drought water supply needs because of the potential financial and environmental costs and the uncertainty regarding the SFPUC's ability to secure all necessary agreements and approvals to implement the Alternative. This Alternative proposes a desalination facility that is in the beginning stages of feasibility analyses, and many issues remain to be resolved.

After balancing competing policy considerations and the extent to which the Regional Desalination for Drought Alternative would add a great deal of complexity and uncertainty to the satisfaction of the SFPUC's long-term water supply objective, the Commission presently rejects the Regional Desalination for Drought Alternative as infeasible within the meaning of CEQA. In doing so, however, the SFPUC is by no means closing the door permanently on eventual participation in a regional desalination facility. As part of its assessment in 2018 as to whether to increase Tuolumne River diversions to meet anticipated 2030 demand in its service area, the SFPUC will assess any progress the region has made towards putting in place, on a timely basis and under acceptable environmental conditions, a facility for desalinating seawater as a source of supplemental water supply during droughts. Any such facility is simply too ill-defined and uncertain at present to be adopted at this time.

#### 7. Modified WSIP Alternative

The Modified WSIP Alternative would implement all of the proposed facility improvement projects, but would modify proposed system operations to minimize environmental effects. This alternative would include as part of its "Project description" the implementation of key mitigation measures identified for the originally proposed WSIP in the PEIR, including acquiring a water transfer of conserved water as a supplemental dry-year source, implementing a minimum instream flow requirement for resident fish in a portion of Alameda Creek, incorporating mitigation measures to address impacts in the Pilarcitos Creek watershed, managing the inundation levels at Crystal Springs Reservoir to preserve upland habitat to the extent possible, and increasing recycled water, conservation, and local groundwater in partnership with wholesale customers. It also requires that any additional water diverted from the upper Tuolumne River must be offset by conservation efforts for water to be released to the lower Tuolumne River. This Alternative proposes to divert an average annual 15 mgd additional water from the Tuolumne River between Hetch Hetchy and Don Pedro Reservoirs compared to existing conditions. This alternative was evaluated to address the impacts identified for the originally proposed WSIP on the Tuolumne River, Alameda Creek, and Peninsula watersheds, including Pilarcitos Creek and Crystal Springs Reservoir, and related resources. (DEIR, pp. 9-78 to 9-84; C&R Section 14.10.)

Water supply sources in both the Modified WSIP Alternative and the Phased WSIP Variant are similar, but differ in a few respects. First, the Modified WSIP Alternative proposes to divert an additional annual average of 15 mgd from the upper Tuolumne River compared to existing conditions through 2030 and thus would result in diverting more water from the Tuolumne River than would occur under the Phased WSIP Variant through 2018. Under the Modified WSIP Alternative, water would be diverted at Hetch Hetchy Reservoir to meet 2030 demand. That diversion would result in reduced inflow to Don Pedro Reservoir, which, under this Alternative, would be offset by reduced outflow from Don Pedro because of conservation measures undertaken by MID or TID (and/or in the service area of another nearby water agency). Water releases from Don Pedro Reservoir to the lower Tuolumne River thus would be the similar to existing conditions under the Modified WSIP Alternative. The Phased WSIP Variant proposes long-term increases in diversions of about 2 mgd, average annual, from the Tuolumne River to meet the Program's reliability and drought rationing objectives and would maintain total deliveries to customers from the watersheds at 265 mgd, average annual. In the short term, the Phased WSIP Variant may result in the need to deliver more than a total of 265 mgd, average annual, to customers for a limited period while local conservation, recycling and groundwater programs are being implemented. Where the Phased WSIP Variant diverts more than an average annual of 265 mgd from the watersheds, mitigation measures will be implemented for the Lower Tuolumne River.

Second, the approach to the dry-year transfer is slightly different for the Modified WSIP Alternative and the Phased WSIP Variant. The Westside Groundwater Basin conjunctive use program would provide a supplemental dry-year water supply source for both the Phased WSIP Variant and the Modified WSIP Alternative. The dry-year water transfer from TID and MID under the Modified WSIP Alternative would be a transfer made only from conserved water (approximately 17.5 mgd average over the design drought). The Phased WSIP Variant does not rule out the possibility of using conserved water only, and includes preferred mitigation measure 5.3.6-4a to be implemented if average annual deliveries of water from the watersheds exceeds 265 mgd, but it does not require that dry-year transfers be conserved water only (approximately 2 mgd average over the design drought). Thus, the substantially reduced size of the dry-year transfer under the Phased WSIP Variant compared to the Modified WSIP Alternative combined with the urgency of undertaking the improvements and increasing reliability through implementation of the dry year supply measures make it difficult to require that no transfer occur without equal and balancing conservation measures in MID/TID service area at this time. Third, the Phased WSIP Variant proposes more conservation, recycling and groundwater programs than the Modified WSIP Alternative. Both the Alternative and the Variant assume 10 mgd of conservation, recycling and groundwater programs in San Francisco. While the Modified WSIP Alternative commits to 5 - 10 mgd of additional conservation, recycling and groundwater programs in the wholesale customer area through 2030, the Phased WSIP Variant requires that a minimum of 10 mgd of additional conservation, recycling and groundwater programs be implemented in the wholesale customer area by 2018.

The Modified WSIP Alternative would result in more impacts on the upper Tuolumne River watershed than the Phased WSIP Alternative, but possibly fewer impacts on the lower Tuolumne River watershed if under the Phased WSIP Variant, average annual deliveries from the watersheds were to exceed 265 mgd in the short-term. The Modified WSIP Alternative would lessen but not entirely eliminate impacts on the lower Tuolumne River, but the impacts would be considered less than significant. (See C&R, Section 14.10, pages 14.10-2 – 14.10-26.) As long as average annual deliveries from the watersheds do not exceed 265 mgd under the Phased WSIP Variant, impacts on the lower Tuolumne River would be considered less than significant; mitigation measures will be implemented any time the SFPUC's average annual deliveries from the watersheds exceed an average annual total of 265 mgd.

In the Alameda Creek watershed, the impacts of the Phased WSIP Variant and the Modified WSIP Alternative are essentially the same. The SFPUC has already incorporated the Alameda Creek bypass flows between the Alameda Creek Diversion Dam and the confluence with Calaveras Creek as protective measures under the Calaveras Dam Replacement project (SV-2), and is adopting now the mitigation measures proposed for the Alameda Creek watershed, so the Modified WSIP Alternative and the Phased WSIP Variant result in similar impacts in the Alameda Creek watershed.

The Modified WSIP Alternative incorporated as part of its "project description" four mitigation measures proposed for operations at Pilarcitos Reservoir and Stone Dam to reduce identified significant impacts of the originally proposed WSIP in the Pilarcitos Creek watershed to a less than significant level. The Phased WSIP Variant would not have any significant impacts in the Pilarcitos watershed through 2018 because operations would be similar to existing conditions. The impacts of the Modified WSIP Alternative and the Phased WSIP Variant are fairly similar; the Phased WSIP Variant avoids the significant impacts, and the Modified WSIP Alternative incorporates mitigation measures to reduce the significant impacts to a less than significant level.

The Final PEIR concluded that impacts of the proposed Crystal Springs Reservoir operations would be potentially significant and unavoidable for both the Modified WSIP Alternative and the Phased WSIP Variant with respect to Impact 5.5.5-1, effects on trout spawning habitat along Laguna and San Mateo Creeks. The impacts would be reduced with implementation of mitigation measures, but impacts would remain potentially significant under both scenarios. Both scenarios assume that the impacts and mitigation measures will be re-evaluated in detail at the project level and refined as part of the environmental review of the Lower Crystal Springs Dam Improvements project (PN-4). Impacts on terrestrial biological resources in upper and lower Crystal Springs Reservoirs are significant and mitigable for both the Phased WSIP Variant

and the Modified WSIP Alternative, although the impacts may be slightly less under the Modified WSIP Alternative.

The Modified WSIP Alternative includes implementation of potentially fewer long-term conservation, water recycling and local groundwater projects within the regional service area than under the Phased WSIP Variant. While construction of these facilities would cause temporary construction disruption and related environmental impacts, long-term implementation of these regional conservation, water recycling, and local groundwater projects would offset impacts of the operational modifications proposed under the Modified WSIP Alternative on the Tuolumne River. Compared to the Phased WSIP Variant, the Modified WSIP Alternative would result in approximately the same impacts on land use, air quality, noise, traffic, and energy in urban environments (expected to be largely mitigable). Both the Phased WSIP Variant and the Modified WSIP Alternative will result in fewer and significantly less severe impacts on biological and fishery resources in natural habitats than the originally proposed WSIP.

The Modified WSIP Alternative was identified as the environmentally superior alternative in the Draft PEIR for the 2030 planning horizon. It would reduce key impacts of the originally proposed WSIP on natural resources along the lower Tuolumne River, in Alameda and Pilarcitos Creeks, and in/around Crystal Springs and Pilarcitos Reservoirs, but it would continue to meet the WSIP's primary goals and objectives. Like the Phased WSIP Variant, this alternative would maximize the use of existing facilities and the largely gravity-driven system without also requiring the construction of additional major facilities called for under many other alternatives, or substantially increasing the energy demand of the system or need for pumping. This Alternative will have more impacts on the upper Tuolumne River, and possible less on the Lower Tuolumne River. It is not entirely clear that the Modified WSIP Alternative is substantially environmentally superior to the Phased WSIP Variant and does not provide a strong basis for selecting this Alternative.

This Commission finds that the Phased WSIP Variant is substantially similar to this Alternative in that it includes essentially the same elements relevant through 2018. The Commission rejects this Alternative insofar as it makes a decision through 2030; instead, the Phased WSIP Variant focuses the SFPUC and the customers on implementation of conservation, recycling and groundwater projects before 2018. The SFPUC will then re-evaluate the water supply decision in 2018. The Modified WSIP Alternative incorporates as part of the program most of the mitigation measures proposed for the original WSIP in the PEIR. Because this Commission is adopting all relevant mitigation measures as part of this Phased WSIP Variant approval, most of the impacts of the two approaches are similar.

The feasibility of this Alternative is not easily confirmed because of its reliance on MID and TID and/or another water supplier for conserved water of 15 mgd average annual, as well as the dry year transfer. If the SFPUC could not procure conserved water from the MID, TID or another water supplier, then no additional diversions from the Tuolumne River could occur under this Alternative. Such an outcome would push the Alternative in the direction of the No Purchase Request Increase Alternative, and the impacts of this Alternative would thus become similar to the No Purchase Request Increase Alternative.

After balancing competing policy considerations, including the extent to which those components of the Modified WSIP Alternative not included in the Phased WSIP Variant would delay resolution of key issues relating to the TID-MID dry-year "conserved water" transfer and operating criteria at Crystal Springs Reservoir, the Commission presently rejects as infeasible within the meaning of CEQA those components the Modified WSIP Alternative not included within the Phased WSIP Variant. In doing so, however, the SFPUC recognizes that mitigation measure 5.3.6-4a is the preferred mitigation measure and should be undertaken as part of the Phased WSIP Variant. The SFPUC is by no means closing the door on the possibility of an dry-year "conserved water" transfer from TID and MID. Whether the SFPUC will ultimately be able to implement the dry year transfer of conserved water will depend on complex negotiations, regulatory issues, cost considerations, and other issues that may or may not be possible for the various agencies involved to resolve within a reasonable time frame or during implementation of the Phased WSIP Variant.

#### VII. STATEMENT OF OVERRIDING CONSIDERATIONS

Pursuant to CEQA section 21081 and CEQA Guideline 15093, the Commission hereby finds, after consideration of the Final PEIR and the evidence in the record, that each of the specific overriding economic, legal, social, technological and other benefits of the Program as set forth below independently and collectively outweighs these significant and unavoidable impacts and is an overriding consideration warranting approval of the Program. Any one of the reasons for approval cited below is sufficient to justify approval of the Program. Thus, even if a court were to conclude that not every reason is supported by substantial evidence, the Commission will stand by its determination that each individual reason is sufficient. The substantial evidence supporting the various benefits can be found in the preceding findings, which are incorporated by reference into this Section, and in the documents found in the Record of Proceedings, as defined in Section I.

On the basis of the above findings and the substantial evidence in the whole record of this proceeding, the Commission specially finds that there are significant benefits of the proposed Program to support approval of the Phased WSIP Variant in spite of the unavoidable significant impacts, and therefore makes this Statement of Overriding Considerations. The Commission further finds that, as part of the process of obtaining Program approval, all significant effects on the environment from implementation of the Phased WSIP Variant have been eliminated or substantially lessened where feasible. All mitigation measures proposed in the PEIR for this Variant are adopted as part of this approval action. Furthermore, the Commission has determined that any remaining significant effects on the environment found to be unavoidable are acceptable due to the following specific overriding economic, technical, legal, social and other considerations.

The Phased WSIP Variant has the following benefits:

1. Implementation of facility improvement projects will reduce vulnerability to earthquakes. Improvements are designed to meet current seismic standards. The regional water system is a critical and vulnerable link in the City's and wholesale customer's ability to survive after a major earthquake and to maintain access to critically needed water supplies. Not only will water be necessary for human consumption, but will provide emergency water supply after an earthquake to protect the public health and safety. The SFPUC will be able to meet the fundamental and most pressing needs of the water system – to improve the seismic safety and reliability of the water system as a means of saving human life and property under a catastrophic earthquake scenario or even a disaster scenario not rising to the level of catastrophic. As the system ages, its reliability decreases and the risk of failure increases. The 167-mile-long system crosses five active earthquake faults. Facilities located near these points of intersection are at risk of failure in the event of a major earthquake, an event considered likely in the next 30 years. Due to the age of the system, many facilities do not meet modern seismic standards. A failure of the water system could leave some customers without water for 10 - 30 days, and in some instances as long as 60 days. Alternative supplies will be limited. Many communities have only a few days of locally stored reserves in tanks and small reservoirs, most of which would be depleted within the first 48-72 hours of an emergency to meet the initial spike in demand for emergency services. Potential economic losses to the region from a water supply interruption as well as incremental damage from lack of adequate water supply to suppress post-quake fires would likely total tens of billions of dollars. The SFPUC system is a critical regional asset providing an essential service and commodity to the Bay Area economy. Its deteriorating condition places the regional economy and the welfare of millions of Bay Area residents at risk. Effecting the necessary repairs and improvements to assure the water system's continued reliability, and developing it as part of a larger, integrated water security strategy, is critical to the Bay Area's economic security, competitiveness and quality of life. (See "Hetch Hetchy Water and the Bay Area Economy", Bay Area Economic Forum 2002)

2. The SFPUC will be able to deliver basic service to the three regions in the service area (East/South Bay, Peninsula, and San Francisco) within 24 hours after a major earthquake.

3. The SFPUC will be able to restore facilities to meet projected average-day demand within 30 days after a major earthquake.

4. The Program reduces the physical, social, and economic impacts associated with the potential rupture of the existing system including, but not limited to, public health and safety, flooding, erosion, biological impacts, traffic interruption, and property damage.

5. The Program supports the economic vitality of the Region by fulfilling the water demands under emergency conditions.

6. The Water system will maintain high-quality water and a gravity-driven system, allowing the SFPUC to continue to provide clean, unfiltered water originating from Hetch Hetchy Reservoir and filter all other surface water sources.

7. Improvements are designed to meet current and foreseeable future federal and state water quality requirements.

8. The Phased WSIP Variant promotes on-going monitoring of watershed areas, limiting diversions while exploring all options and demand by 2018 – the dynamic nature of information and technology weighs in favor of making a decision on water supply only through 2018.

9. The Program will increase delivery reliability and improve the ability to maintain the water system, providing operational flexibility to allow planned maintenance shutdown of individual facilities without interrupting customer service, operational flexibility to minimize the risk of service interruption due to unplanned facility upsets or outages, and operational flexibility and system capacity to replenish local reservoirs as needed. In order to implement a feasible asset management program in the future that will provide continuous maintenance and repairs to facilities, the regional water system requires redundancy (i.e., backup) of some critical facilities necessary to meeting day-to-day customer water supply needs. Without adequate redundancy of critical facilities, the SFPUC has limited operational flexibility in the event of an emergency or a system failure, as well as constraints on conducting adequate system inspection and maintenance. Failure to implement the Program would place the water system at significant risk to seismic hazards, increased facility failures, and increased supply shortages on a day-to-day basis, as well as result in prolonged service disruptions to many customers in the event of an earthquake or other emergency due to inadequate facility redundancy and operational flexibility.

10. The SFPUC can meet the estimated average annual demand under the conditions of one planned shutdown of a major facility for maintenance concurrent with one unplanned facility outage.

11. The SFPUC can meet customer water supply needs; the Phased WSIP Variant would serve 265 mgd of retail and wholesale customer purchases from the SFPUC watersheds, and meet or offset the remaining 20 mgd through conservation, recycled water, and groundwater in the retail and wholesale service areas. Ten mgd of this would be met, as proposed under the WSIP, through conservation, recycled water, and groundwater projects in San Francisco, and 10 mgd would be met through local conservation, recycled water and groundwater in the wholesale service area.

12. The Phased WSIP Variant can meet dry-year delivery needs through 2018 while limiting rationing to a maximum 20 percent system-wide reduction in water service during extended droughts.

13. The Phased WSIP Variant diversifies water supply options during non-drought and drought periods.

14. The Phased WSIP Variant will substantially improve use of new water sources and drought management, including use of groundwater, recycled water, conservation, and transfers.

15. The Program will enhance sustainability in all system activities, including management of natural resources and physical systems to protect watershed ecosystems and to protect public health and safety.

16. The Phased WSIP Variant will achieve a cost-effective, fully operational system, ensuring cost-effective use of funds, and maintaining a gravity-driven system.

17. The water system will continue to provide a source of clean energy and require a low level of energy to run the system, both of which help maintain and minimize GHG emissions associated with water and power utility services.

18. The PEIR identified climate change as a factor that may affect regional water system operations due to potential changes in precipitation that originates as rainfall or snowmelt in the Tuolumne watershed, and the magnitude of rain events in the local system watersheds. Understanding and adapting to climate change as it affects watershed ecosystems will be an ongoing task for regional water system operators, but the science underlying the changes may be better known in 2018 than it is today. The Phased WSIP Variant will allow the SFPUC to benefit from a better understanding of the science and potential effects of climate change when it evaluates whether to increase water supply deliveries in 2018.

19. The PEIR identified at least three watersheds where increases in instream releases may be required by regulatory changes or in conformance with SFPUC stewardship goals, with corresponding reductions in regional water system yield. By 2018 most of these regulatory requirements or stewardship programs will have been implemented, thereby clarifying the reliability and yield of the regional water system. The Program gives the SFPUC the flexibility to take into consideration these issues when it evaluates whether to increase water supply deliveries in 2018.

To accomplish all of the SFPUC's objectives, it must move forward with the WSIP facility improvement projects as proposed, to improve seismic and water delivery reliability, to meet current and future water quality regulations, to provide for additional system conveyance for maintenance and delivery reliability, and to meet water supply reliability goals for 2018 and possibly beyond. Like all water utilities, the SFPUC must consider current needs as well as possible future changes and unplanned outages, and design a system that achieves a balance among the numerous objectives, functions and risks a water supplier must face. As prudent water managers, the SFPUC must make decisions about how to manage its water system effectively. Approval of the Phased WSIP Variant will allow the SFPUC to accomplish these many goals.

Having considered these benefits, including the benefits discussed in Section I above, the Commission finds that the benefits of the Program outweigh the unavoidable adverse environmental effects, and that the adverse environmental effects are therefore acceptable.

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To : Regional Water Board Executive Officers

Date: SAN - 4 1994

Regional Water Board Attorneys

William R. Attwater Chief Counsel

From : OFFICE OF THE CHIEF COUNSEL STATE WATER RESOURCES CONTROL BOARD 901 P Street, Sacramento, CA 95814 Mail Code: G-8

Subject: GUIDANCE ON CONSIDERATION OF ECONOMICS IN THE ADOPTION OF WATER QUALITY OBJECTIVES

#### ISSUE

What is required of a Regional Water Quality Control Board (Regional Water Board). in order to fulfill its statutory duty to consider economics when adopting water quality objectives in water quality control plans or in waste discharge requirements?

#### CONCLUSION

A Regional Water Board is under an affirmative duty to consider economics when adopting water quality objectives in water quality control plans or, in the absence of applicable objectives in a water quality control plan, when adopting objectives on a case-by-case basis in waste discharge requirements. To fulfill this duty, the Regional Water Board should assess the costs of the proposed adoption of a water quality objective. This assessment will generally require the Regional Water Board to review available information to determine the following: (1) whether the objective is currently being attained; (2) what methods are available to achieve compliance with the objective, if it is not currently being attained; and (3) the costs of those methods. The Regional Water Board should also consider any information on economic impacts provided by the regulated community and other interested parties.

If the potential economic impacts of the proposed adoption of a water quality objective appear to be significant, the Regional Water Board must articulate why adoption of the objective is necessary to assure the reasonable protection of beneficial uses of state waters, despite the potential adverse economic consequences. For water quality control plan amendments, this

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discussion could be included in the staff report or resolution for the proposed amendment. For waste discharge requirements, the rationale must be reflected in the findings.

#### DISCUSSION

#### A. Legal Analysis

#### 1. Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, Water Code Section 13000 et seq. (Porter-Cologne Act or Act), the State Water Resources Control Board (State Water Board) and the Regional Water Boards are the principal state agencies charged with responsibility for water quality protection. The State and Regional Water Boards (Boards) exercise this responsibility primarily through the adoption of water quality control plans and the regulation of waste discharges which could affect water quality. See Water Code Secs. 1317.0, 13170.2, 13240, 13263, 13377, 13391.

Water quality control plans contain water quality objectives, **as** well as beneficial uses for the waters designated for protection and a program of implementation to achieve the objectives. Id. Sec. 13050(j). In the absence of applicable water quality objectives in a water quality **control plan**, the Regional Water Board may also develop objectives on a **case-by**case basis in waste discharge requirements. See id. Sec. **13263(a)**.<sup>1</sup>

When adopting objectives either in a water quality control plan or in waste discharge requirements, the Boards are required to exercise their judgment to "ensure the reasonable protection of beneficial uses and the prevention of nuisance". Id. Se-cs. 13241, 13263; see id. Sec. 13170. The Porter-Cologne Act recognizes that water quality may change to some degree without

<sup>1</sup> The focus of this memorandum is limited to an analysis of the Boards' obligation to consider economics when adopting water quality objectives either in water quality control plans or, on a case-by-case basis, in waste discharge requirements. This memorandum does not discuss the extent to which the Boards' are required to consider the factors specified in Water Code Section 13241 in other situations. Specifically, this memorandum does not discuss the applicability of Section 13241 to the development of numeric effluent limitations, implementing narrative objectives contained in a water quality control plan. Further guidance on the latter topic will be developed at a later date.

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> causing an unreasonable effect on beneficial uses. Id. The Act, therefore, identifies factors which the Boards must consider in **determining what** level of protection is reasonable. Id.<sup>2</sup> These factors include economic considerations. Id.3

> The legislative history of the Porter-Cologne Act indicates that "[c] onservatism in the direction of high quality should guide the establishment of objectives both in water quality control plans and in waste discharge requirements". Recommended Changes in Water Quality Control, Final Report of the Study Panel to the [State Water Board], Study Project--Water Quality Control Program, p. 15 (1969) (Final Report). Objectives should "be tailored on the high quality side of needs of the present and future beneficial uses". Id. at 12. Nevertheless, objectives must be reasonable, and economic considerations are a necessary part of the determination of reasonableness. "The regional boards must balance environmental characteristics, past, present and future beneficial uses, and economic considerations (both the cost of providing treatment facilities and the economic value of development) in establishing plans to achieve the highest water quality which is reasonable." Id. at 13.

2. Senate Bill 919

The Boards are under an additional mandate to consider economics when adopting objectives as a result of the recent enactment of Senate Bill 919. 1993 Cal. Stats., Chap. 1131, Sec. 8, to be codified at Pub. Res. Code, Div. 13, Ch. 4.5, Art. 4. The legislation, which is

2 Other factors which must be considered include:

- (a) Past, present, and probable future beneficial uses of water;
- (b) Environmental characteristics of the hydrographic unit under
- consideration, including the quality of water available thereto; (c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area;
- (d) The need for developing housing within the region;
- (e) The need to develop and use recycled water.

3 See also Water Code Section 13000 which mandates that activities and factors which may affect water quality "shall be regulated to attain the highest water quality which is reasonable, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, <u>economic</u> and social, tangible and intangible" (emphasis added).

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> effective January 1, 1994, amended the California Environmental Quality Control Act, Public Resources Code Section 21000 et seq. (CEQA), to require that, whenever the Boards adopt rules requiring the installation of pollution control equipment or establishing a performance standard or treatment requirement, the Boards must conduct an environmental analysis of the reasonably foreseeable methods of compliance. This analysis must take into account a reasonable range of factors, including economics. For the reasons explained above, the latter requirement is duplicative of existing requirements under the Porter-Cologne Act regarding consideration of economics.

#### B. Recommendation

The meaning of the mandate to "consider economics" in the Porter-Cologne Act is not entirely clear. It is clear that the Porter-Cologne Act does not specify the weight which must be given to economic considerations. Consequently, the Boards may adopt water quality objectives even though adoption may result in significant economic consequences to the regulated community. The Porter-Cologne Act also does not require the Boards to do a formal cost-benefit analysis.

The Porter-Cologne Act does impose an affirmative duty on the Boards to consider economics when adopting water quality The Boards probably cannot fulfill this duty objectives. simply by responding to economic information supplied by the regulated community. Rather, the Boards should'assess the costs of adoption of a proposed water quality objective. This assessment will normally entail three steps. First, the Boards should review any available information on receiving water and effluent quality to determine whether the proposed objective is currently being attained or can be attained. If the proposed objective is not currently attainable, the Boards should identify the methods which are presently available for complying with the objective. Finally, the Boards should consider any available information on the costs associated with the treatment technologies or other methods which they have identified for complying with a proposed objective.<sup>4</sup>

<sup>4</sup> See, for example, <u>Managing Wastewater In Coastal Urban Areas</u>, National Research Council (1993). This text provides data on ten technically feasible wastewater treatment technologies, which can be used to make comparative judgments about performance and to estimate the approximate costs of meeting various effluent discharge standards, including standards for toxic **organics** and metals.

Regional Water Board Executive Officers et al. -5-

In making their assessment of the cost impacts of a proposed objective, the Boards are not required to engage in speculation. Rather, the Boards should review currently available information. In addition, the Boards should consider, and respond on the record, to any information provided by dischargers or other interested persons regarding the potential cost implications of adoption of a proposed objective.

If the economic consequences of adoption of a proposed water quality objective are potentially significant, the Boards must articulate why adoption of the objective is necessary to ensure reasonable protection of beneficial uses. If the objective is later subjected to a legal challenge, the courts will consider whether the Boards adequately considered all relevant factors and demonstrated a rational connection between those factors, the choice made, and the purposes of the Porter-Cologne Act. See <u>California Hotel &</u> <u>Motel Assn. v. Industrial Welfare Com.</u>, 25 Cal.3d 200, 212, 157 Cal.Rptr. 840, 599 P.2d 31 (1979).

Reasons for adopting a water quality objective, despite adverse economic consequences, could include the sensitivity of the receiving waterbody and its beneficial uses, the toxicity of the regulated substance, the reliability of economic or attainability data provided by the regulated community, public health implications of adopting a less stringent objective, or other appropriate factors. These factors may also include the legislative directive that a "margin of safety [ ] be maintained to assure the protection of all beneficial uses." Final Report, p. 15 and App. A, p. 59.

If objectives are proposed for surface waters and adverse economic consequences stemming from adoption of the objectives could be avoided only if beneficial uses were downgraded, the Boards should address whether dedesignation would be feasible under the applicable requirements of the Clean Water Act and implementing regulations. See 40 C.F.R. Sec. 131.10. Dedesignation is feasible only for potential, rather than existing, uses. See id. Sec. 131.10(g). If dedesignation of potential beneficial uses is infeasible, the Boards should explain why, e.g., that there is a lack of data supporting dedesignation.<sup>5</sup>

5 It should also be noted that, even if dedesignation of potential beneficial uses is feasible, in the great majority of cases it will not have any significant effect on the selection of a proposed objective. This is so because the proposed objective will be necessary to protect existing beneficial uses, which cannot be dedesignated. Regional Water Board Executive Officers et al. -6-

> The State or Regional Water Board's rationale for determining that adoption of a proposed objective is necessary to protect water quality, despite adverse economic consequences, must be discernible from the record. This reasoning could be included in the staff report or in the resolution adopting a proposed water quality control plan amendment. When objectives are established on a **case-by**case basis in waste discharge requirements, the rationale must be included in the findings.

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## **EXHIBIT 4**



DENNIS J. HERRERA City Attorney

## OFFICE OF THE CITY ATTORNEY

JONATHAN P. KNAPP Deputy City Attorney

Direct Dial: (415) 554-4261 Email: jonathan.knapp@sfgov.org

July 29, 2014

State Water Resources Control Board Division of Water Rights Attn: Mark Gowdy P.O. Box 2000 Sacramento, CA 95812

Dear Mr. Gowdy,

In a recent letter dated May 6, 2014 to the San Francisco Public Utilities Commission ("SFPUC"), the Division of Water Rights outlined certain "key assumptions" that State Water Resources Control Board ("State Water Board") staff will use in their impact analysis for the revised *Draft Substitute Environmental Document in Support of Potential Changes to the Water Quality Control Plan for the Bay-Delta: San Joaquin River Flows and Southern Delta Water Quality* ("Phase 1 SED"), to evaluate impacts to the City and County of San Francisco ("CCSF") that may result from the proposed Tuolumne River flow alternatives.<sup>1</sup> The purpose of this letter is to comment on the propriety of staff"s reliance on the "key assumptions" identified in the May 6, 2014 letter.<sup>2</sup>

The May 6, 2014 letter identifies assumptions by State Water Board staff ("staff") regarding how CCSF will fulfill its obligations under the Raker Act and the Fourth Agreement to the Modesto Irrigation District and the Turlock Irrigation District ("Districts") as a result of new instream flow requirements on the Tuolumne River if the CCSF's storage credits in its Water Bank account in the Don Pedro Project are reduced to zero. In this scenario, staff will assume that economic impacts to CCSF from increased instream flow requirements will be limited to those arising from increased water rates because CCSF will be able to purchase sufficient water from the Districts to avoid water shortages and consequent reductions in water deliveries throughout the Hetch Hetchy Regional Water System ("RWS") service territory.

<sup>2</sup> CCSF reserves the right to argue how the Raker Act or the Fourth Agreement should be interpreted in future proceedings before the State Water Board or other bodies.

<sup>&</sup>lt;sup>1</sup> Letter from Barbara Evoy, Deputy Director, Division of Water Rights, State Water Resources Control Board, to Ellen Levin, Deputy Manager, Water Enterprise, San Francisco Public Utilities Commission, May 6, 2014 (referred to below as the "May 6, 2014 letter" or "letter"). The State Water Board also filed the letter in the Federal Energy Regulatory Commission ("FERC") docket for the Don Pedro Hydroelectric Project, FERC No. 2299 ("Don Pedro Project"), on May 12, 2014. The letter is available through the FERC eLibrary under Accession Number 20140513-0028.

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#### I. The Phase 1 SED Must Analyze Impacts from Reduced Water Deliveries throughout the Hetch Hetchy Regional Water System as a Result of Implementation of the Proposed Tuolumne River Flow Alternatives Because Reduction in Deliveries is the Reasonably Foreseeable Method of Compliance.

The May 6, 2014 letter suggests that the Phase 1 SED may not include analysis of the impacts from reduced water deliveries throughout the RWS service territory that may result from implementation of the proposed Tuolumne River flow alternatives. Such an omission would render staff's California Environmental Quality Act ("CEQA") impact analysis inadequate.

The Phase 1 SED must analyze the impacts of reduction in deliveries throughout the RWS service territory that may result from implementation of the proposed Tuolumne River flow alternatives because reduction in deliveries is the only method of compliance that is within the SFPUC's control, and thus, it is the reasonably foreseeable consequence of the State Water Board's contemplated action. The Phase 1 SED must contain "[a]n environmental analysis of the reasonably foreseeable methods of compliance . . . ."<sup>3</sup> As explained by the California Court of Appeal, under CEQA whether one or more methods of future compliance with a new regulatory requirement are reasonably foreseeable "depends upon the quality and quantity of evidence in the administrative record."<sup>4</sup> Evidence introduced into the administrative record for the Phase 1 SED by CCSF shows that the foreseeable method of compliance with the proposed Tuolumne River flow alternatives will be reduction in water deliveries throughout the RWS service territory.<sup>5</sup> More specifically, CCSF submitted comments on the Draft SED for Phase 1 in which it explained that,

SFPUC's analysis of the proposed action [*i.e.*, the preferred alternative which would require 35% of unimpaired flow to remain in the stream] shows there would be dramatic and significant impacts on the SFPUC's diversions from the Hetch Hetchy Project to its Regional Water System service area and the Bay Area economy assuming – as the draft SED recognizes – that revised water release requirements ordered by FERC could result under the Fourth Agreement in a reallocation of water bank credits so as to apportion an additional burden on CCSF of 51.7121%. Assuming current demands and a recurrence of the 1987-1992 drought, the SFPUC's annual diversions from the Tuolumne River could be reduced by 111,700 [acre-feet] for each of the six years of the drought. This additional annual reduction in supply – when added

<sup>&</sup>lt;sup>3</sup> 23 CCR § 3777 (b)(4) (identifying required elements of Substitute Environmental Documentation ("SED") prepared by the State Water Board, and specifying that "[t]he Draft SED shall include, at a minimum, the following information . . . An environmental analysis of the reasonably foreseeable methods of compliance.").

<sup>&</sup>lt;sup>4</sup> Cnty. Sanitation Dist. No. 2 of Los Angeles Cnty. v. Cnty. of Kern ("County Sanitation District") (2005) 127 Cal. App. 4th 1544, 1586.

<sup>&</sup>lt;sup>5</sup> Comment Letter – Bay Delta Plan SED, CCSF, March 29, 2013, *available at* <u>http://www.waterboards.ca.gov/waterrights/water\_issues/programs/hearings/baydelta\_pdsed/doc</u> <u>s/comments032913/dennis\_herrera.pdf</u> (referred to below as "CCSF Comment Letter"), at pp. 6-7.

Mark Gowdy State Water Resources Control Board Page 3 July 29, 2014

to reductions in deliveries of up to 20% already imposed by the SFPUC to ensure delivery of water to customers throughout the 1987-1992 drought – results in a single year of reduction in deliveries of 42%, and five years of reduction in deliveries of 52%. In 2009 the SFPUC presented testimony to FERC on the economic impacts of 41% and 51% rationing within the service area of the Regional Water System. . . . *The impacts of such levels of rationing on the Bay Area economy are staggering*.<sup>6</sup>

Thus, CCSF's predicted method of compliance with the proposed Tuolumne River flow alternatives, *i.e.*, reduction in deliveries throughout the RWS service territory, and the information upon which the prediction is based, *e.g.*, the analyses of CCSF's experts, Mr. Steiner and Professor Sunding, constitute substantial evidence which supports a fair argument that reduction in deliveries to the RWS service territory is a reasonably foreseeable consequence of the SWB's proposed action.<sup>7</sup> Therefore, staff's impact analysis in the Phase 1 SED must consider reduction in deliveries to the RWS service territory and the impacts that would result from such reductions.

In particular, staff's analysis must consider direct and indirect physical impacts on the environment from reduction in deliveries to the RWS service territory. (*Bakersfield Citizens for Local Control v. City of Bakersfield* (*"Bakersfield"*) (2004) 124 Cal. App. 4th 1184, 1205 (explaining, "if the forecasted economic or social effects of a proposed project directly or indirectly will lead to adverse physical changes in the environment, then CEQA requires disclosure and analysis of these resulting physical impacts.").) A reasonable analysis should evaluate the physical impacts associated with insufficient water supplies and rationing. These types of analyses should be undertaken to provide the decision makers with a full understanding of the environmental consequences of their decision, as required by CEQA.

#### II. The Phase 1 SED Should Not Analyze CCSF's Purchase of the Required Water from the Districts Because it is Not Reasonably Foreseeable that CCSF and the Districts Would be Able to Effectuate Such a Water Transfer.

Under staff's assumption that CCSF would be able to purchase the requisite volume of water from the Districts, the economic impacts to CCSF from increased instream flow requirements will be limited to rate impacts of the additional cost of purchasing such water:

<sup>&</sup>lt;sup>6</sup> Id. at pp. 6-7 (italics added) (*citing* Attachment C to CCSF Comment Letter, CCSF Exposure to SWRCB 35 Percent February-June Flow Requirement, Daniel B. Steiner, Consulting Engineer; Attachment D to CCSF Comment Letter, Answering Testimony of David L. Sunding on Behalf of San Francisco Public Utilities Commission Before the Federal Energy Regulatory Commission (Turlock Irrigation District and Modesto Irrigation District, Project No. 2299 (Don Pedro Project), September 2009)).

<sup>&</sup>lt;sup>7</sup> *County Sanitation District*, 127 Cal. App. 4th at 1587 (wherein the Court of Appeal concluded that predicted methods of compliance with new regulatory requirements, and the information upon which the predictions are based, "constitute substantial evidence supporting a fair argument" that the predicted methods of compliance are "reasonably foreseeable alternatives" that must be analyzed under CEQA).

Mark Gowdy State Water Resources Control Board Page 4 July 29, 2014

For purposes of the Phase 1 SED analysis . . . staff believes it is reasonable to evaluate CCSF's purchase of the required water from the Districts. The Phase 1 SED, therefore, will evaluate economic impacts by assuming a purchase price for this water from the Districts and then estimate the corresponding increase in water rates in the SFPUC service area and associated indirect and induced impacts in the regional economy. The corresponding fiscal benefit to the Districts of these water sales will also be evaluated.<sup>8</sup>

It is not reasonably foreseeable that CCSF and the Districts would be able to effectuate such a water transfer for at least three reasons. First, there is no agreement between CCSF and the Modesto Irrigation District (MID) or Turlock Irrigation District (TID) that would enable CCSF to purchase the required volume of water from either of the Districts. The most recent effort to transfer a relatively small amount of water -2 million gallons per day ("MGD") – from MID to CCSF met with significant opposition and the parties were unable to reach agreement.<sup>9</sup> CCSF also pursued a 2 MGD water transfer with Oakdale Irrigation District ("OID") that would have required a transfer between OID and MID, but the parties were unable to reach agreement to effectuate the transfer, even though the water in question would have come from OID and not MID.<sup>10</sup>

Second, even if such a water transfer could be agreed upon, neither MID nor TID has ever transferred the volume of water that CCSF may be required to contribute under the proposed Tuolumne River flow alternatives. Under the "key assumptions" that the May 6, 2014 letter states staff will use, the preferred alternative analyzed in the Draft SED would require purchase of 111,700 acre-feet ("AF") for each of the six years of the drought. On average, 85 percent of RWS supplies come from the Tuolumne River watershed. At recent delivery rates this amounts to approximately 222,510 AF/year. Thus, to replace the forecasted shortage amount of 111,700 AF/year, CCSF would need to obtain more than half of the water that it currently diverts from the Tuolumne River for each of six consecutive drought years. Neither MID nor TID has ever transferred that much water to any other entity, and thus, it is not reasonably foreseeable that they would do so during a severe and prolonged drought. Indeed, it is unclear whether the requisite volume of water – over 100,000 AF – would be available for transfer by the Districts in any water year type, let alone a dry or critically dry year.

<sup>&</sup>lt;sup>8</sup> May 6, 2014 letter, *supra* note 1, at p. 1.

<sup>&</sup>lt;sup>9</sup> See *e.g.*, Holland, "Modesto Irrigation District kills proposed water sale," Modesto Bee (September 18, 2012) *available at* <u>http://www.modbee.com/2012/09/18/2378903/modesto-irrigation-district-kills.html</u> (explaining that MID voted to cease negotiations with CCSF regarding the proposed 2 MGD water transfer). See also *Closed Session Resolution No. 2012-07 Directing Staff and General Counsel to Discontinue Further Negotiations Regarding the Proposed Sale of Water to the City and County of San Francisco, Modesto Irrigation District, September 18, 2012, included hereto as Attachment 1.* 

<sup>&</sup>lt;sup>10</sup> Stapley, "Modesto Irrigation District blocks Oakdale water sale to SF, for now," The Modesto Bee (January 23, 2014) *available at* <u>http://www.modbee.com/2014/01/23/3150103/modesto-irrigation-district-not.html</u>.

Mark Gowdy State Water Resources Control Board Page 5 July 29, 2014

Third, staff's proposed impact analysis will be based on an assumed purchase price for water to be sold by the Districts to CCSF, without any reasonable basis for determining such a price. Since the hypothetical water transfer proposed by staff is neither based on any existing agreement, nor remotely comparable in scale to any completed or contemplated water transfer by either of the Districts, a purchase price for that water cannot be predicted with any reasonable assurance of accuracy. Staff nevertheless appears to envision that this speculative, assumed purchase price will be the basis for its evaluation of impacts to CCSF from the proposed Tuolumne River flow alternatives, *i.e.*, impacts that would result from rate increases to account for the additional costs borne by CCSF to purchase the required water.

Staff's assumption that it will be feasible for CCSF to purchase the required volume of water from the Districts at staff's assumed purchase price must be supported by substantial evidence in the administrative record. (*Bakersfield*, 124 Cal. App. 4th at 1198 (explaining, "[t]he substantial evidence standard is applied to conclusions, findings and determinations.").) Argument, speculation, unsubstantiated opinion or narrative, and evidence which is clearly inaccurate or erroneous is not substantial evidence. (Cal. Pub. Res. Code § 21082.2(c); 14 CCR § 15384(a).) In the May 16, 2014 letter, staff indicates, but fails to identify, the bases for its assumptions.<sup>11</sup> If staff is unable to support its assumptions regarding the feasibility of CCSF purchasing the requisite volume of water from the Districts at staff's assumed purchase price with substantial evidence, then the State Water Board will be unable to rely upon any analysis based on such assumptions in the Phase 1 SED.

Thank you for the opportunity to comment on the May 6, 2014 letter.

Very truly yours,

DENNIS J. HERRERA City Attorney

Jonathan P. Khab Deputy City Attorney

Enclosure

<sup>&</sup>lt;sup>11</sup> May 6, 2014 letter, *supra* note 1, at p. 2.

# Attachment 1

#### CLOSED SESSION RESOLUTION NO. 2012-07 DIRECTING STAFF AND GENERAL COUNSEL TO DISCONTINUE FURTHER NEGOTIATIONS REGARDING THE PROPOSED SALE OF WATER TO THE CITY AND COUNTY OF SAN FRANCISCO

BE IT RESOLVED, That based on information received from the City and County of San Francisco, the Board of Directors of the Modesto Irrigation District directed staff and General Counsel to discontinue further negotiations regarding the proposed sale of water to the City and County of San Francisco.

Moved by Director Byrd, seconded by Director Warda, that the foregoing resolution be adopted.

The following vote wad had: Ayes: Directors Blom, Byrd, Van Groningen, Warda and Wild

Noes:Directors NoneAbsent:Directors None

The President declared the resolution adopted.

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I, Pat Mills, Secretary of the Board of Directors of the Modesto Irrigation District, do hereby CERTIFY that the foregoing is a full, true and correct copy of a closed session resolution duly adopted at a special meeting of said Board of Directors held the 18th day of September 2012.

Fat Melle

Secretary of the Board of Directors of the Modesto Irrigation District

# **EXHIBIT 5**

#### BAY-DELTA PHASE I STAFF

TECHNICAL WORKSHOP OF DECEMBER 12, 2016

TRANSCRIPT OF VIDEO RECORDING

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LES GROBER: Good morning. We would like to get started with the second day of two days of technical workshops having to do with the phase one update of the water quality control plan for the Sacramento and San Joaquin River Delta estuary phase one update, having to do with San Joaquin River flows and Southern Delta salinity objectives.

8 I am going to provide a brief introduction -- a 9 very brief introduction and then talk to you about some 10 changes in the agenda, and then I am going to hand it off 11 to Gita Kapahi to talk about how we are going to be 12 running -- facilitating the meeting today. First, a 13 couple of sundry items.

First thing, for those of you familiar with our 14 processes, I would like you to take a moment to look 15 around the room to find the nearest exit. If an alarm 16 should sound, we have to evacuate the room immediately. 17 18 Please take your valuables with you. Take the stairways, not the elevators. Our relocation site is across the 19 street in Cesar Chavez Park, and if you cannot use the 20 stairs, you will be directed to a protected area inside 21 of a stairwell. 22

23 So today's webcast is being broadcast and 24 recorded, as was the last webcast, which is now available 25 on our Website. So when you ask questions, please use a 2

microphone -- we will have people with roving mics
 helping you with that -- and state your name and
 affiliation. I think that is it for the sundry items.

In the interest of time, I have a very brief 4 introduction update to the project. As I said, this is 5 the second day of the workshop. We had one last Monday, 6 and today we are going to describe some of the models 7 that were used and the development of the SED for the 8 9 amendment of the plan. And we are going to answer 10 questions that will help you to provide comments at both the upcoming hearing days. We already had one hearing 11 day on November 29th, and we have four more coming. But 12 today is to help you answer technical questions so you 13 can make good targeted technical comments on the proposal 14 with written comments until January 17th. 15

A little bit of change in the outline of what we 16 are covering today, we have this welcome introduction. 17 18 As I said, Gita Kapahi is going to provide you some additional information about the facilitation of the 19 project. We are not going to go through a refresher of 20 the water supply effects model. It seems a number of you 21 were here for the last round. If you want to get that 22 23 detailed information, both the PowerPoint and the webcast 24 is available on our Website.

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We are, however, going to continue to do an

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overview of the impact analysis. That is going to be 1 part one. There is going to be six parts that we are 2 going to move into -- groundwater use, methodology, and 3 results. We are going to describe the ag economic 4 effects and the model that was used, the SWAP model, and 5 how that folds into the regional economic effects and 6 IMPLAN multipliers followed by Southern Delta salinity ag 7 effects and the city and county of San Francisco. 8

9 The first two items will be before the lunch 10 break and the other four after the lunch break. The four 11 matters for each of these is going to be staff 12 presentation followed by a question session and responses 13 to help clarify. But if you have clarifying questions in 14 the midst, you can do that as well.

15 The project, as I said, is the update of the 16 water quality control plan -- two elements of the plan, 17 the San Joaquin River Flow Objectives for the Reasonable 18 Protection of Fish and Wildlife and the Southern Delta 19 Salinity Objectives for the Reasonable Protection of 20 Agricultural uses and the program and implementation for 21 those two elements.

The project area is the lower San Joaquin River, including the Merced, the Tuolumne, and the Stanislaus River and the valley floor area -- that is for the flow component of it -- and including into the Southern Delta,
shown on the map here, the area kind of northwest of
 Vernalis in the Southern Delta.

This shows the time line for the project and for some other critical elements that I will be referring to. It shows going back -- not completely linear -- the last major update of the water quality control plan in 1995 with a minor update in 2006. There it starts becoming linear.

9 We released a notice of preparation for this 10 project in 2009, and in 2010, per the Delta Reform Act, we prepared this thing called the flow criteria report, 11 which I will be referring to in a moment. We did a 12 scientific peer review and a release of the draft SED in 13 2012 -- 2011 and 2012. But based on responses -- based 14 on comments that we received on that draft, we went back 15 and had prepared this recirculated and revised draft SED. 16 We also had in that time period the intervening drought, 17 18 which delayed the rerelease of the document but also helped to inform the document because of the dry 19 conditions and how that was important. Moving forward, 20 we plan to release a revised draft later this spring for 21 the board to consider adoption by the summer of 2017. 22

23 So a few major points before we move on to the 24 technical elements. As I mentioned in the previous 25 slide, the last time the plan was significantly updated

was in 1995. A lot has happened since that time. There
 has been a decline of species. We have had a change of
 conditions. We have identified the need for the update
 in the last minor update of the plan in 2006.

In that time we have seen in the Delta and also 5 in the San Joaquin River and the Stanislaus the 6 endangered species act has been increasing water 7 restrictions. We have also had the development of the 8 9 administration's water action plan, which has identified 10 the critical need as part of it for the state water board to complete the update for the water quality control plan 11 and to achieve the coequal goals in the Delta for a more 12 reliable water supply and for ecosystem protection. 13

A big part of this update is flow. The question 14 is always asked, "Why are we focusing on flow?" Flow is 15 an important element at -- that gets directly at the 16 17 board's responsibilities and authorities. And scientific studies have shown that flow is a major factor in the 18 survival and resiliency of fish like salmon. Aside from 19 some of the direct improvements of flow that can be 20 achieved, like water temperature and increased habitat, 21 it can also do other things. It can reduce the risk of 22 23 predation. It can improve reproductive success and a 24 number of other things. So flow is one of those kind of major factors. 25

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1 And that being said, the board recognizes that 2 non-flow measures are important. So that is why non-flow 3 is considered in the program as part of the adaptive 4 implementation elements of the plan so that you can do 5 things other than flow to achieve the goals of fish and 6 wildlife protection.

Because this involves big quantities of water 7 and basically taking some of the water that currently now 8 9 is available for public interest uses and keeping more of 10 it instream to protect fish and wildlife, this is a hard thing to do. That 2010 document that I referred to in 11 the time line, in that report, we just did the scientific 12 assessment asking the question of, "How much flow is 13 needed to protect fish and wildlife without consideration 14 of other uses of water?" 15

And that report concluded that 60 percent of the 16 17 flow should be left in the river to protect fish and 18 wildlife, but it didn't consider uses like ag, municipal, drinking water, or hydropower. So there is a tension 19 there because the current uses, as this report shows, can 20 use 80 percent or more of the flow in that critical 21 period of February through June in which the flow 22 23 proposal applies. So how do you balance that? So that 24 is the hard thing that the board has to deal with. So unlike the 2010 report, the SED that we 25

1 released back in September does all of the analysis. And 2 that is what this technical analysis is about is, "How do 3 you balance the flow proposal, the benefits of the flow 4 against the other uses of the water", and "What are the 5 water supply effects, the ag effect, the economic 6 effects?"

So tied to both the adaptive implementation and 7 the recognition that non-flow measures can be brought to 8 9 bear, the staff proposal recommends a range of 30 to 50 10 percent of unimpaired flow from February through June with a starting point of 40 percent so that you can 11 operate within that adaptive range to achieve goals of 12 fish and wildlife protection, but you make the best use 13 of the limited quantities of water. 14

15 It allows for flow shifting within that time 16 period. It also allows for flow shifting -- when I 17 say, "flow shifting," using a bunch of water, taking the 18 total quantity of water for that February and June and 19 shaping it to best achieve the fish and wildlife 20 protection goals. A portion of that water can also be 21 used outside of that February through June period.

22 So the final point to punch -- and why this is 23 hard -- is the flow proposal. Clearly then, it is not at 24 that 60 percent. It is at 30 to 50 percent with a 40 25 percent starting point. So it is less than what the science shows is needed, but it is more than what ag and
 urban users would want because it would require shifting
 some of that water from those uses to the fish and
 wildlife protection. But it gets at the core of what the
 state water board has to do. It is that balancing.

And because it is hard, the board -- there is 6 one final element here that I would like to call out. 7 It is that the adaptive implementation component and the 8 9 entire program implementation is intended to encourage and allow for settlements so that you can come up with a 10 solution that won't require the board to go, with the 11 risk of litigation and other things, through a lengthy 12 process, but rather to encourage local solutions that can 13 get the best bang for the buck with the limited 14 quantities of water. And that really is tied to that 15 adaptive implementation component. 16

17 So we are looking to local water agencies, local 18 interests, working with fish agencies and others to map out the foundation for the durable solutions. I know the 19 state water board has this proposal. You know, it has 20 been in communication with the -- and the California 21 Natural Resources Agency is the agency that is leading 22 23 settlement discussions. So as we are moving forward with 24 this proposal and these hearings and workshops, those settlement discussions are proceeding. And that is not 25

just for the San Joaquin River but also for the
 Sacramento River, to look for durable solutions for the
 entire Sacramento and San Joaquin Delta watershed.

4 So with that I am going to hand it off to Gita 5 Kapahi. Oh, and I also should have noted that I have 6 some folks with me here today. I will do introductions 7 after. I will let Gita go through her introduction.

8 GITA KAPAHI: Good morning, everyone. Again, 9 this is the second of two technical workshops. I am Gita 10 Kapahi. I am the director of the Office of Public 11 Participation. I will be facilitating the meeting today. 12 My job is to make sure that all of you get your questions 13 responded to and that we get out of here on time.

A couple of ground rules, if you could turn off 14 any noisemaking devices. And in the interest of time, if 15 you have clarifying questions during presentations, raise 16 17 your hand. If it gets too cumbersome, I may ask you to 18 hold them until the end of the presentation. And with the interest of time as well, I may limit how much time 19 you spend on your questions so we can get through 20 21 everyone.

There are speaker cards at the back of the room. They have boxes for the various subjects that we are covering today. We probably won't use them for the actual questions during the presentations, but at the end of the day if there are burning questions that you still want responses to, if you could fill them out with your contact information, we will make sure we have staff follow up with you. Finally, there are a couple of breaks during the day, and we will make sure that you get through everything.

7 And for those that are on the web, we want to 8 make sure that you hear the presentations and the 9 questions that are being asked. So again, we will have 10 microphones that are being brought through the room so 11 that you will be able to ask those questions and folks 12 can hear you on the web. Please, again, state your name 13 and your affiliation.

With that, we will turn to the first presenter. 14 LES GROBER: And actually, just for the morning 15 session, we have staff from ICF here this morning. We 16 17 have to my left Nicole Williams and then Anne Huber and 18 Bill Mitchell. We will have a rotating staff up here depending on the topics, but for this first morning 19 session before the morning break, it is going to be ICF 20 staff. 21

And now, I will turn it over to Nicole.
NICOLE WILLIAMS: Thanks, Les.
Good morning, everyone. My name is Nicole

25 Williams, and I am a senior environmental consultant with

the consulting firm ICF. I first have to apologize. I
 am suffering from a bit of a cold. So if my voice
 fluctuates or if you can't hear me, I will try to speak
 louder.

5 ICF has been assisting the state water board 6 staff with phase one of the update to the Bay-Delta Plan. 7 Today I will start off the second day of the technical 8 workshop with part one and provide a broad overview of 9 the analytical tools as they relate to the impact and the 10 economic analyses described in the SED.

The purpose of my presentation today is to 11 connect the analytical tools to the impact and economic 12 analyses. On December 5th, you heard about several 13 analytical tools including the water supply effects model 14 that influenced the impact analyses. Later today we will 15 provide more details regarding additional analytical 16 17 tools related to groundwater and economics. But before 18 we get to the rest of the day, I will provide an overview of the various analytical tools, the general types of 19 results, and how they are incorporated throughout the 20 impact and economic analyses. 21

22 So we will start off with an overview. I will 23 discuss those tools and how they relate to the resources 24 analyzed in the document. I will provide a bit more 25 detail about the different environmental variables analyzed for different resources and the types of results
 and information used in the analysis. Finally, I will
 walk through general methods and a few example resources,
 including hydrology and water quality, agricultural
 resources, groundwater resources, and service providers.

The focus of the presentation today is the 6 analytical tools and impact analyses that use or consider 7 output from these tools, as such assessments that did not 8 9 directly use these tools or did not consider results or 10 output from these tools are not being described. The presentation also generally focuses on the LSJR 11 alternatives. However, I will wrap up at the end with a 12 few additional considerations and some conclusions. 13

Here we have our first table. This table has a lot of information on it because there are a lot of different tools that are used in the SED. This table summarizes the water supply effects model, different fish habitat models and tools, the electrical conductivity increment analysis, the export analysis, and the types of results that are provided.

The WSE informs most of the resources evaluated in the SED because it provides results for reservoir storage, diversions, stream flow, and hydropower under each of the LSJR alternatives evaluated. The colors used on this table to identify specific tools are used

throughout the presentation. The tools identified in
 pink on the slide are grouped together because they
 relate to fish habitat.

4 The second table summarizes the different tools 5 related to groundwater, agriculture, and economic 6 analyses. The types of results that each of the 7 analytical tools provides is used either directly as 8 criteria in the impact analysis or is used to inform the 9 impact analysis, depending on whether the analysis is 10 ultimately quantitative or qualitative.

11 Now that we have a bit of an understanding of 12 the different tools and the types of results provided 13 from those, they can be matched to the different 14 resources in the SED. The next series of slides walks 15 through that matching. Analytical tools are on your 16 left, and resources are listed on your right.

The first one is the WSE model. The results of 17 18 the WSE model are used for the impact analyses for the resources highlighted here in blue, everything except for 19 groundwater resources. Again, resources -- these 20 impacts -- the impact analysis for these resources uses 21 output related to changes in reservoir storage, 22 23 diversions, flow, and hydropower. For example, impact flow 2 in Chapter 6, Flooding and Erosion, is using WSE 24 results and estimating the peak monthly flows on the 25

Stanislaus, Tuolumne, and Merced Rivers during the
 wettest years to analyze the potential for flooding
 impacts.

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Excuse me.

Here is our second tool. The EC increment 5 between Vernalis and the Southern Delta compliance points 6 uses WSE estimated flow and EC at Vernalis' impact. 7 So as we are getting into building this flowchart, you will 8 9 note that the larger arrow represents direct input from one analytical tool to another. Smaller arrows then 10 start to identify where the results of that tool are 11 used. There will be more large and small arrows to come. 12

The EC increment analysis helps describe 13 salinity and water quality effects and was used to 14 identify potential exceedances of salinity objectives and 15 salinity effects on Southern Delta agriculture and 16 service providers. Impacts water quality 1 and water 17 18 quality 2 in Chapter 5, Hydrology and Water Quality, and impact SP-2(A) in Chapter 13, Service Providers, uses 19 estimated changes during different parts of the year at 20 different compliance points to evaluate whether a water 21 quality violation would occur. Tim Nelson later today 22 23 will provide more information regarding salinity in the 24 Southern Delta.

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And we continue to build our flowchart. On

December 5th, you learned about the different tools
 related to fish benefits and fish impact analyses. They
 included HEC5Q, weighted usable area, and floodplain
 inundation analysis.

The HEC5Q model uses estimated flow of reservoir 5 storage from the WSE as input, and the output is 6 incorporated into impacts aqua 4 in Chapter 7, Aquatic 7 Biological Resources. WUA floodplain and export analysis 8 9 tools use estimated flow from the WSE for input, and the 10 output is used as impact aqua 3 and aqua 12 in Chapter 7 to evaluate changes in potential habitat and entrainment. 11 In addition, aqua 10 and impact aqua 11, predation risk 12 and disease risk, respectively consider the model results 13 of all of these tools. 14

Our next tool is the groundwater use analysis. 15 Output from the WSE model, including WSE results related 16 to reductions and surface water diversions, are used as 17 18 input to the groundwater use tool. There is some overlap between the WSE model and the groundwater use analysis, 19 but surface water diversions are key input. As such, the 20 groundwater use analysis tool uses the WSE model 21 estimated reductions and surface water supply. 22

This information is used to inform several
resource chapters -- groundwater, service providers,
energy and greenhouse gases, and then economic impact

analyses. For example, impact GW-1 and GW-2 in
Chapter 9, Groundwater Resources, uses predicted changes
in groundwater pumping and surface water recharge under
the alternatives based on water supply reductions to
identify potential impacts to subbasins. The potential
cost of groundwater pumping associated with reduced water
supply is discussed in Chapter 20, the Economic Analysis.

8 Much of the information related to this tool is 9 described in Appendix G, Agricultural Economic Effects of 10 the LSJR Alternatives Methodology and Modeling Results. 11 And the next presentation after the break will be about 12 the details of Appendix G and the input and output of the 13 groundwater use analysis.

Output from the groundwater use analysis is used 14 as input to the statewide agricultural production, or 15 SWAP model. Results from the SWAP model inform the 16 17 impact analyses for agricultural resources, particularly 18 impact AG-1 in Chapter 11, Agricultural Resources, and then are also used to inform the economic analyses 19 associated with a reduction of agricultural revenue and 20 regional economics in Chapter 20. This is also described 21 in Appendix G, and later today you will hear about the 22 23 details of those two models.

Output from the SWAP model is used as input tothe regional economic analyses of agricultural effects.

The SWAP estimates are aggregated into eight crop 1 categories from the impact analyses for planning, or 2 IMPLAN model, and the multipliers are applied to the crop 3 categories to determine potential regional impacts. 4 The analysis uses IMPLAN multipliers to identify the direct, 5 indirect, and induced effects resulting from the 6 reduction in agricultural revenue. The results of 7 regional economic analyses of agricultural effects is 8 9 used to inform all of the economic analyses summarized in 10 Chapter 20, and again, there will be more on this particular method today. 11

Output from the WSE is used as input for the 12 IMPLAN analysis to evaluate potential regional economic 13 effects associated with a potential water supply 14 reduction to the city and county of San Francisco. 15 The input to the analysis is the annual average New Don Pedro 16 17 Reservoir water bank deficit for a six-year drought period as created by WSE. Later this afternoon on our 18 19 agenda, the details of this analysis will be described, but the information is also contained in Appendix L, and 20 it is rolled up into the economics discussion in 21 22 Chapter 20.

This might be our last tool. Output from the WSE is used as input for the power flow analysis using PSLF, the positive sequence load flow model. The input

is the largest reduction in the cumulative distribution 1 2 for hydropower capacity in July and August, basically representing peak demand. Results of these analyses are 3 used to inform the energy analysis and to assess 4 electrical grid stability. This information is described 5 in Appendix J, and the information is also used in 6 Chapter 14 related to energy and impact EG 1, Chapter 14, 7 Energy and Greenhouse Gases. 8

9 So when we put everything together, we have over 10 ten analytical tools that are informing the impact analyses for various environmental resources and economic 11 effects. Now that we have some understanding of the 12 ten-plus analytical tools and how they align with the 13 resources, we can then begin to summarize the types of 14 environmental variables evaluated for the different 15 16 resources.

17 The next series of tables that I am going to 18 build on top of one another show the resources, tools 19 used, and the type of environmental variable evaluated in 20 the table cells. The first group of resources presented 21 in this table are water quality, flooding and erosion, 22 fish, terrestrial, biological resources, recreation and 23 aesthetics, and service providers.

The WSE model is used for all of these resources to evaluate impacts associated with changes in flow,

reservoir elevation, and diversions. It is depending on
 the resource, predicted changes in the timing, frequency,
 magnitude, and duration of a variable, which are
 evaluated as a part of the impact analysis. And I will
 summarize these changes when I discuss our example
 resources later in the presentation.

For aquatic biological resources, we use the 7 three additional tools in addition to the WSE to evaluate 8 9 impacts of water temperature and habitat, and you heard 10 the details about these on December 5th. In general, the results of these three tools address habitat variables or 11 functions that relate to the survival or growth of 12 different life stages of fish. This information is used 13 in the impact analyses in Chapter 7 as the particular 14 life stage of a fish as a line of the change estimated by 15 one of these analytical tools. 16

17 Then for water quality and service providers, we 18 use the EC increment analysis tool to estimate the timing 19 and magnitude of changes in southern salinity. And 20 finally, for official and service providers, we also use 21 the export analysis to evaluate the potential changes in 22 exports and in treatment.

Based on the existing Delta objectives and NIMS
biop rules, the most likely changes in export for each
month were estimated based on the changes in flow at

Vernalis simulated by the WSE model and the most likely
 regulations to be controlling the Delta exports for a
 given month. This estimation is ultimately used to
 evaluate effects on fish and service providers.

5 Similar to the other fish tools, estimated 6 changes in exports are aligned with the life stage to 7 evaluate impacts to fish, and a potential decrease in 8 exports was evaluated in the service provider's chapter 9 to identify whether impacts would occur to an export 10 service area.

And here is the second set of resources --11 groundwater, agriculture, cultural resources, service 12 providers -- again because it relies on additional 13 tools -- energy and greenhouse gases and economics. The 14 WSE model results are used in the evaluation of all of 15 these resources except groundwater. The groundwater use 16 17 analysis, SWAP, and regional economics are all used to 18 inform the impact analyses for these different resources, all except for cultural. And finally, our last two 19 IMPLAN for the city and county of San Francisco tools. 20 analyses and PSLF for the electrical grid stability. 21

22 So before getting into some of our example 23 resources, I am just going to walk through a few examples 24 of how the results are discussed in the document. 25 Results from the analytical tools are conveyed and used

in the SED in many ways. In many cases, the full
 distribution of results is presented either as tables of
 monthly percentiles showing the cumulative distribution,
 exceedance curves, or time series graphs.

And we will just walk through a few examples. 5 So here we have an exceedance curve -- oops. That was a 6 little too quick. Hydrologic conditions are often 7 described by showing exceedance curves or the cumulative 8 9 distribution. The exceedance curve is the reverse of the 10 cumulative distribution. For example, the 10th percentile value is exceeded 90 percent of the time. 11 This exceedance plot shows WSE flow results for the 12 Stanislaus River and gives a basic overview of how the 13 flows are expected to change on the Stanislaus River as a 14 result of the LSJR alternatives. It shows the amount of 15 increased flow for the full range of hydrologic 16 conditions for the full period of record. 17

This percentile table shows information that is 18 similar to the previous figure, namely the changes to the 19 Stanislaus River flow for a wide range of hydrologic 20 conditions, 10th percentiles to 90th percentiles, but it 21 shows values for all months separately. The cumulative 22 23 distribution of a particular variable -- for example, 24 flow at a particular location -- provides a basic summary of the distribution of the values. These results are 25

looked at to understand estimated changes within groups
 of years over the historic record. For example, dry
 years at the 10th percentile or wet years at the 90th
 percentile.

5 In some cases, results are presented as time 6 series plots to show the changes for all months. It 7 allows you to see the results over time for a particular 8 set of years or a particular month within a set of years. 9 Annual time series plots in Chapter 21, Drought 10 Evaluation, allow the reader to visually compare the 11 drought sequence with past drought sequences.

The previous examples identified are all used to 12 assess impacts in a general sense, but in some cases a 13 more precise metric is used to assess impacts based on a 14 particular resource being evaluated. For example, the 15 10th and 50th percentile values in this table, which I 16 showed you a few slides back, were used to assess the 17 18 potential for an increase in surface water contaminants under impact water quality 3 in Chapter 5, Surface Water 19 Hydrology and Water Quality. 20

For this assessment, any decrease in the median, the 50th percentile, or the 10th percentile flow of more than 33 percent was used as a metric for further evaluation. These percentiles were selected because they indicated lower flows where there might be a problem with surface water quality. As can be seen in this table,
 there were no decreases greater than 33 percent relative
 to the baseline flow, shown in purple bold numbers.

The specific methodology and approach for the 4 different resource impact analyses and economic analyses 5 describe the specific analytical tool or tools used, the 6 type of results used, and other information considered in 7 the impact analysis. However, I am going to walk through 8 9 a few common themes here about the methods. The entire 10 document is under the umbrella of a programmatic analysis. A programmatic document may be prepared on a 11 series of actions that can be characterized as one large 12 project and are related to logical parts in a chain of a 13 contemplated series of actions. 14

For example, specific measures to achieve the 15 flow objectives will need to undergo evaluation as to 16 whether additional environmental review is necessary. 17 18 Typically, programmatic documents have a broader approach to analyzing impacts. This also relates to how 19 reductions in surface water diversions were characterized 20 and analyzed in the document, and I will get to that in a 21 minute. 22

23 The analytical tools are used to produce
24 baseline results, which are then compared against
25 alternative results. However, other information can also

inform the baseline condition in the analysis. 1 For example, in Chapter 13, Service Providers, a broad 2 discussion of the different mechanisms of how service 3 providers receive water is provided and incorporated into 4 the analysis as well as the discussion of the 5 characteristics of the different types of service 6 providers. So, for example, those that rely solely on 7 groundwater and those that rely on a combination of 8 9 groundwater and surface water.

10 In general, impacts are typically assessed based on geography, which allows for distinctions to be made if 11 Ultimately the overall significance impact 12 needed. determination is a roll-up of different geographic 13 components. As such, analyses throughout the SED is 14 presented by alternatives, with or without adaptive 15 implementation, and generally provided by tributary, 16 17 river, watershed, or reservoir, depending on what is being evaluated. A lot of information is considered and 18 ultimately rolled up into a single impact determination. 19

20 So I am just going to walk through some 21 discussion points about surface water diversions and 22 reductions. Surface water diversions from the WSE model 23 include both agricultural and municipal water supply. We 24 cannot know where and exactly how water supply effects 25 will occur, and we cannot know all of the exact different permutations. As such, we look at surface water
 reductions slightly differently between different
 resources.

For the purposes of agricultural resources, the 4 full reduction on surface water supply would occur to all 5 agricultural crops. For the purposes of groundwater 6 resources, we link this to the agricultural analysis and 7 that the shortfall expected to occur in the agricultural 8 9 analysis would result in an increasing groundwater 10 pumping over a subbase scenario and a reduction in groundwater recharge. 11

12 Excuse me.

However, because the WSE includes municipal and 13 agricultural demand together, the analysis accounts for 14 the overall changes in supply as they relate to a 15 particular groundwater subbasin. For service providers, 16 17 WSE model results are considered to identify the potential magnitude for surface water reduction on a 18 particular river, but the impact analysis is also based 19 on service provider characteristics and that service 20 providers could experience some part of the reduction and 21 surface water supply that was assumed for agriculture. 22

In addition, in this service provider analysis,
our analysis for CCSF is quantitative and is based on WSE
model results over a six-year severe drought period, as

mentioned previously. Because of all of these different 1 2 considerations, the degree of impacts analyzed in the SED may be more conservative or worse than what might 3 actually occur because all types and magnitudes of 4 impacts cannot occur to multiple resource areas 5 simultaneously. For example, if CCFS were to experience 6 a reduction in water supply, or another water service 7 provider, agricultural resource impacts currently 8 9 disclosed in Chapter 11 could likely be reduced.

10 In addition to the previous methods we previously discussed, there are some general ways that 11 adaptive implementation is considered in the document. 12 There are four methods of adaptive implementation, which 13 generally allow for an increase or decrease of unimpaired 14 flow or shifting of that unimpaired flow between months 15 and within months. Frequently adaptive implementation is 16 17 addressed qualitatively in the document. However, 18 numeric results may be presented at either 30 percent or 19 50 percent unimpaired flow depending on the evaluation because method 1 could increase or decrease the 20 unimpaired flow by up to 10 percent within the range of 21 20 to 40 to 60 percent of unimpaired flow. 22

23 The analysis assumes that the adjustment to 24 unimpaired flow under adaptive implementation would be a 25 longer term. Typically, numeric results are presented if

there is a change in determination between 20, 40, or 60 percent unimpaired flow. For example, if there is a change in the determination between 20 and 40 percent, then the numeric results at a 30 percent unimpaired flow are presented and incorporated into the analysis to disclose the full potential effects.

7 So now, I am going to walk through some of the 8 resources evaluated and the different approaches and 9 tools within each of those resources for a particular 10 impact statement. I didn't include the specific impact 11 statements on each of these slides because there is 12 already probably too much text. So I will provide 13 summaries to those as I move along.

Impact water quality one and two discuss 14 potential increases in salinity in the Southern Delta 15 whereas water quality three is related to potential 16 17 increases in surface water pollutants generally. 18 Ultimately all impacts to water quality under the LSJR alternatives are less than significant because in general 19 increases in flow are expected to reduce salinity and 20 improve water quality. The interplay between the LSJR 21 alternatives and the SDWO alternatives is captured in 22 23 impacts water quality 1 in Chapter 5. The SDWQ 24 alternatives are not expected to cause a change in the Southern Delta salinity because under baseline 25

conditions, the program of implementation would require
 0.7 and 1.0 DSM to continue to be met at Vernalis.

Groundwater resources are evaluated based on 3 depleting groundwater supplies or interfering with 4 groundwater recharge or resulting in subsidence. 5 Groundwater resources were primarily evaluated 6 quantitatively. As discussed before, the full shortage 7 of surface water supply associated with the alternatives 8 9 is considered for each subbasin in the groundwater 10 analysis. This is considered using both the 2009 and 2014 maximum groundwater pumping capacity. 11

Ultimately, impacts to groundwater resources 12 under LSJR Alternative 3 with or without adaptive 13 implementation are significant and unavoidable because of 14 expected effects on the Modesto, Turlock, and extended 15 Merced subbasins without adaptive implementation and then 16 17 also on the eastern San Joaquin subbasin with adaptive 18 implementation. This is primarily attributed to method one as a result of an increase of unimpaired flow from 40 19 percent to 50 percent. 20

21 Impact AG-1 looks at the conversion of prime and 22 unique farmland of statewide importance to 23 nonagricultural uses. Impact AG-2 looks at other 24 circumstances which would convert farmland to 25 nonagricultural uses. The analysis uses information from

the WSE model and the SWAP model to analyze impacts. 1 The SWAP model cannot fully quantify whether an actual 2 conversion of prime farmland of statewide importance or 3 unique farmland to nonagricultural uses would occur given 4 the numerous factors, including individual decisions of 5 agricultural producers that influence potential 6 conversions. However, the model results were used as an 7 indicator of the amount of prime, unique, and farmland of 8 9 statewide importance that could be converted under each 10 of the alternatives. Ultimately, under LSJR Alternative 3, impacts are significant and avoidable for 11 impact AG-1. 12

Service providers were evaluated both 13 quantitatively and qualitatively within a particular 14 impact statement and between them. This is because we 15 were trying to accommodate many different types of 16 17 information to inform the analysis and because different 18 service providers have different circumstances and may react to a reduction to surface water in different ways. 19 For example, the extent to which service provider's 20 surface water supplies would actually be reduced is a 21 function of the mechanism by which they received the 22 23 water, such as water rights or contracts. It is also 24 influenced by existing policies, regulations, and the type of water they supply. 25

Some water supply contracts have provisions that 1 2 could dictate when and how much surface water municipal service providers receive from irrigation districts. For 3 example, contracts could require irrigation districts to 4 supply the full contracted amount of surface water to the 5 service provider at all times, including during dry 6 periods or water restricted periods. However, other 7 irrigation districts have policies in place that may 8 9 require the curtailment of water supplies for municipal 10 service providers during periods of service water reduction. 11

So the approach to analyzing service providers 12 tries to take into account all of these different 13 factors. Ultimately, impact SP-1 is considered to be 14 significant and unavoidable under LSJR Alternative 3 15 because it is expected that the construction of new water 16 supply facilities or waste water treatment facilities 17 18 would be needed that could cause significant 19 environmental effects.

20 There are a few more service provider impacts. 21 These three impacts are about violation of water quality 22 standards and changes in water supply associated with the 23 exports. They were evaluated qualitatively with the 24 results from the groundwater use analysis, the EDC 25 increment analysis, and the export analysis informing

them. Ultimately, SP-2A and 3 are less than significant,
 and 2B is significant and unavoidable.

There are a few common treatments about our 3 results in general in the document. We have relatively 4 few significant impacts in our LSJR Alternative 2 without 5 adaptive implementation. Impacts to resources that are 6 water supply dependent typically increase in severity 7 with the increase on the percent of unimpaired flow. 8 9 Adaptive implementation can either increase or reduce 10 impacts, depending on the increase or the decrease in the percent of unimpaired flow under method one. 11

12 The results from the analytical tools were used 13 to provide an understanding of the nature of the impacts 14 associated with the LSJR alternatives and the relative 15 magnitude of changes between the baseline and the 16 alternatives. Here is a roll-up summary table of the 17 different resources we just walked through, showing with 18 and without adaptive implementation.

So a few additional considerations, the
Sustainable Groundwater Management Act, or SGMA, is
incorporated into the analysis in a few ways as it
relates to groundwater and service providers. Under
impact GW-1, SGMA is discussed as it relates to potential
mitigation to groundwater resources. Since SGMA now
requires that local agencies form groundwater GSAs by

June 30th, 2017, in the critically overdraft eastern San
 Joaquin, Merced, and Chowchilla subbasins, they must
 implement GSPs by January 2020.

These plans must include measurable objectives 4 as well as milestones in increments of 5 years to achieve 5 the sustainability goal in the basin within 20 years of 6 the implementation of the plan. The sustainable level 7 pumpings to be determined by the different agencies is 8 9 unknown at this time and will depend on groundwater 10 recharge, which could increase or decrease. In our cumulative discussion for groundwater resources and 11 service providers, we identified that a cumulative impact 12 would not result to these resources because physical 13 effects to the existing subbasins would improve once 14 groundwater use becomes sustainable. 15

However, for agricultural resources, we have a 16 17 different story. SGMA was evaluated qualitatively for the cumulative impact analysis, which acknowledges that 18 SGMA requires sustainable groundwater management that 19 could result on limits on groundwater supply for 20 irrigation water. Historically groundwater has been used 21 as both direct irrigation and for surface water 22 23 replacement, especially under drought conditions when 24 surface water supplies are low. A reduced groundwater supply could result in a reduced number of acres that can 25

be irrigated and could result in the conversion of
 agricultural land. Therefore, in our cumulative impact
 analysis, we do identify that the potential effect when
 combined with the effects of the LSJR alternatives would
 result in a significant cumulative impact.

Non-flow measures, the document analyzes ten 6 non-flow measures qualitatively in Chapter 16. 7 These are related to habitat restoration, fish passage 8 9 improvements, and other measures related to predatory 10 fish control and evasive aquatic vegetation control. They range from floodplain and riparian habitat 11 restoration to implementing fish screens on unscreened 12 diversions. 13

The non-flow measures could inform the body of 14 scientific information potentially used to make adaptive 15 implementation decisions. We recognize that not any one 16 17 measure alone could fully inform the body of scientific information and a combination could occur. So we cannot 18 predict the combination of measures that could occur. 19 However, we disclose the types of impacts that are 20 associated with these different measures. 21

A few words about the SDWQ Alternatives 2 and 3, the water quality of the Southern Delta under SDWQ Alternatives 2 and 3 would not result in a change to the general range of historic salinity in the Southern Delta.

This is because the program of implementation included in
 these alternatives does not call for a change to the
 Bureau of Reclamation's compliance requirements at
 Vernalis. The relationship between the salinity at
 Vernalis and the Southern Delta is not expected to
 change.

Because the compliance requirements at Vernalis 7 are the same for the SDWO alternatives, the water supply 8 9 effects modeling for the LSJR alternatives include 10 effects that would occur under all SDWQ alternatives. Because of this, the SDWO alternatives are primarily 11 evaluated based on exceedances in EC, the potential to 12 result in new infrastructure to comply with potential 13 regional board requirements, and also the salt tolerance 14 for agricultural crops in the Southern Delta. 15

So over ten different analytical tools were used 16 in the SED to help either form or provide results for the 17 various impact analyses -- environmental impact analyses 18 and economic effects analyses. Results of the tools were 19 used quantitatively to evaluate resources such as aquatic 20 biological resources. Results of the tools were used in 21 combination with other information to evaluate resources 22 23 such as service providers, and different results were 24 used depending on the resource and how the analytical tool presented different information. 25

1

Thank you very much.

2 GITA KAPAHI: So with that, we will open it up 3 to questions. If you could raise your hand, and as I see 4 you, I will get you a microphone. There is one right 5 there.

MAUREEN MARTIN: Good morning. My name is 6 Maureen Martin, and I am from the Contra Costa Water 7 District. And I was just curious about your export 8 9 analysis, if you are planning on releasing the modeling 10 tool you used to estimate changes in exports or if you have any kind of modeling verification that you could 11 provide, you know, that shows the validity of how you 12 approximated the change in exports. 13

14 ANNE HUBER: First let me --

15 Is this working? Yes.

First let me mention that the methods are described in Chapter 5 and also Appendix F.1, and the equations used to estimate the change in exports are included within the WSE results file, which I believe is publicly available.

21 MAUREEN MARTIN: I guess I was just wondering if 22 you would also include -- if there is any evaluation --23 since they are approximations and not necessarily being 24 able to choose which -- anyway, in reality there are 25 multiple competing objectives that are governing export operations at any time. So I was just wondering if you
 had any way to corroborate your approximations with any
 kind of other models, like CalSim or historical results,
 just so you are providing some context with those.

ANNE HUBER: Well, the approach was to use the 5 regulation that was most likely to affect export 6 restrictions, and that was based on, you know, logic as 7 well as what -- as other types of modeling. Other 8 modeling like -- well, I have been involved in multiple 9 10 projects which we have estimated change in export based on actual flows and conditions in the Delta. And in some 11 cases, it is fairly clear, like in May and April, exports 12 are often limited to 1,500 CFS. So that is a fairly 13 large control on exports. 14

And in other cases, the restrictions are -there is a general pattern in which regulations are in control during particular months, but I agree that it is not always exactly the same.

19 LES GROBER: I just want to check your question. 20 Is that about corroborating with other models -- or I 21 mean, there is -- I think as you suggest, the operation 22 of the project is complex, and there can be a number of 23 things that can drive it. We have used just the basic 24 requirements/regulations to programmatically get a sense 25 of what the different level of exports would be. I'm

sure they could come up with different assumptions, you
 know, but as Anne had said, the model constraints and
 results are posted in our -- the files that we have for
 that analysis.

GITA KAPAHI: Other questions? There you go.6 Okay.

CHRIS SHUTES: Chris Shutes with CSPA with a 7 follow-up. So did you look at a variety of export 8 9 operations and evaluate different -- different operations 10 and the effects particularly on salinity based on those different export operations and what the differences 11 would be? And second question, where more precisely in 12 your appendices, which is rather large, can we find the 13 output and the analysis of the exports? 14

LES GROBER: We did not do different scenarios for exports. It was just one, the single run since it was not part of the project, looking at the exports. There is going to be additional analyses that will be done as part of phase two where there would be proposals for changing conditions in the objectives in the Delta, but that is not part of this project.

22 NICOLE WILLIAMS: I think you also asked where 23 in Appendix F.1, and we will look that up and get that to 24 you.

25

CHARLEY BRUSH: Charley Brush with the Bay-Delta

office. And I just had kind of a -- Les said earlier
 that flows -- I guess the diversions would be reduced
 from approximately 80 percent of San Joaquin flows to
 approximately 60 percent, leaving 40 percent as instream
 flows as an approximate ballpark.

And then in Nicole's presentation, there was 6 some question about how this would impact groundwater 7 pumping, and there is combined impacts of reduced surface 8 9 water and also the unknown impacts of SGMA 10 implementation. So I was wondering if in this combined analysis you see an increase in groundwater pumping or a 11 reduction in groundwater pumping or if you haven't really 12 answered that question. 13

14 So what do you think in the long term? Would 15 there be -- of course, there are regional geographic 16 differences. But in the, let's say, San Joaquin, 17 Tuolumne, Stanislaus, and Merced River basins, do you 18 expect an increase in groundwater pumping or a reduction 19 in groundwater pumping?

LES GROBER: The short answer -- and then stick around for the rest of today when we show how we do that analysis. But the short answer is, yes, we expect that there would be an increase in groundwater pumping. Going to the first part of the question -- and hopefully I didn't confuse things in talking about these different

percents. But the flow proposal is for keeping 30 to 50 1 2 percent of unimpaired flow, February through June, in the Merced, the Tuolumne, and the Stanislaus for the 3 reasonable protection of fish and wildlife, with a 4 starting point of 40 percent. 5

I think, as you said, if you do the math, that 6 leaves 60 percent to continue to do what it is doing, 7 being stored or directly diverted. That other number, 80 8 9 percent, that was just an illustration of just frequently how 80 percent, sometimes even more, of the water is 10 diverted or stored during that time period for other 11 purposes. When I say, "and more," that was something 12 that we covered at the workshop last Monday. Sometimes 13 in the single digits, it can be 5, 6 percent of the 14 unimpaired flow currently in the instream February 15 through June period. So I think you will get more 16 answers to your questions about methods and numbers with 17 18 regards to groundwater when we get into that session.

ANNE HUBER: And one other thing, I think your 19 question was about SGMA and what we expected under SGMA. 20 And as Nicole had mentioned, SGMA is considered 21 qualitatively in the cumulative analysis section. 22 GITA KAPAHI: Other questions? Back there.

23

24 ART GODWIN: Hi. Art Godwin with the Turlock Irrigation District. On the water quality -- the surface 25
1 water quality, did I understand you correctly that the 2 way you analyzed it was if there was a change of more 3 than a certain percentage of flow, then you would assume 4 there was an impact of water quality?

ANNE HUBER: That is correct for the general --5 for impact aqua three -- water quality three. The first 6 two impact analyses focus on salinity, and the third one 7 is more of a general assessment based on delusion 8 9 effects. And in general, the three tributaries have a 10 fairly high water quality, and it is unlikely that increasing the flow, as is expected under the 11 alternatives, would cause problems. 12

13 GITA KAPAHI: And can you get a little closer to 14 the microphone?

15ANNE HUBER: Okay. Should I repeat that?16ART GODWIN: I'm fine. I heard it.

17 ANNE HUBER: Okay.

18 GITA KAPAHI: Any other questions? Should we 19 take a break?

LES GROBER: We are actually a bit ahead of schedule, which is good because I think we have probably more depth in terms of groundwater. I would suggest perhaps a little bit early for a break, unless we want a five-minute break. I will tell you what, why don't we just take a very short break, a five-minute break, because we will get some other speakers up here to move
 into the groundwater session. So by -- the only accurate
 clock I see is that red one. 10:07? So let's just say
 10:15, we will get started.

5

6

GITA KAPAHI: Thank you.

(Whereupon a break was taken.)

7 LES GROBER: Okay. We are going to get started 8 again and now move into the groundwater use methodology 9 and results. And we have been joined now in addition by 10 Tim Nelson and Will Anderson, water resource control 11 engineers.

12 TIM NELSON: Hello. My name is Tim Nelson, and 13 I am a water resource control engineer here with the 14 board. I have been here for about a year and a half 15 after graduating from Davis with a master's in civil 16 environmental engineering. And so today, I am going to 17 present the groundwater assessment.

18 So the topics I am going to cover include an 19 overview of the analysis and what was performed, a 20 summary of the data used and the assumptions made as part 21 of the analysis. I will go over the methods and 22 calculations for determining groundwater pumping, and 23 then I will cover a few rules.

24 So what is the logic behind our modeling? So 25 based on the results of the WSE, we noted surface water diversions could be reduced as an effect of the potential unimpaired flow requirements. If possible, as we saw in the recent drought, water users would likely increase groundwater pumping to compensate for lost surface water supplies and avoid them in advance.

There are many ways to do this analysis, but we 6 assumed that water users could replace any applied 7 surface water shortage up to the maximum pumping 8 9 capacity. And this maximum pumping capacity is based on 10 the current infrastructure capacity, so the number and sizes of wells in each district. But in the future, it 11 may be limited by the Sustainable Groundwater Management 12 13 Act.

14 So the primary input for this analysis is the 15 surface water diversions for each district determined in 16 the WSE model. So the WSE gives us a total diversion for 17 each tributary. This diversion is then postprocessed, as 18 I will go over later. And we determine the applied 19 surface water, which we use in our groundwater equation 20 to determine the additional groundwater pumping.

Here is a map of our plan area. It includes four groundwater subbasins -- the Merced, Turlock, Modesto, and Eastern San Joaquin. All four of these basins are considered priority basins, and the Merced and Eastern San Joaquin subbasins are considered critically overdrafted. Overlying these subbasins are seven
 irrigation districts -- Merced; Turlock; Modesto;
 Oakdale; South San Joaquin; and the two CVP contracting
 districts, the Central San Joaquin Water Conservation
 District and Stockton East Water District.

So as part of this analysis, we are performing a 6 district groundwater balance. So here we have a 7 tributary, a generic district and its irrigated crops 8 9 overlying one of the groundwater subbasins. So it begins 10 with surface water diversions from a tributary into the district's distribution system from which there will be 11 losses for evaporation, surface water returns to the 12 tributary, and distribution system seepage. 13

Some of the districts may have municipal 14 deliveries to make, but the majority of their surface 15 water diversion will be used as applied surface water to 16 17 irrigate crops. Now, if there is a shortage in applied surface water, we assume that the districts can pump 18 groundwater up to the maximum capacity, and the total of 19 applied surface water and groundwater will be used to 20 satisfy crop consumptive use demands and account for 21 22 seepage passed through as deep percolation.

23 So for this analysis, we made some key 24 assumptions. The first is that groundwater pumping 25 occurs at the farm gate and is only used to satisfy crop

applied water demands. Of course, we assume that the 1 2 districts can pump as much groundwater as needed up to the maximum pumping capacity. And for the two 3 contracting districts -- the CVP contracting districts --4 we only model a portion of their demands that they divert 5 from the Stanislaus River, so about 155,000 acre-feet. 6 And we assume that both districts can fully replace any 7 shortage within this amount with groundwater. 8

9 So, of course, as part of the analysis, we want 10 to use the best available information. For many of our 11 terms, the agricultural water management plans served as 12 a source. In addition, we also sent information request 13 letters to each of the modeling irrigation districts, and 14 based on their responses, we were able to improve our 15 representations a lot.

Some of the parameters that we used these sources to estimate include district M&I deliveries, seepage from regulating reservoirs, minimum annual groundwater pumping, estimates of their maximum groundwater pumping capacity, distribution loss factors, and deep percolation factors. And I am going to get into all of these terms in just a little bit.

23 So now I want to go over the demand parameters, 24 what they are, and I guess, a little bit of where they 25 are from, and a little bit as well of how they are

represented. So the first one is municipal and industry
 surface water deliveries. So WSE represents three
 municipal deliveries from the districts. The first is
 from the Modesto Irrigation District to the City of
 Modesto to reduce their reliance on groundwater, and this
 equals about 30,000 acre-feet per year and is assumed to
 be fully delivered each year.

The second is deliveries from SSJID through the 8 9 Degroot water treatment plan to Manteca, Escalon, 10 Lathrop, and Tracy were about 15.7 TAF per year, which is also assumed to be fully delivered each year. The final 11 one represents SEWD municipal deliveries for about 10,000 12 acre-feet per year. Based on their contract, the 10,000 13 acre-feet of diversion from the Stanislaus is supposed to 14 be used for municipal demand. But since OID and SSJID 15 are senior to the CVP contracts, sometimes SEWD may not 16 17 receive supplies from the Stanislaus. And in that case, 18 it is assumed that any shortage in this delivery would be replaced with groundwater. 19

20 The WSE also represents three off-stream 21 regulating reservoirs that some of the districts use to 22 maintain water supply reliability. Now, each of these 23 reservoirs is usually maintained at full capacity. But 24 they are constantly losing water to seepage, and that 25 needs to be replaced. The first one is Woodward

Reservoir for SSJID, and it loses about 29.5 TAF per
 year; Modesto Reservoir for Modesto, which loses about
 31.2 TAF per year; and Turlock Reservoir, which loses
 46.8 TAF per year. And as part of these estimates, we
 assume that these estimates also account for any
 distribution seepage losses that occur in the
 distribution system prior to the reservoirs themselves.

There is surface water returns, so any water 8 9 such as operating spills or surface applied water runoff 10 that returns to the tributaries, so if there is any water diverted by the district that returns to the river. And 11 the estimates for spills and returns are from CalSim 2. 12 Here is a time series of annual surface water returns for 13 the irrigation districts from 1922 to 2003. We see that 14 TID, which has the largest area of the districts, also 15 has the largest returns, about 60,000 acre-feet in most 16 years except in really dry periods when it significantly 17 18 drops to about 20,000 acre-feet per year. And Merced ID has very little while Merced ID has very little return 19 20 flows.

The Merced ID also has a sphere of influence demands that it delivers to. So the first one is Bear Creek in the Merced National Wildlife Refuge, which is required delivery as part of the district's FERC license for New Exchequer, and so they deliver about 15,000

acre-feet per year. There is the Steavenson entitlement,
 which is an adjudicated delivery to the Steavenson
 Irrigation District of 24,000 acre-feet per year.

In CalSim, deliveries to the El Nido Irrigation 4 District are represented separately, and this is an area 5 south of the Merced Irrigation District. But it was 6 incorporated with the larger district in 2005. So for 7 the groundwater analysis, it is actually incorporated 8 9 with the district. And then finally other SOI demands, which represent voluntary water sales to the district of 10 16,000 acre-feet per year, and these are only delivered 11 if the district has fully met all of its demands. And it 12 is also assumed that any shortage from these demands, 13 apart from El Nido because it is represented with the 14 district, can be replaced with groundwater. 15

So distribution system losses are mostly seepage 16 17 from district canals and ditches but also include some 18 evaporation. So for this analysis, we represent the distribution losses as a percent of the total surface 19 water deliveries apart from regulating reservoir losses 20 and municipal deliveries, and this percent is calculated 21 based on information in agricultural management plans. 22 23 And so the distribution loss factor is equal to the 24 distribution seepage plus the distribution evaporation, so our losses divided by deliveries for applied surface 25

water, spills and returns, and for Merced, the SOI
 deliveries. And here is a table of the loss factors. So
 Merced irrigation has the largest of about 32 percent,
 and Modesto has the smallest of about 5 percent.

So deep percolation is represented similarly. 5 So this is the portion of applied water that seeps past 6 the root zone and back into the groundwater basin. So we 7 have presented it as a percent of the consumptive use 8 9 demand as being satisfied with the applied water. And 10 this is also calculated based on the agricultural water management plans and so the factors -- the plan's 11 estimate of deep percolation divided by the estimated 12 consumptive use. And here is a similar table of factors. 13 The CSJWCD WMP did not provide estimates for deep 14 percolation so we assume that their deep percolation was 15 the same as SEWD's. 16

17 So minimum groundwater pumping is any groundwater pumping performed regardless of year type or 18 surface water availability despite areas that may not 19 have access to the surface water distribution system. 20 So here is a bar chart of each district's minimum 21 groundwater pumping performed each year. TID has the 22 23 largest at 80.6 TAF per year. The first three -- SSJID, 24 OID, and Modesto -- these estimates are from their information response letters from 2015. Both TID and 25

Merced are from their agricultural water management
 plans.

The last demand term is the consumptive use of 3 applied water, so pretty much the focus of the irrigation 4 districts to supply irrigation water. And so this is the 5 portion of applied water that supports crop growth 6 through evapotranspiration. And as was described in the 7 presentation last Monday as part of the WSE, the CUAW 8 9 demands are based on the CalSim 2 demands. And so here 10 is a time series of annual consumptive use demands for each district, 1922 to 2003, and we see it varies by year 11 based on local weather conditions and local water 12 13 availability.

14 So a large part of the groundwater analysis is 15 based on how we use our surface water, how much of it is 16 going to be delivered for applied water, and how much 17 reaches the crops. So first I am going to go through how 18 we take the WSE total tributary diversions and divide it 19 up among the districts and how it reaches its end use.

20 So first I am going to describe it in words. So 21 where more than one district diverts water from a 22 tributary, it will assume that each of these districts 23 will receive an equal percent of their crop surface water 24 demand, which I will define in a minute. So in times of 25 shortage, both districts received the same shortage relative to their demand after accounting for the minimum
 groundwater pumping.

On the Merced River, Merced ID makes 100 percent of the diversions, but some water is also passed through a sphere of influence demands. And for the two CVP contractors, they only receive water from the Stanislaus after SSJID and OID have made their diversions because those are senior districts.

9 I am about to go into a bunch of math. So 10 first, I wanted to define some terms. So the total surface water available for diversion on each 11 tributary -- and I define tributary terms with a 12 subscript of "T." This is DIVT, total diversion, and 13 this is the primary input from the WSE. For parameters 14 that are specific to each district, I define them with a 15 subscript "Z." And these include distribution loss 16 17 factors, "DF"; deep percolation factors, "PF"; the crop 18 COAW demand, "CDEM"; the crop surface water delivery, "CSW"; and the applied water demand, "AWDEM," which is 19 equal to the crop demand times one for itself plus the 20 deep percolation factor to account for any associated 21 deep percolation. 22

And if you get lost during any of this map I am going to go through, please raise your hand or yell out. Are we good now? Okay.

1 So the first step is to take out any off-the-top 2 demands. These are demands that we assume are fully 3 satisfied in each year. So we start with our total 4 tributary diversion, DFT, and we subtract out terms for 5 reservoir losses, M&I deliveries, and return flows along 6 with their associated distribution losses for each 7 district on that tributary.

8 For Merced, we also subtract out deliveries to 9 the Merced National Wildlife Refuge and to Steavenson 10 along with distribution losses. After subtracting all of 11 these terms, we end up with the total tributary diversion 12 available for farm demands, so consumptive use and any 13 deep percolation. So DIVFT is the farm diversion.

So these remaining diversions are used to 14 satisfy district crop demands and any associated deep 15 percolation distribution losses. Therefore, we can write 16 17 it also as the farm diversion is equal to the sum for all 18 districts on the tributary of the crop surface water delivery times one, plus the percolation factor times 19 one, plus the distribution loss factor. So it is just 20 the remaining demands that it can be delivered to. 21

22 What we want is the crop surface water delivery 23 because this will tell us how much surface water is used 24 as applied water in our groundwater calculations. So for 25 the Tuolumne and Stanislaus, it is -- well, I guess,

first, on the Merced, this equation is easy to solve for 1 2 because there is only one district. So there is no summation, and there is only one unknown. But for the 3 other two rivers, there is two districts. So we have two 4 unknowns in the equation. So for those rivers, it is 5 assumed that the diversions are divided between the 6 districts so that both districts meet the same percentage 7 of their crop surface water demand. 8

9 So crop surface water demand is the remaining 10 crop demand after accounting for minimum groundwater pumping, so the portion that would be ideally satisfied 11 with surface water. And so the crop surface water demand 12 times this percent that we say is the same for both 13 districts is known as XT and should equal our crop 14 surface water delivery. The crop surface water demand is 15 the COAW demand that remains after accounting for minimum 16 groundwater pumping. And so we need to remove the 17 minimum groundwater pumping from our consumptive use 18 19 demand.

20 So it is easier to start this derivation by 21 looking at the applied water. So the applied surface 22 water demand is equal to the applied water demand minus 23 minimum groundwater pumping. These applied water demands 24 equal to a crop -- either crop surface water demand times 25 one plus the percolation factor or the total crop demand times one plus the percolation factor. And so in this case, we want the crop surface water demand so we can rearrange, and we end up with the crop surface water demand is equal to the total crop demand minus the minimum groundwater pumping divided by one, plus the percolation factor.

7 So this -- so we want to know how much of the 8 minimum groundwater pumping is actually used to satisfy 9 crop demand. And so dividing by one plus the percolation 10 factor will account for any deep percolation that would 11 have occurred.

12 So now we have all of the estimates that we need 13 to calculate our X of T, the percent of crop surface 14 water demand met. So combining our equations, we get our 15 total farm diversions on the tributary are equal to the 16 crop surface water demand times our percent, multiplied 17 by one plus the percolation factor, and times one plus 18 the distribution loss factor for each district.

19 Now X of T, XT, is the same for both districts 20 so it can be taken out of the summation. And since it is 21 the only thing we don't know, we can rearrange. And we 22 get our percent of crop surface met, which is the total 23 farm diversions divided by the sum of crop surface water 24 demand times one, plus the deep percolation factor times 25 one, plus the distribution loss factor. So it is the sum 1 over both districts on the tributary.

And now with X of T, we can plug it back into 2 the equation for surface water delivery, and we have --3 and we now know how our surface waters are -- how our 4 surface water diversions are used to meet component 5 demands. And this now leads into our groundwater 6 calculation. We have the use of applied surface water 7 and our minimum groundwater pumping. In times of surface 8 9 water shortage, we want to know how much additional 10 groundwater pumping we can use.

So this assumes that in times of surface water 11 shortage, districts are going to increase groundwater 12 13 pumping to compensate. And so the increased groundwater pumping here adds groundwater -- it should be Z. The 14 additional groundwater pumped for the district is the 15 minimum between any leftover demand after applying 16 17 surface water and minimum groundwater pumping. It should be the applied water demand minus the applied surface 18 water minus the minimum groundwater pumping, or the 19 available pumping capacity, so the maximum groundwater 20 pumping capacity minus the minimum groundwater pumping 21 22 capacity.

23 So a high value of maximum groundwater pumping 24 can reduce agricultural impacts, but it also increases 25 the potential for groundwater impacts. So it is a

balancing act. Now, for the analysis, we looked at two
 different maximum groundwater pumpings, one to represent
 2009 infrastructure and one for 2014 infrastructure after
 the recent drought because a lot more wells have been
 drilled.

6 Before the 2009 scenario, we looked at it 7 because it corresponds with the initial notice of 8 preparation for the SED. We used irrigation district 9 capacities based on 2012 AWPMs and information therein. 10 And as mentioned before, the contracting districts we 11 assumed could fully replace their Stanislaus River supply 12 with groundwater.

For the 2014 scenario, we had asked the 13 districts directly for current estimates of their 14 groundwater pumping capabilities. So it takes into 15 16 account wells drilled from 2013 to 2015. And in this scenario, SSJID, OID, Modesto, and Turlock capacities are 17 18 based on their 2015 information request response letters. But for the impact determinations in the SED, we used the 19 2009 scenario results because the 2014 scenario is even 20 more -- or is more unsustainable. And with SGMA, it 21 doesn't seem likely for it to continue. 22

23 So here is a chart of the minimum groundwater 24 pumping and the two estimates of the maximum pumping 25 capacity. We see that for Modesto and Turlock, there was

1 a large increase in groundwater capacity over this recent 2 drought period to avoid unmet demands. For Merced, we 3 did not get an estimate of their current groundwater 4 pumping, but they already had such a high capacity that 5 we assumed that they could already account for most of 6 their loss -- any unmet demand with the 2009 7 infrastructure.

So now I will cover just a few results. So here 8 9 we have a time series of total applied water for Merced 10 Irrigation District. It is the black line broken down into the sources of how it is satisfied. So the purple 11 bar down at the bottom is the minimum groundwater 12 pumping, and it is virtually constant, the same for 13 almost all years. Then the light blue section is the 14 surface water deliveries. See, under baseline, they 15 usually were fully satisfied with surface water. In a 16 17 few of these drier years, in '77 and the early '90s, they 18 had to increase the groundwater pumping, and so the additional groundwater pumping is the red section. 19 And if they reach the capacity for groundwater pumping and 20 there is an unmet demand, this is the white portion 21 beneath the black line. 22

23 So comparing this with the same situation on our 24 40 percent unimpaired flow alternative, we see a large 25 increase in groundwater pumping to replace surface water

shortage but not a lot of increase in unmet demand or
 agricultural shortage because Merced has such a high
 groundwater pumping capacity.

So here is the annual average for all years and 4 then by water year type for groundwater pumping over all 5 of the irrigation districts. So we see that on average 6 for all years, there is an increase of about 104,000 7 acre-feet per year in response to the 40 percent 8 9 unimpaired flow objective, but most of this increase is 10 coming in dry and critical years. Particularly, in dry years, as in critical years, they have already met their 11 capacity under baseline a lot of times. 12

At the same time, there is also a decrease in 13 annual groundwater recharge from the districts because 14 there is more surface water shortage, and they reach 15 their groundwater capacity more. There is more unmet 16 17 demand, and so there is less deep percolation and at the same time, less surface water diversion and less 18 distribution losses. So we see about 80,000 acre-feet of 19 annual recharge across all of the districts, but most of 20 21 it is coming in dry and critical years.

Finally, I want to take a look at the net input from the districts. So if you subtract the groundwater pumping from the groundwater recharge, you get the net input associated with the districts. So here we see

under baseline, we have a relatively high net input to 1 the groundwater subbasin, and as you increase your 2 unimpaired flow objective to the right, you see they 3 start to decrease as they have less recharge and are 4 doing more groundwater pumping. But even under the 40 5 percent unimpaired flow objective, they still have a 6 positive net input to the groundwater subbasin. So they 7 are net contributors to groundwater storage. 8

9 And so for further information, please look at 10 Chapter 9, the Groundwater Resource Analysis, and in 11 Appendix G, which contains all of the modeling and 12 assumptions used for the analysis. And both of these can 13 be found on the Website. Thank you.

14 GITA KAPAHI: Thank you, Tim.

15 With that, we will open it up to questions. Can16 I get the microphone? Thank you.

17 UNIDENTIFIED SPEAKER: Thank you.

You mentioned that 2014 groundwater is not sustainable, and so that is why you used 2009. Does the board believe that 2009 is sustainable?

LES GROBER: That is a good question. The issue of sustainability, that is an important question. So I think the way to frame the 2009 versus 2014 is that 2014 is less sustainable. There is a lot that goes into the question of sustainability. In what we describe, even using the 2009 rates of groundwater pumping, there is an
 increase of groundwater pumping over the current
 condition, and we go into some discussion about those
 numbers and how it relates to the current rate of pumping
 in the area. But the question of sustainability is that
 big question that has to be answered by SGMA.

7 UNIDENTIFIED SPEAKER: And also, what is the 8 planning horizon? Perhaps in the short time you can 9 compensate for the loss of surface water by repumping 10 more groundwater, but in the long run, that is very 11 programmatic. So what is the planning horizon of this 12 study?

LES GROBER: So as the introduction showed, the last major update of the plan was in 1995. We are updating it now, you know, 20 years later. So we are required to periodically update the water quality control plan. But it is that 10- or 20-year horizon over which it would be reevaluated and updated again.

19 So that is the reason we handled groundwater 20 issues and SGMA in the plan, in that we expect based on 21 the observation of what happened in the recent drought 22 that there would be some level of increased groundwater 23 pumping. We selected 2009 rather than 2014 for the 24 reason that I said, that it is less unsustainable in 25 general. SGMA is going to have to determine that 1 sustainability.

But there will be other things that will likely 2 be happening in the next few years, things like 3 additional groundwater recharge, things like that, 4 response to the program here. So a lot of that starts 5 becoming quite speculative. So the short answer is the 6 planning horizon is about 10, 20 years in terms of the 7 frequency of the update of the water quality control 8 9 plan.

10

UNIDENTIFIED SPEAKER: Thank you.

ART GODWIN: I am curious why you used CalSim for some of the input data and you used the ag water management plans for other input data. For instance, you had district spills, and that was from CalSim. But then you used the ag water management plan to develop other demand data within the district.

17 LES GROBER: Because in some ways, though, this is not the whole suite of models -- and I will let Tim 18 add. The whole suite of models is not as limited of a 19 dynamism. It is not a dynamic model in terms of surface 20 groundwater interaction, but we are perturbing the system 21 here with changes in surface water supply and things like 22 23 that. So we relied upon the ag model plans rather to 24 come up with a more targeted run that gets at answering the question in terms of surface water, groundwater 25

1 response, and those such changes rather than CalSim.

2 ART GODWIN: So I am wondering why you used 3 CalSim for some of the inputs and you used the ag water 4 management plan for other inputs.

WILL ANDERSON: Art, that is a really -- you can 5 see why that is a question. However, we used the spills 6 in CalSim because that is what the WSE water balance --7 the surface water balance is based on, and if we -- we 8 9 basically keep those the same. But it doesn't alter the 10 effect -- it doesn't have a lot of effect on the actual applied water calculation because the operational spills 11 and returns are going back to the river. And so those 12 are essentially a passthrough for the applied water 13 component. 14

So it is -- it really doesn't -- it doesn't 15 cause a mismatch, if you see what I am saying, because we 16 17 are really concerned about the fate of surface water 18 diversions that do not return to the river. If they return to the river, you could say, "Spills are X" or 19 "Spills are Y." But the fact that they are going back to 20 the river is consistent in WSE, and they are not part of 21 the applied water, if that makes sense. 22

ART GODWIN: Yeah. And then I am not following
Les' explanation earlier on why you didn't just stick
with CalSim since CalSim already has surface water

diversions, already has an ag demand component to it, has
 groundwater surface returns, et cetera.

3 WILL ANDERSON: Well, we could do that, but we 4 really believe that the ag water management plans are a 5 really good, updated, more recent source of data that is 6 published by those who really know the water balance more 7 recently than the most recent update to CalSim.

8 ART GODWIN: Then that goes back to my other 9 question about, "Well, why did you use some of the ag 10 water management plans and not the rest?" Because the 11 management plans have spills in them as well. So just --12 WILL ANDERSON: Because it is a passthrough. 13 ART GODWIN: Well, I know, but that doesn't 14 answer why.

LES GROBER: We are trying to maintain some of 15 the -- I mean, the backbone for the water supply effects 16 17 is CalSim. So every time you, kind of, make a change, it 18 has, you know, some other effect. So we made the adjustments to CalSim that actually improve the response, 19 if you will, in terms of information that is provided by 20 the ag water management plans in terms of what we expect 21 in terms of responses of the districts to the reduced 22 23 surface water supply and groundwater pumping.

24 But changing things like spills, which is kind 25 of like, you know, a fundamental part of the CalSim

construct would become a more difficult exercise, and as
 Will suggested, it doesn't change the results.

3 ART GODWIN: Well, it would change the results,
4 wouldn't it, when you look at your --

GITA KAPAHI: Can you use the microphone? 5 ART GODWIN: Sorry. It would change your 6 results, wouldn't it, for your equation for determining, 7 for instance, the -- I don't know which equation it was 8 9 but one of those factors. I don't recall which one, but 10 it seems like -- because this is basically a water balance. You are looking at what got diverted, and you 11 are subtracting losses and evaporation. And you are 12 including the consumptive use of the crop. Somewhere in 13 there, spills is -- are you using spills just to balance 14 it out? 15

16 TIM NELSON: Like I said before, the spills are 17 a passthrough. The only way that that enters this 18 balance would be the fraction that is lost from the 19 distribution system on that passthrough.

20 ART GODWIN: Okay. So it was the distribution? 21 TIM NELSON: Right. So that is going to be --22 that amount is -- it is a fraction of a fraction. So if 23 you are looking at what that difference is, it is going 24 to be a relatively small difference in the scheme of 25 things here. One of the other things -- I mean, it is a

good topic, returns and spills, because one might ask, "Well, what happens if in response to this, people become more efficient and reduce their spills and return flows?"

And so we thought about that. Essentially, when 5 we have it here as a passthrough, the same as 6 CalSim, "Okay. Go ahead and reduce those operational 7 spills. Then you will need to divert less in that 8 operational regime." And so if it is just left in the 9 10 stream, that doesn't change the hydrologic water balance, the WSE balance. So it is either going to be going 11 through the stream or going through as a passthrough 12 additional loss. 13

14 ART GODWIN: Right.

15 LES GROBER: And it doesn't change the water 16 supply effect.

17 ART GODWIN: Right. But it does change what18 ends up at Vernalis.

19 LES GROBER: Well, no. I think that is what 20 Will's explanation was because the requirement for the 21 instream flow is at the confluence for each of the 22 tributaries. So --

23 ART GODWIN: Right. But the spills don't24 necessarily happen at the confluence.

25 WILL ANDERSON: Right. It would be back in the

1 stream.

2 AMY: Right. As a follow-up to Art's
3 questions -4 GITA KAPAHI: Can you please state your name?

5 Thank you.

6

AMY: Amy -- okay. Thanks.

So just to clarify, is it only the spills, the returns, and the max and min pumping rates that are different from CalSim? Or I think I read somewhere that the consumptive use of applied water was also adjusted.
Was that adjusted to the daily operations model?

WILL ANDERSON: No. Not to the daily operations 12 The -- starting with the CalSim consumptive use 13 model. demands, which is basically the crop ET demand, that is a 14 time series -- a monthly time series that will change 15 with regards to climate, lower needs, and wetter years 16 with more precipitation. To translate from the COAW, or 17 18 crop demand, to the diversion demand, you have to add up all of these components. All of these components are the 19 distribution losses, reservoir losses, return spills, all 20 of the things that would have to be diverted in order to 21 get that crop demand met. 22

23 So the total surface demand is made up of those 24 components based on the fractions from the ag water 25 management plans for all of the things except for those

operational spills. So that is where CalSim had the
 value of, "Okay. 30 percent deep percolation and 10
 percent distribution losses." That is kind of their main
 assumption that they use in a few different places.

We have got better information than that. So we 5 use the fractions that were published. Once you add all 6 of that up to a total surface demand or diversion 7 demand -- the point of diversion -- you can then look at 8 9 the spectrum -- the demand curve when it is totally met, and we would have to adjust that then to what has been 10 observed with diversions. By "observed," I mean you can 11 look at what CalSim actually diverts when it meets full 12 You can look at what an operation meets at full 13 demand. demand. You can look at the ag water management plan 14 diversion to meet total demand. And those are three kind 15 of different views at the total demands. 16

17 We think that operations models are probably a 18 really good representation of that over many years. CalSim is over the longest time span, but we are a little 19 bit skeptical about, you know, where that exact level is 20 because sometimes it can be based on older estimates. 21 The aq water management plans are the most recent 22 23 estimates but may only be for a couple of years. Though, 24 with those three different views, we have to take the weight of all of that evidence and land on what is a 25

total demand. And so that is why we adjusted the
 consumptive use demand that scales the total demand to
 the best available estimate of district demand.

4 AMY: So it is scaled to the agricultural water 5 management plans and not CalSim?

6 WILL ANDERSON: For the most part, the scaling 7 was done to the operations model representations of 8 demands, since we have the operations models for each 9 tributary.

10 AMY: Oh, okay. Thank you.

11 UNIDENTIFIED SPEAKER: You said you used the 12 operations model for each tributary. Which operations 13 models are those?

14 WILL ANDERSON: So for the Tuolumne, we have the 15 Tuolumne FERC process operations model. For the Merced, 16 we have the same from Merced ID. And also on the 17 Stanislaus, there is the CalSim runs that were done by 18 Steiner as part of the San Joaquin Tributaries Authority 19 interm plan of operations reports, and those incorporate 20 the 1988 agreement, total diversions, and so on.

21 So we really have to think long and hard 22 about, "What does that mean to have the total diversions 23 met and what that level is?" So in terms of getting 24 feedback and comments on the values that we use, that is 25 exactly what we are here to talk about and would expect to hear back on those numbers. And I would be happy to
 clarify, either now or through further correspondence, on
 those values and how these work.

4 UNIDENTIFIED SPEAKER: Just a general question, 5 if I could. You had access to CalSim; you had access to 6 the three tributary models. And yet, you developed a WSE 7 model. So what was wrong with the other models?

8 WILL ANDERSON: Mainly --

25

9 UNIDENTIFIED SPEAKER: I am familiar with the 10 Tuolumne model, and I know you can adjust flows, 11 diversions, everything else you want to do with that 12 model. And I am wondering why that didn't fit your 13 purposes.

14 WILL ANDERSON: Well, one might use different 15 tools for different evaluations. We found that putting 16 it in the spreadsheet was the most flexible way to 17 implement the instream flow alternatives and determine 18 the amount of additional flow in the river and the 19 effects of that.

20 UNIDENTIFIED SPEAKER: Well, I mean, the 21 Tuolumne is a daily operations model, and you went with a 22 monthly operations model and then disaggregated that to 23 whatever for the temperature study. So just an 24 observation. You don't have to answer it.

SUSAN BERK: Hi. My name is Susan Berk. I am a

resource economist working for some of the irrigation 1 districts in the region. Just switching gears a little 2 bit, I do still want to talk about groundwater but not 3 operations models. Quoting here from Appendix K, the 4 water quality appendix, you state that the state water 5 board must consider in establishing water quality 6 objectives the need for developing housing within the 7 region. So that is just from the water code. 8

9 And I am curious to know -- as an example, the 10 population of Merced County as well as actually Stanislaus and San Joaquin are projected to continue to 11 outpace the population growth in the state. They are 12 expected to grow between 3 and 4 percent a year through 13 2050. Understanding that a lot of the municipal 14 providers as well as the rural service providers as well 15 as domestic wells require, you know, sustainable 16 groundwater use for housing, I am wondering where in the 17 18 SED you spoke to this issue about how additional groundwater pumping would affect the ability for the 19 region to continue to develop housing at a pace that is 20 needed. 21

LES GROBER: There is some discussion at that looking at the county plans in the cumulative impacts analysis.

25

SUSAN BERK: What was the result of that? I

have been through the document, but I have to admit I 1 2 haven't been through every single page of it. So what was the takeaway from that analysis? 3

LES GROBER: That there would be additional 4 groundwater pressures and needs for groundwater surface 5 water for developing -- accommodating population growth. 6 7

Anne --

ANNE HUBER: In addition, there is discussion in 8 9 Chapter 13 about how municipalities would respond to a 10 shortage in water and discussion about how there may be a need prior to full implementation of SGMA to increase 11 well depths or pumping, if necessary. 12

SUSAN BERK: Okay. Because is it covered as 13 a -- I didn't notice that there was an environmental 14 justice section, but one of the things that does strike 15 16 me about this is that the median household income is much 17 lower in this area than it is throughout the state, and 18 this is some of the last affordable housing in the state. So the impact is actually probably on disadvantaged 19 communities in terms of how they would pay for those well 20 depths, et cetera. Is there acknowledgment of the EJ? 21 22 LES GROBER: I just want to bring us back to the

23 technical nature of this here. If you have policy comments, then I encourage you make those at the 24 hearings. 25

SUSAN BERK: Well, technically the EJ is a - should be a section of the document, right, the
 environmental document? It is okay.

4 ANNE HUBER: I just want to add that there is 5 some discussion in Chapter 22 about disadvantaged 6 communities.

VALERIE KINCAID: Thanks. Valerie Kincaid, San 7 Joaquin Tributaries Authority. On slide 20, you begin to 8 9 talk about the calculations for the groundwater analysis. 10 I think the top of that slide says that the DIVT is from the WSE, and that is consistent with my reading of the 11 document as well. But it is inconsistent with the 12 earlier presentation that Nicole made, and there were, in 13 the WSE, a number of lines pointing to the analyses in 14 the document. And interestingly the only error that was 15 missing in that was a WSE groundwater line arrow. So I 16 guess my question is: Is the groundwater analysis based 17 18 on the WSE model or not?

ANNE HUBER: I can answer that. Nicole's lines were direct links. So the WSE results were not directly used for groundwater analysis. Instead, they fed into the -- well, they were not used directly in Chapter 9. Instead the WSE results fed into the groundwater use analysis, which then fed into the Chapter 9 discussion. VALERIE KINCAID: So they are the top -- I mean,

1 the WSE inputs are the top line here, though, of the 2 groundwater analysis; is that right?

3 ANNE HUBER: Yes. All we are saying is that the 4 WSE results fed into the groundwater use analysis, which 5 then fed into the discussion in Chapter 9.

6 VALERIE KINCAID: All right. I had questions 7 about that slide when it came up. If this presentation 8 is being circulated elsewhere, we might want to improve 9 that. I think that is misleading in saying that the WSE 10 doesn't actually drive the groundwater analysis and 11 results, and I don't think that is the case.

So I have a second question. So on slide 26 --12 there we go -- Tim did a very good job of walking through 13 a lot of the inputs for the calculations. But one of the 14 inputs that I think you all know I have a continuing 15 curiosity about is the max groundwater input. And that 16 wasn't walked through specifically. I am wondering if 17 18 Tim could take some time. And I think the following 19 slide tries to go into it, but I still have a lot of questions about not necessarily why you used 2009 versus 20 2014 data but why we are calling it a maximum groundwater 21 number and how that max groundwater calculation was made. 22 23 TIM NELSON: The maximum groundwater pumping, it 24 is just the, I guess, how much can they pump based on their infrastructure. So in that equation, they can't 25

pump any more than that, even if they wanted to, to meet
 their demand.

3 VALERIE KINCAID: Are you saying it is a maximum 4 capacity? Because my understanding from reading the SED 5 is that is not the case. 626,000 acre-feet is the 6 combined maximum total groundwater capacity pumping, and 7 as you see in that chart, you are showing it in the 8 mid-200s.

9 TIM NELSON: These are by district. The 626 is10 for all of the districts combined.

VALERIE KINCAID: Okay. But also in the 11 document, there are times where max groundwater pumping 12 doesn't equal the maximum capacity. Right? You have 13 different years. You have above normal years and 14 different years that drive that calculation. It doesn't 15 seem like a static number. So I quess my question is: 16 Are you saying the maximum groundwater number on slide 26 17 is a static number? And if it is, can you tell me where 18 you got it? 19

20 TIM NELSON: It is a static number, and for 21 2009, it is from the 2012 AWMPs. And for 2014, it is 22 from the district response letters, at least for the 23 indicated districts. And --

24 VALERIE KINCAID: Do you have the -- and you
25 don't have to provide them now because I wouldn't have

them if I were you, but if you have the page numbers from
 where you got those in the AWMPs, that would be helpful.

3 TIM NELSON: They are in Appendix G, but I don't
4 have it with me to give you --

5 WILL ANDERSON: Valerie, a month ago in Modesto,
6 I showed you that Excel file --

7 VALERIE KINCAID: Right.

8 WILL ANDERSON: -- that has all of those 9 referred out, and I think it might be useful for us to 10 put them on a white paper, just so it is abundantly 11 clear.

12 VALERIE KINCAID: It would be useful, and I 13 appreciate that. I have gone through that, and I still, 14 frankly, can't match up the data. And we have had other 15 people who are much more technically savvy than me look 16 at it, and we still can't match up the data. So we still 17 have a lot of outstanding questions on that issue.

18 WILL ANDERSON: Your point is well taken.
19 LES GROBER: And I just want to make sure I
20 understand on the question, you are saying you are not
21 finding that -- though that is a hard number, that max
22 pumping, you don't see that we are relying upon it up to
23 that amount in years?

24 VALERIE KINCAID: I am actually not saying that25 it is a static number. So that was my first question. I

understand that that was Tim's answer. But I have dug
 down a lot of this, and it is not a static number. So
 maybe that is not part of the problem.

And if it is a static number, my question is: 4 Where are you getting an ag water management plan? 5 We have looked for that, and I don't see that anywhere in 6 our ag water management plans. So my only assumption can 7 be that it is a calculation of some sort. That is an 8 9 assumption of mine because I can't find it. And if it is 10 a calculation, which I think it is because, like I said, there is different numbers for above normal, dry years, 11 and different year types. So I guess I am not finding 12 that in the aq water management plan, and I am wondering 13 if there is a calculation behind what it is. And if 14 there is not, where specifically it comes from. 15

16

LES GROBER: Okay. Thanks.

17 WILL ANDERSON: I am going to try and address that just one more time because I know it has been a 18 source of confusion. When we show summary statistics by 19 year type, we would say, you know, wet year, dry year, 20 critically dry year. Those statistics are for -- it is a 21 22 composite of however many years in this 82-year study, 23 each of which has a unique value for the amount of 24 applied water shortage and the amount of groundwater that is pumped additionally for that. 25
1 And so when you see that critically dry years 2 may pump less than that capacity, it is because not all 3 critically dry years use all of that capacity, but some 4 do. And when you take the average of the critically dry 5 years, it may provide a different number that you are 6 expecting, if you think that the pumping would reach a 7 maximum in all critically dry years.

BILL PARIS: Bill Paris from Modesto. Last week 8 9 we talked about accretions and how those contributed to 10 meeting some of the requirements. And they were assumptions that we talked about. I think 20 percent was 11 what was in there. Has there been an analysis or 12 evaluation of the potential relationship between --13 potential impacts to groundwater depths and whether or 14 not the streams would remain gaining or losing or in what 15 percentages or how that might change? And if so, can you 16 17 tell me where that might be?

ANNE HUBER: In Chapter 5 there is a discussion 18 in the setting about the interaction between rivers and 19 groundwater. It is not part of the groundwater use 20 analysis partly because this analysis focuses on the main 21 22 part of the groundwater budget that would be affected by 23 the alternatives. So if groundwater pumping were to 24 increase, there is some potential that there would be small increases in seepage from the rivers, which would, 25

in a small, way help ameliorate groundwater impacts. But
 there was not a need to analyze that in detail in order
 to determine that there would be an impact.

The amount of water lost from the rivers is currently -- well, there are sections of rivers that are both gaining and losses. If groundwater were to drop over a long time, which is not expected due to SGMA, then seepage, like I indicated, could increase, but it would probably not have a large effect on flows.

10 BILL PARIS: Okay. But is that reflected in the 11 document anywhere, or is that sort of your perception of 12 things in response to the question?

ANNE HUBER: Well, like I said, there is the 13 section in Chapter 5 that talks about the existing 14 interaction between surface water and groundwater. 15 Sorry. I am incorrect. It is Chapter 9. I was just 16 looking at -- yeah. So there is some uncertainty there, 17 and I don't know that we have a large discussion on that. 18 BILL PARIS: Okay. And I understand that maybe 19 today we are talking about groundwater. I guess, maybe, 20 I should have asked this question last week, and if so, I 21 apologize. 22

I am wondering if from the surface water
perspective -- and, again, the assumptions regarding
accretions -- if there should have been some analysis

between these two, whether it was in the groundwater section or the surface water section. Has anyone looked at or considered whether or not -- and I don't know. I am just asking if anyone had looked at what impact that might have had.

6 TIM NELSON: We haven't published any analysis 7 of that.

8 BILL PARIS: Okay. Thank you.

9 And if I may, I would like to ask a follow-up 10 question. I apologize. I was talking to Amy back here 11 when you had mentioned this, but Will, you had mentioned 12 the use of the Tuolumne River daily operations model. 13 Can you explain how the state board used that model, in 14 what capacity?

15 WILL ANDERSON: The only way we used that was to 16 have another independent view on what the total 17 diversions might be, the duration of what those total 18 diversions might be.

BILL PARIS: Sort of as a check on the accuracy of the other models that you were using and the results that you were getting?

WILL ANDERSON: Right. Just another independentuse of the weight of evidence.

24 BILL PARIS: Thank you.

25 MAUREEN MARTIN: Hi. I'm Maureen Martin again

from the Contra Costa Water District. Last Monday, I 1 2 heard that you guys were evaluating some sensitivity studies in the WSE model related to maybe removing some 3 of those adaptive management, the carryover storage, and 4 flow shifting, things like that. So AO was wondering if 5 we were going to -- I thought I remembered that those 6 results might be presented. So if you could describe if 7 those types of sensitivity analyses are going to be 8 9 discussed today, and if they are, how they might affect 10 this type of analysis, you know, removing some of those in any way or how it might trickle down into the other 11 analyses that are dependent on the WSE. 12

13 LES GROBER: Sure. We were unable to get those 14 sensitivity runs, so we are not going to be presenting 15 those today.

16 MAUREEN MARTIN: Will they be available in the 17 future?

LES GROBER: We will see. We have some capacity issues in doing all of this. We will see -- you know, a number of people have that question. We will see what we are able to do and keep people posted. Maybe we will add it as an add-on at one of the upcoming hearings or maybe we will just post something, but we don't have it today.

24 MIGUEL MATTEO: Miguel Matteo, Merced Irrigation
25 District. So my first question, I guess as a piece of

information from a technical standpoint, the baseline for
 Merced Irrigation District for groundwater pumping is off
 by 100,000 acre-feet. And I can explain why, if you guys
 want me to.

5

LES GROBER: Sure.

MIGUEL MATTEO: So the 100,000 acre-feet is 6 based on acreage that does not take surface water 7 altogether. So they are not in our books. So basically 8 9 they are acreage within the Merced Irrigation District 10 that are strictly on groundwater. If you want to see those numbers, you need to go to the 2015 ag water 11 management plan, where we use a metric to be able to come 12 up with a consumptive use on those. We have 13 qualitatively discussed those in the 2012 ag water 14 management plan, but we did not have numbers since 15 groundwater was not under the jurisdiction of the 16 district at the time. 17

18

LES GROBER: Thank you.

19 MIGUEL MATTEO: That is one. The other thing is 20 just back to the depletion/accretion. When you analyzed 21 the shortages on diversions, are we using the same 22 software -- are we using the same water balance that has 23 to do with groundwater with accretion and depletion, or 24 are we using different assumptions?

25

WILL ANDERSON: It is essentially the same

1 assumptions that are based on the ag water management
2 plans components. But it does start with the CalSim time
3 series of consumptive use of applied water because that
4 represents the climatic pattern of wet and dry years -5 wet and dry months to come up with the total demand. Is
6 that clear at all? Does that answer your question?

7 MIGUEL MATTEO: Well, basically, are we using 8 the same depletion number for the groundwater model that 9 you are using and also for the river flows in meeting 10 unimpaired flows at the confluence? Are these the same 11 equations? Is this the same water balance, basically? 12 Is it all tied together or not?

WILL ANDERSON: The groundwater balance is 13 separate. It is entirely separate from the WSE water 14 supply effects surface water hydrology. We use the same 15 factors -- the same fractions, but the purpose of the WSE 16 is to determine how much water is available to meet 17 18 demands at a point of diversion. In the groundwater surface water use analysis, the purpose is to evaluate 19 the fate of that diverted surface water and what 20 additional water might need to be pumped, if that is 21 22 clear.

23 MIGUEL MATTEO: Yeah. I can see why you are 24 doing one exercise versus the other, but the question is: 25 If I go to the WSE model and I went backwards to come up

with the value for depletion, for example, or accretion 1 and I went into the other model that you are working on 2 for the shortages on demand on the districts and went 3 backwards to come up with the accretion/depletions, am I 4 going to get the same answers? 5 WILL ANDERSON: When I heard you 6 say, "accretions" and "depletions" --7 MIGUEL MATTEO: The river depletions. 8 9 WILL ANDERSON: -- I am thinking that we use the 10 CalSim values for the -- these are local inflows and additional depletions or water that is not seen 11 12 downstream. So that is separate from the groundwater use analysis, and they are the same values for each of all of 13 the alternatives. So each alternative will be the same 14 for accretions and depletions. And information on 15 accretions would be one thing that would be welcome as a 16 17 comment. MIGUEL MATTEO: Okay. 18 Thank you. CHRIS SHUTES: Chris Shutes with CSPA. 19 I was wondering if you could go back to slide 15 or 16 and 20 describe a little bit more the definition and how you got 21 22 to the deep percolation factor. 23 There you are. 24 And I am particularly curious why it is so different for the different districts. 25

1 TIM NELSON: Well, this is just based on their 2 reported estimates of deep percolation and consumptive 3 uses. I think these are the averages. And, I guess, I'm 4 not really sure what goes into the numbers that we get 5 from the agricultural water plans.

6 CHRIS SHUTES: Okay. Can you tell me, just 7 simply definitionally, what is the deep percolation 8 factor?

9 TIM NELSON: It is the percent of consumptive 10 use that -- so if you have a crop demand, you know your crop demand. How much more water do you need to account 11 for deep percolation? How much more water do you need to 12 apply to the field to make sure that your crop is fully 13 satisfied? And so that is a percent of that crop demand. 14 So it is the extra water that you want to apply to make 15 sure you have fully met your demands. 16

17 WILL ANDERSON: Let's turn that around because 18 Tim is trying to figure out what the comparison of what the crop need is and translate that to what is needed at 19 a point of diversion. I think definitionally the most 20 fundamental way to look at it is to look at what has been 21 published and observed as the on-field efficiency. 22 That 23 is how much of the applied water percolates through the 24 root zone and into the groundwater. The other fraction would be consumptive use without the transpired water. 25

1 CHRIS SHUTES: Okay. And so the bigger the 2 number here, the less efficient it is for crop use? In 3 other words, you have to increase your diversions in 4 order to meet your -- in order to produce your crops; is 5 that correct? Or do I have it backwards?

6 TIM NELSON: That is essentially correct. I 7 will just leave it at that.

8 CHRIS SHUTES: All right. But this doesn't 9 reflect the actual percolation into a groundwater basin 10 and tell you how much water is usable as groundwater at 11 some future time; is that correct?

WILL ANDERSON: It is in the water balance, in 12 the mass balance. It is what goes into the ground, yes. 13 And it would be potentially usable in that balance. And 14 the opposite would be what is pumped and removed from the 15 ground. And these districts have long histories. They 16 have many systems. They have many crops they are 17 18 growing. And if you look at the individual reports, you can probably kind of view the numbers. They are 19 published, and they are very clear. They are incredible 20 sources of information, and so we are very pleased to be 21 able to use them. 22

23 LES GROBER: These are good questions and 24 observations, and it is kind of reflective of what we see 25 here. And we are interested in receiving comments if

anybody thinks the numbers are wrong and also why it is important that they are wrong. But this whole area has been doing this kind of conjunctive use because it is kind of leaky systems and a lot of water supply that isn't used for crop consumptive use. So it is something that we, you know, struggle with in trying to find the right mix here.

But I just want to point out that in the 8 9 examples of the effects and what we are trying to get 10 from this, it is a zero-sum game in that if you improve efficiencies or stop the leaky systems or things like 11 that, you will lose less water in the moment, but you 12 will also do less of the groundwater recharge, and the 13 groundwater deficit goes up, if you will. So it is an 14 interesting problem. 15

CHRIS SHUTES: Yes. I remember asking at a 16 17 conference someone from DWR what the efficiency was of, 18 say, flood irrigation as a groundwater recharge means or method, and the response I remember getting was that it 19 was quite varied depending from place to place. But 20 these numbers, at least for MID and TID, seem very high. 21 So I am wondering if there is a distinction between what 22 23 they need to produce their crops and what is eventually 24 available in practice as usable groundwater. And then I also wondered about the statistics, and maybe I need to 25

1 do some research on things.

UNIDENTIFIED SPEAKER: So just so I understand 2 this, so this is saying, for instance, for TID that 46 3 percent of the applied water goes into deep percolation? 4 TIM NELSON: No. It is a consumptive use 5 demand, the crop demand. So you need 46 percent more 6 water than the crop demand. So you know how much your 7 crop needs. So you need 46 percent more of that to 8 9 account for deep percolation. If you want -- so that is 10 looking at it from the demand side. So if you want to look at it as how much -- you 11 know your applied water and you want to know what percent 12 of that becomes deep percolation, you could adjust this 13 to become a supply side factor. 14 UNIDENTIFIED SPEAKER: So you could have an 15 equation that says applied water is equal to consumptive 16 17 use plus deep percolation? 18 TIM NELSON: Yes. UNIDENTIFIED SPEAKER: Well, yeah. I was sort 19 of including that with consumptive use, but yeah. There 20 was another table that you showed, which is, I think, 21 efficiencies or something -- distribution loss factors. 22 23 So this is showing that even though we have a 24 leaky system, TID only loses 8 percent? TIM NELSON: So they need to divert 8 percent 25

more water over their demands to account for distribution
 losses.

3 LES GROBER: And that is downstream of, say, the 4 off-stream reservoir?

5 TIM NELSON: Yes. So the off-stream reservoir, 6 we assume that it accounts for any losses upstream of it. 7 UNIDENTIFIED SPEAKER: Right.

8 TARIQ KADIR: Tariq Kadir from the Department of 9 Water Resources. Can you go back again to the deep 10 percolation factor slide?

11 LES GROBER: Jason, can you just go to the 12 slide, please?

TARIQ KADIR: Again, I think this has already 13 been brought up, and maybe it has been answered. But 14 your definition is the deep percolation factor represents 15 seepage of applied water, and yet your equation is a 16 17 function of the consumptive use. So my question is: 18 When you talk about deep percolation as a function of the physical system, is that what is grown on them there? 19 So if you have one crop and then you have another crop that 20 is double the consumptive use of applied water, are we 21 saying that deep percolation is actually increasing as a 22 23 result of that?

TIM NELSON: Yeah. For each crop -- so if you
have two crops, they both have a demand. You apply water

for one of them. Some of that water is going to seep past through. So if you apply water to two crops, there will be twice as much water seeping through the pass-through zone, assuming both fields have the same, I guess, soil efficiency.

6 ANNE HUBER: And also, I am just thinking 7 another part of it is these numbers are imperial. So it 8 has -- the numbers from the ag water management plans 9 have aggregated all of the crops. So this was a way to 10 estimate total overall percolation.

11 TARIQ KADIR: So it seems then that you have a 12 deep percolation factor that is really tied into what is 13 being grown in that area as opposed to a factor that is 14 representative of the physical system. What are the 15 properties of the soil and filtration and the deep 16 percolation part of it?

17 WILL ANDERSON: That would be all rolled together. It is a fraction of applied water that is not 18 used by the crop. So it would be -- it would include all 19 of those factors rolled together to what has been 20 published. If you look at -- you know, I am looking at a 21 22 TID plan now because the question was brought up. That 23 46 -- well, we have got 46 percent on the percolation 24 side and 8 percent on the distribution side.

25

So actually for TID, they have got a much more

1 complicated water balance. They have got -- their 2 distribution system, they have a whole balance for that, 3 and then for the field, they have a whole thing for that. 4 And we have had to combine them and generalize it in, 5 kind of, a simplified schematic here. And I am looking 6 at as this is what has been evaluated and published as 7 the fate of this applied water. So --

8 TARIQ KADIR: So not to belabor it for too long, 9 so if you have two irrigation districts growing the same 10 crop, they will have the same deep percolation factor? 11 WILL ANDERSON: No. They have got unique 12 soils -- parcels. Essentially, it would be what has

13 actually happened. So we are not assuming that a certain 14 crop has a certain percolation. We are evaluating from 15 water balances what has actually happened. That is the 16 best, you know, view for each of these.

17

TARIQ KADIR: Thanks.

18 GITA KAPAHI: Any other questions? Okay. It 19 appears that we are done with this particular topic. We 20 are a little ahead of schedule. Do you want to take an 21 hour or come back at 1 o'clock. An hour? Okay. With 22 your agreement, we will take one hour and come back at a 23 quarter to 1 o'clock. So 12:45. Yeah, 12:45, be back in 24 this room, and we will resume. Thank you.

25 (Whereupon a lunch break was taken.)

GITA KAPAHI: We have lost a few in the 1 audience, but we will resume with the afternoon portion 2 of the second day of the technical workshop. The next 3 topic is agricultural economic effects and the statewide 4 agricultural production model, the SWAP model. Go ahead. 5 TIM NELSON: Hello again. So now I will cover 6 the agricultural economic effects and the statewide 7 agriculture production model, and I will be assisted by 8 9 Josue Medallin-Azuara. So the topics that are going to 10 be covered is an overview of the analysis, what was done; preparation of inputs for the SWAP model and how we run 11 it --12

You are not missing anything yet. 13 Okav. Okay. After the inputs, I will hand it off to 14 Josue, who will give a description of the SWAP model and 15 cover the modeling equations and assumptions that go into 16 And finally, I will cover the results, the analysis. 17 it. So the modeling logic -- so given the unimpaired 18 flow objectives, there will likely be more frequent 19 agricultural water shortages as we showed from the ground 20 water analysis and the WSE. With greater shortage, crop 21 production could be lower in certain years, particularly 22 23 during drier periods. Fallowing -- and with the greater 24 shortage, there will be more fallowed acres, which will reduce the gross revenue. Although, some changes to 25

1 pricing and cropping patterns may dampen the effect.

So I showed this slide in the previous 2 presentation. So from WSE, we get our surface water 3 diversions. We use that in our groundwater analysis and 4 determine our groundwater pumping. And from both of 5 those, we have the applied surface water and the applied 6 groundwater, so our total applied water for agricultural 7 This total applied water estimate is then used as 8 use. 9 the primary input to the statewide agricultural model, or 10 SWAP. And from SWAP, we get estimates of -- we get the change in acreage that would result from this change in 11 supply. We get the change in acreage that would result 12 from the change in applied water between the 13 alternatives, and we also get the change in revenue that 14 would occur. 15

So in setting up the SWAP model -- so the 16 analysis covers six areas, representing the seven 17 18 irrigation districts, with the two CVP contracting 19 districts -- S EWD and CSJWCD -- combined. We have 19 crop categories following the DWR classifications for the 20 land and water use. The primary input provided to the 21 SWAP is the annual estimates of total applied water over 22 23 the modeling period; although, the district applied water 24 demands are calibrated to 2010 levels using DWR DAU crop surveys for 2010. 25

So here is a map of the irrigation districts and 1 the DAUs overlapping them. So SEWD and CFWCD are in DAU 2 SSJID is DAU 205. Modesto and Oakdale are DAU 206. 182. 3 Turlock is DAU 2008, and Merced is DAU 210. So we used 4 the DWR DAU crop surveys to calibrate our applied water 5 demand for each district. So the DWR surveys land and 6 water uses within each county periodically to develop 7 crop distribution estimates for each DAU, but they don't 8 9 do this every year. Instead, between surveys they use agricultural commissioners' annual reports to update crop 10 yields appropriate for subsequent water years until the 11 next survey is done. And all of this information can be 12 found on DW R's Website. 13

So here is an example of crop distribution for 14 DAU 205 for SSJID in 2010. As you can see, they have a 15 lot of almonds. About 46 percent of their total cropping 16 17 area is considered almonds in the crop -- in DAU's 18 cropping patterns. So we applied the cropping pattern to the total irrigated acres of the district, and we get 19 these estimates from the agricultural water management 20 21 plans.

22 So for SSJID, we have 59,000 acres of irrigated 23 area. So we multiply the previous crop distribution by 24 the 59,000 acres to get our total crop area for each 25 crop. And so we have 27,000 acres of almonds and 8.3 of

1 corn and so on.

Also from the DAU crop surveys, we get crop 2 applied water rates for the -- I guess the water needed 3 to grow that crop -- grow an acre of that crop. So this 4 is a bar chart of different applied water rates for each 5 And the applied water rates are in acre-foot per 6 crop. acre. So for every acre, how many acre-feet would you 7 need to grow? Or how many acre-feet would you need to 8 9 grow one acre of the crop?

10 So for almonds, we require 3.5 acre-feet for 11 every acre. Multiplying this by our total acreage, we 12 get an applied water demand. And then for almonds -- and 13 if you sum that up for all of the different crops, you 14 will get a total applied water demand for the district in 15 that year, so for SSJID about 190,000 acre-feet of 16 demand.

17 So now I will hand it off to Josue, and he will 18 cover the statewide agricultural production model.

JOSUE MEDALLIN-AZUARA: Hello. I am Josue Medallin. I am an associate research engineer for the UC Davis Center of Watershed Sciences, and I have worked with the SWAP model as a codeveloper for the past ten years with Professor Richard Howard and other colleagues. So I will present the SWAP model, a description, and how -- the mechanics that we follow to come up with the 1 outputs from the model that we are applying these in.

So this is a map that shows the model that is 2 applied to California. It covers about 90 percent of the 3 irrigated crop areas in the state and employs something 4 called positive mathematical programming, which lies 5 between the adopted and unadopted modeling, which uses 6 statistics. And we have, as Tim said, 19 crop categories 7 for this area. However, we have 20 crop grows for the 8 9 statewide operation of the model that is employed in many 10 studies.

We use information from land, water, labor, 11 supplies, production costs, crop prices, and use. These 12 come from different various sources. Our primary source 13 for land and water use, as Tim said, is the crop use 14 surveys by DAU, by the Department of Water Resources. 15 And we also use information from cost and return studies 16 17 from the UC Davis corporate station. We have several 18 years for that information. We use that for the 20 crop 19 categories, and we use, also, information from the ag commissioner's report to corroborate the information from 20 the Department of Water Resources or match the cropping 21 patterns reported by the counties. 22

The model maximizes net returns to land and management. In other words, we assume that the farmers show a profit-maximizing behavior and will plant making

their crop decisions based on the crops that have net 1 returns. And one of the nice features of positive 2 mathematical programming is that it calibrates to the 3 values of land and water use among other inputs, another 4 feature of that that is well-suited for policy analysis. 5 We have conducted many applications in California and 6 other places in -- sure -- California and other places in 7 the United States -- Chile, Mexico, the Middle East, and 8 9 other locations employed for the same sort of 10 publications.

So it was developed in the 1990s. 11 It was constantly updated, and we have, as I mentioned, studies 12 on agricultural adaptation to water scarcity. It 13 provides, as an output, cropping patterns of land and 14 water use and calibrates exactly to a base dataset using, 15 as I mentioned, the positive mathematical programming. 16 17 So the framework employed has been applied for California, for the U.S., the Americas, and the Middle 18 East as well. An application for the area was developed 19 using information from land and water use provided by the 20 team and the water boards based on DAU crop surveys for 21 2010. 22

23 So the technique of positive mathematical 24 programming considers a multi-region and multi-crop model 25 in which the production is constrained to land and water use. We use a functional form from production. It is
 called the constant elasticity of substitution production
 function. And what this functional form does is to limit
 the amount of substitution that can occur between
 factors. In other words, we cannot keep producing water
 for crops just by adding supplies. We have limits on the
 amount that one factor can substitute for the other one.

We also have a nonlinear cost function. So this 8 9 is one of the features. It is called a PMP cost 10 function. It is one of the features in which the model bases its calibration to the observed datasets, and it is 11 a form to represent the profit-maximizing behavior of 12 In other words, we assume that observations in 13 farmers. the field or in the base dataset -- it is the smartest 14 thing to do based on the economics and the institutional 15 and physical constraints in a region. 16

So as variables we have X, and you will see some 17 of the modeling equations of the model, which is input 18 use. And we have inputs for land, water, labor, and 19 supplies. We also have a set of parameters. There are 20 many parameters, as you can imagine. One is "V" for 21 price. Delta, gamma, and omega are parameters for cost 22 23 functions. The beta is for a cost parameter in the 24 constant elasticity of substitution production function. And that is from the -- those are the main parameters 25

that you would see on the equations, but we can go back
 to them as needed.

So in conducting the calibration, we use a 3 six-step procedure. We will start with a base dataset. 4 In this information, it was information that was provided 5 on land and water use. We employed cost information from 6 the SWAP model of the federal study that was conducted 7 just a few years ago, and we employed that as the base 8 9 dataset. And then we calibrate -- we obtain a calibrated 10 linear program, which is fixed proportions in the base dataset and obtain the multiplier on the constrained 11 resources -- in this case, land. We use that multiplier 12 to parameterize the CES and the PMP cost function, and 13 then we obtain a fully calibrated model. 14

The PMP is parameterized by using little squares 15 of elasticities that we have available for California 16 17 based on various studies. Then we have demand 18 calibration in the case of those prices. And lastly, we have a calibrated model that we can then use to test 19 different policies including water shortages, changes in 20 land restrictions, and other -- depending on the 21 applications. So this is the six-step procedure that we 22 23 follow.

24 So this is how the CES production function looks 25 like. It is not as scary. It is just a function that

limits the substitution that can occur. In other words, 1 we cannot just grow a crop by adding more labor. We need 2 water and other inputs that are more essential. And 3 anything between that and fixed proportions, which is 4 essentially what we keep -- for a scaling production, we 5 keep adding the same of an input and everything behaves 6 in the same way. So this type of function or form will 7 allow us to go in-between, in which we can cover a 8 9 sensible range of a substitution of all factors.

10 And the profit first -- the profit maximization problem looks like the one below in the first term. 11 On the left, we have the constant elasticity of substitution 12 production function, and we have an escape parameter 13 there. And by the way, all of these are cited in the 14 references of the report or the document. This comes in 15 a paper by Howard and myself on 2012, but we have these 16 derivations well-documented in the literature as well. 17

18 One of the things to observe in this equation is that the right-hand side is working with average costs. 19 So this is before the PMP cost function is calibrated. 20 So we assume on this one that the constant returns to 21 scale. And then we have the three -- the betas. 22 The 23 cost share returns are obtained by using this equation. 24 We essentially use average costs and observe amounts -survey amounts of inputs to obtain the parameters. 25 Plus

some of these parameters use some of the multiplied
 properties of the station calibration.

The bottom term is the scale term, which is dividing the fields and the land by the -- by the production that we obtained that we observed in the scales. The one with a tilde on the top is observed values.

Another feature that we use in this model is an 8 9 exponential PMP cost function. So this has very desirable properties in a cost function. It assumes that 10 no cultivated land would still have a fixed cost -- a 11 fixed margin of cost on production given some sort of 12 input. So we have -- the original formulation in the 13 model back in the '90s was programmatic, and over time, 14 we changed this to the exponential cost function. 15

Okay. So the calibrated program -- the base 16 17 data functions are combined into a final program without 18 calibration constraints, and it can be used for policy simulations. And this is how the calibrated program 19 looks like. This is the objective function. The first 20 term is prices. And term B and the exclamation term 21 there is the production function. By the way, this is in 22 23 index G. I is for crop, and J is for an input, so land, 24 water, supplies, and labor.

25

The second term is the PMP cost function. It is

the exponential functional form, and that only goes on 1 2 land. And the rest is cost on supplies. And lastly, it is cost of water depending on the region. The land 3 constraint is the one below. We assume that crops grown 4 in a region are limited by the amount of land that is 5 available in the base dataset. In other words, we are 6 limiting expansions. If we take out this constraint, it 7 can work on the regional range, but it is out of the 8 9 calibration base.

10 The water resources constraint would take two sources of water. In this case, surface water and 11 groundwater and some over -- of both sources to obtain 12 the total water applied. We also have constraints on 13 crop stressors documented in the federal disability 14 study, in which the rates of applied water cannot go 15 after a certain ratio. We also have constraints on 16 silage corn. And again, these are limits based on the 17 18 federal disabilities study. And we also have a rate of rotation in perennials, and we assume a certain life 19 depending on the chart type. In this study, we observe 20 something above 90 percent. So that means that if the G 21 of 3 is 25 -- 20, 25, or 30 years, we put that into the 22 23 denominator there -- in the perennial life denominator, 24 and we obtain a value of about 0.92, 0.94, depending on the crop type. 25

So other things that we look into is we 1 2 conducted a qualitative analysis for forward-linked It is talking about various livestock. Forward sectors. 3 linkage is quantifying or just considering the downstream 4 effects to industry sectors from an industry change in 5 the supply chain. In other words, how much one sector 6 downstream changes as a result of the supply. So the way 7 we did that was to look for silage results in the SWAP 8 9 and results from the alfalfa pasture. And it also reviewed the influence of milk prices. We conducted all 10 of these using reasonable information from the UC Davis 11 recent drought studies, which I coauthored with Dr. Dan 12 Sumner, director of the AIC center and also an expert on 13 milk and other commodities. 14

So again, the inputs to the SWAP model will be 15 constraints on perennials; constraints on silage; the 16 crop stress limits; base input information from the rest 17 18 of the team -- from the water supply model, WSE that we discussed this morning; groundwater use assessment; and 19 prices, yields, silage constraints, and production costs 20 provided from the federal disability version of the SWAP 21 22 model.

23 What we do with this information is apply it on 24 water -- the expected shortages on water in a time series 25 of two years and to the constraint that you saw in the

calibrated program to water. And with that, the model 1 2 decides, based on the profit-maximizing behavior of farmers and the calibration of parameters, what is the 3 crop that maximizes this net return to land and 4 management. And with that, we take into account the 5 amount of water available, the amount of land 6 available -- which, in this case, does not change -- and 7 we report crop patterns and revenues. 8

9 And from here, I will pass it to Tim, who will 10 tell us about the agriculture and economic impacts.

TIM NELSON: All right. So here is a time 11 series of an applied water shortage across all irrigation 12 districts. So as was mentioned, applied water is the 13 primary input into the swap model. So SWAP will take 14 these shortages here, just comparing the baseline with 15 the 40 percent alternative -- well, here is the applied 16 water shortage averaged over all years. Under baseline, 17 there is about 37,000 acre-feet of shortage, which 18 increases to about 149,000 acre-feet in the 40 percent 19 alternative, primarily in the critical years. 20

21 So SWAP will take the applied water estimates, 22 account for all of the shortage, and it tells us how 23 acreage will respond, what acres will be fallowed, and 24 how many acres will be fallowed. So here is a time 25 series of the annual irrigated area fallowed across all of the irrigation districts. It is pretty much the same
 pattern as the applied water. We see large spikes in the
 drier periods and almost nothing in the wetter periods.

So here is the average annual irrigated area by 4 crop type across all of the districts. So the crops that 5 are being reduced in the 40 percent alternative are 6 alfalfa, a little bit of corn, field crops, and pasture. 7 These relatively are the lower net revenue crops. If we 8 9 look at this for critical years, we see that the 10 fallowing increases to more than half the crop in field crops, pasture, and alfalfa, but most of the other crops 11 don't really see much changes. Like almonds, there is a 12 little bit of fallowing. Orchards don't have any, all of 13 these higher net revenue crops. 14

Here is the average annual acreage fallowed by year type for all of the districts. Can you see under baseline there is about 6,000 acre-feet fallowed and under the 40 percent alternative, 29,000 acre-feet is fallowed? So the difference would be a 23,000 acre-feet increase in fallowing under the 40 percent alternative.

21 Primarily from critical years -- well, but then 22 in wet years, there is pretty much no increase in 23 fallowing. Above normal, there is a 5,000 acre-feet 24 increase and below normal, 13,000 acre-feet. When you 25 start getting to dry and critical years, you are going to

start to see a lot more fallowing. So in dry years,
 there is an increase of 31,000 acre-feet -- or thousand
 acres. Sorry. In critical years, there is about 80,000
 acres of additional fallowing.

So SWAP also estimates how much money -- how 5 much revenue these acres are worth, how much revenue 6 would be lost from this additional fallowing. So here is 7 the time series of annual revenue lost by fallowing land 8 9 across all of the districts. And once again, it is 10 pretty much the same pattern as the acres fallowed. And you can average this by district -- or you could look at 11 this by district, and you can see on average, the annual 12 revenue lost by TID is \$20 million. But this is looking 13 at the entire time series, when some years they won't 14 have any; some years they will lose more. 15

So when you look at the average for critical 16 years, you see that the losses are a bit higher. 17 TID 18 loses about \$66 million on average. And then if you look at the overall average revenue loss, there is about 36 --19 about a \$33 million increase in revenues lost, primarily 20 from critical years and dry years. But the revenue lost, 21 you have to take into account what the baseline revenue 22 23 is. And so here is a bar chart of the average annual 24 agricultural revenue across all districts. But -- so the actual total rather than the loss that we were just 25

1 looking at.

So under baseline for all years, the average is 2 about one and a half billion dollars. And for the 40 3 percent alternative, this decreases by about 40 million, 4 as is shown. And in the critical years, the baseline is 5 about 1.44 billion, which decreases to 1.32. So for 6 further information, see Chapter 11, The Agricultural 7 Resource Analysis or Impacts, and Chapter 20, The 8 9 Economic Analysis, as well as Appendix G for modeling 10 information, which are all on the Website. GITA KAPAHI: Okay. Thank you. Now we will go 11 12 to questions. There is one right there, Sandra. Thank you. 13 SUSAN BERK: So Susan Berk again. I am a water 14 resource economist working with several of the irrigation 15 districts. I am curious to know your choice of the 16 baseline. You estimate the baseline is about \$1.5 17 18 billion, but I think that that just accounts for crop 19 commodities, and it doesn't account for the animal commodities produced. 20

21 So in the annual county ag commissioner's 22 reports, more than half of the commodity value produced 23 every year in these three counties comes from dairies and 24 cattle and chicken, which are dependent on -- Tim, as you 25 said -- the lower-valued crops that fall out of 1 production when you run SWAP.

So I am having a hard time thinking through how 2 leaving animal commodities out of the analysis, 3 particularly when you are impacting the feed crops, is an 4 adequate representation of the potential impact to the 5 SED. And, you know, I noticed even in the long-term 6 average annual numbers, you are estimating that 17 7 percent of alfalfa, 10 percent of corn silage, and 27 8 percent of pasture comes out of production. 9

10 And I know that the SED has written that you can 11 import those crops to feed animals, but I am a little bit 12 concerned about, one, importing corn because it is a 13 wet -- as you know, it is a wet corn so it is difficult 14 to import. So I guess I will just leave it at that and 15 ask you to, sort of, describe to me your thinking about 16 not including the animal commodities.

17 JOSUE MEDALLIN-AZUARA: Sure. That is a really 18 good question. I think, as I mentioned, we addressed that qualitatively based on the recent studies of drought 19 conducted at the center for watershed sciences, which we 20 coauthored with Dan Sumner. The rationale is that the 21 decisions, especially for dairies, on production are 22 23 mostly driven, even in drought, by economic conditions. 24 In other words, by the price of milk.

25

And even if we look at the reports from the

counties, a lot of the impacts that are reported for the 1 2 dairy industry are based on low milk prices, more than on water shortages. Which of course, as you mentioned, a 3 market for alfalfa exists in the state, and that is often 4 important when there is a shortage from other areas of 5 the state. The silage corn, from our experience, showed 6 that corn has to be grown within a range of about 50 7 miles within a region. We did not see a large impact on 8 9 silage, even in dry years, that can actually impact -that will suggest that dairies will face issues. 10

11 Also the substitution between the feed crops for 12 the dairies depend pretty much on the preferences of the 13 farmer. So some farmers prefer to substitute with a 14 little bit more of alfalfa or concentrate. Although we 15 understand that is limited, we mostly modeled the average 16 farming operation for the dairies rather than the 17 individual farming for these issues.

18 SUSAN BERK: Thank you. If I could just follow 19 up, what would you consider to be a large impact on corn 20 silage that actually might have an impact on the amount 21 of milk that cattlemen can produce -- or dairymen can 22 produce?

JOSUE MEDALLIN-AZUARA: I think we see previous modeling impacts in dry years. If we can go back to the slide -- I mean, we have seen in the effect of recent

droughts that that doesn't go down. It is the 1 fluctuations in the model of cultivated alfalfa and corn 2 that is mostly fallowed in the milk prices rather than 3 the water shortages. We have in 2014 a pretty dry year, 4 where the alfalfa numbers and the corn silage numbers 5 were at a historic high because the milk prices were at a 6 historic high. So as we said, in our recent drought 7 study, we did not see an effect for that that would 8 9 matter. But going to the individual crops, where is this 10 slide -- here. I mean, in a number of years in corn we see relatively low declines in the total amount of 11 silage. And again, to our knowledge, this radius of 12 about 50 miles is still acceptable to have some 13 transportation of silage. 14

15

SUSAN BERK: Thank you.

JEFF MICHAEL: Jeff Michael from the University 16 17 of Pacific. A question, as we look forward in time, I 18 noticed in some of the critical years, it was about half or more than half of some of these low-value crops that 19 were fallowed. And as we look over the past couple of 20 decades, we have seen this sort of baseline movement out 21 22 of these low-value crops into these high-value crops all 23 across the state and the valley, including in this area. 24 And we also have SGMA being implemented over the next couple of decades. 25

So my question is: "Have you considered" -- I 1 guess your baseline is based on 2010 crop values and 2 looking forward and whether that buffer of low-value 3 crops could be smaller in the future than it is today. 4 LES GROBER: No. We did not look at any changes 5 in future cropping. 6 JEFF MICHAEL: The question is: Is the choice 7 of the baseline year, 2010 I quess it was, that was the 8 9 most recent available data? 10 JOSUE MEDALLIN-AZUARA: It is for -- Tim --TIM NELSON: So we chose 2010 because that 11 corresponds with the initial notice of preparation -- or 12 a period of the notice of preparation. Even if there was 13 more recent data, we did not use it. 14 JEFF MICHAEL: So it doesn't reflect more recent 15 crop prices? 16 17 TIM NELSON: No. 18 DEBBIE LIEBERSBACH: Hi. Debbie Liebersbach with the Turlock Irrigation District. So in the 19 agricultural impacts section, I think you indicated that 20 you didn't include double-cropping in the analysis. 21 Is 22 it incorporated in the economic analysis? 23 JOSUE MEDALLIN-AZUARA: You mean, like, winter 24 and summer crops? They are -- we are working in the SWAP model with irrigated crop areas, which account for 25

1 multi-cropping in a way. Areas like the Salinas Valley 2 in which they have two or three seasons, we have a 3 slightly different model to account for that. But here 4 we essentially work with the irrigated crop areas more 5 than with the irrigated land areas. Does that make sense 6 to you?

7 DEBBIE LIEBERSBACH: Well, I mean, a lot of
8 times a lot of these forged crop acres will be double
9 crops. So you will have corn/corn or, you know,
10 silage/wheat.

JOSUE MEDALLIN-AZUARA: Right.

11

12 DEBBIE LIEBERSBACH: And, I mean, there is any 13 number of combinations, but that should be accounted for 14 in the analysis.

JOSUE MEDALLIN-AZUARA: Right. And I think we do. We have, as I mentioned, irrigated crop areas and irrigated land areas. So the difference between these two is the amount of multi-cropping.

19 UNIDENTIFIED SPEAKER: You mentioned that you 20 modified the SWAP model to more adequately reflect the 21 area of study. And presumably by region, you did the six 22 regions representing the seven irrigation districts where 23 you combined the CVP districts. What were the 24 assumptions that you made about the ability of each 25 district to transfer water from one crop to another crop? JOSUE MEDALLIN-AZUARA: We assumed in the SWAP model deposits represented by the farmer in each district -- so we assumed internally a market for water that can occur within the district, which I think is a defensible assumption. Within the districts -- we do not assume transfers within the districts.

7 UNIDENTIFIED SPEAKER: So no interdistrict but 8 intradistrict transfers. So some of the districts 9 actually don't accommodate intradistrict transfers. You 10 might want to know that for future use. They don't 11 actually allow that kind of transfer.

12 JOSUE MEDALLIN-AZUARA: You mean, within the 13 district?

14 UNIDENTIFIED SPEAKER: Within the district, that15 is right. Yeah. Some do, but some don't.

And also, while I have the microphone, where in the SED or in the spreadsheets that you have attached can I find the information on the SWAP input specifically yielded and the prices that were used for the various crops?

21 TIM NELSON: I don't believe -- those are 22 parameters that are part of SWAP itself and not part of 23 the input spreadsheets.

24 UNIDENTIFIED SPEAKER: Right. Is it possible to 25 get those?
LES GROBER: It seems that it should be, yes.
 UNIDENTIFIED SPEAKER: Okay. Thanks.

UNIDENTIFIED SPEAKER: I was just wondering what 3 the error bars on this would be. It seems to me like we 4 are estimating a minimum difference in revenue lost 5 because we are optimizing whether or not the agricultural 6 distribution of one crop to the next is optimum and has 7 some practical constraint. So could it be that we are 8 9 representing a minimum rather than the full range of what 10 is possible?

JOSUE MEDALLIN-AZUARA: Well, we represent a range of 82 years of water availability, yearly. I'm not sure if you are asking about, "How does that vary?" I mean, the model calibrates exactly to a base dataset.

UNIDENTIFIED SPEAKER: Well, my question is: For each given year -- and pardon me if this is an uneducated question. But for each year, you are targeting and assuming that the business would respond to the optimization function and would operate ideally. But there are potentially another range of things they could do that aren't optimum.

JOSUE MEDALLIN-AZUARA: Well, the modeling assumption of something like SWAP is that the farming behavior is profit maximizing and that they are doing the smartest thing, which is what we observed. And we 1 represent the average decisions in farming over a certain 2 area. If a farming operation is losing money, then it 3 wouldn't be farming for very long. So we assume that 4 what is observed is making enough money. And you are 5 right. There is many factors that occur around those 6 terms.

7 UNIDENTIFIED SPEAKER: Okay. Thanks.
8 JOSUE MEDALLIN-AZUARA: You are welcome.
9 STEVE BOYD: Steve Boyd, Turlock Irrigation
10 District. If I could follow up with Mr. Grober, would it
11 be possible -- assuming it is possible to provide those,
12 that we could expect to see them?

13 LES GROBER: I'm not sure. Did you ask when it 14 would be possible to get that information?

15 STEVE BOYD: You said, "It seemed possible." 16 LES GROBER: Yes. I just looked at Josue. It 17 seems like it is data that is available. So that is 18 something that we will then --

19 STEVE BOYD: So you will provide that?

LES GROBER: There were some other requests also for other types of runs and information. So we will try to do that over the next couple of weeks, and we would send notice out, post it, and make it available.

24 STEVE BOYD: Thank you.

25 GITA KAPAHI: One more.

1 UNIDENTIFIED SPEAKER: So I saw in your -- in 2 the information about the calibration -- or the 3 constraints on SWAP that you had a deficit irrigation 4 constraint of up to 85 percent. Did you then add or look 5 at the change in yield, particularly, like, with fruit 6 and nut trees from deficit irrigation?

7 There has been sort of a wealth of information 8 written about the fact that yields would decline under 9 deficit irrigation and that not just -- particularly for 10 trees, not just in the year of the deficit irrigation. 11 But there is a lag impact; also, there is a problem with 12 the setting of fruits in the following year. Is that 13 included anywhere in the model?

JOSUE MEDALLIN-AZUARA: We account for it to the extent that it is captured by the curvature of the production function.

17

UNIDENTIFIED SPEAKER: Okay.

JOSUE MEDALLIN-AZUARA: So if you put in less
water, you will see a decline in yield. But it is based
on the curvature of the production function.

21 UNIDENTIFIED SPEAKER: So if we got the prices 22 and the yields for the baseline in SWAP, can we also get 23 the SWAP output for how yield changes? In other words, 24 part of the SWAP output is going to be that estimated 25 yield. JOSUE MEDALLIN-AZUARA: Yeah. I mean, we are
 providing that base yield, but I am not sure if I
 understand --

UNIDENTIFIED SPEAKER: So the baseline yield, 4 say for almond trees as you said, that is available as is 5 the price data. Now what I understand you to say is that 6 the yields -- the effective yields in SWAP are also 7 changing based on the curvature of the production 8 9 function. So can we see that information also? 10 JOSUE MEDALLIN-AZUARA: It is part of more of the calibrated production function more than a physically 11 based yield from a crop experiment. 12 13 UNIDENTIFIED SPEAKER: I'm sorry. JOSUE MEDALLIN-AZUARA: There are crop 14 experiments that shows what the relationship is between 15 applied water and the yield. 16 17 UNIDENTIFIED SPEAKER: Right. JOSUE MEDALLIN-AZUARA: Those are not a part of 18 the calibration, if that is what you mean. 19 UNIDENTIFIED SPEAKER: Right. I understand 20 21 that. And I also understand what you are saying about the fact that there is curvature to the production 22 23 function. So effectively you are getting a reduction in

25 SWAP output. I would just like to be able to see that

yield as a consequence. So what I am asking for is that

24

SWAP output so that I could see how the yields are
 effectively changing. Is that information that could be
 made available?

4 LES GROBER: So is the answer the output files 5 are available that are being requested? So we can add 6 that to the list of things that we will make available. 7 UNIDENTIFIED SPEAKER: Okay. That would be

8 great.

9 I have one more question since I have the mic. 10 What was it that you said about forward linkages in the 11 slide show? I'm sorry. I was actually taking notes on 12 the previous slide, and when I looked up, it was gone. 13 My understanding was that there weren't any forward 14 linkages into the processing sector that were made in the 15 SED.

JOSUE MEDALLIN-AZUARA: So what I am saying is that we -- by construction of the IMPLAN model, we look into what were linkages. And the forward linkages were assessed qualitatively.

20 UNIDENTIFIED SPEAKER: The forward linkages were 21 what?

JOSUE MEDALLIN-AZUARA: Assessed qualitatively.
UNIDENTIFIED SPEAKER: Right. I think that the
SED says that IMPLAN doesn't support doing forward
linkages, but I would point you to some work that is

being done out of Cornell with USDA money on farm hubs
 where they actually have a handbook out now about how to
 use IMPLAN to do forward linkages.

4 JOSUE MEDALLIN-AZUARA: Okay.

5 UNIDENTIFIED SPEAKER: In the demographic 6 analysis that I have taken a look at for the area, my 7 estimation is, like, 25 percent of the jobs or more are 8 tied to either crop or animal production and/or 9 processing because there is an enormously robust 10 processing sector in the region.

So I am wondering if there would be impacts. I 11 know anecdotically when you talk to the economic 12 development directors in these areas, they will tell you 13 that, you know, when the tomatoes go out of production, 14 they lose jobs; right? Factories downsize. They reduce 15 shifts. So, you know, the fact that we are not really 16 17 looking at that full compliment of potential impacts --18 particularly, again, I will, kind of, go back to the EJ area where we have, you know, very low incomes and 19 minority populations. It is a little concerning that it 20 hasn't been addressed fully in the SED. 21

22

23

UNIDENTIFIED SPEAKER: Okay.

24 GITA KAPAHI: So it appears that we have 25 exhausted the comments on this particular subject and can

LES GROBER: Please provide those comments.

1 now move on early to the next one.

TIM NELSON: All right. Now we will cover the 2 regional economic effects and IMPLAN multipliers. So the 3 topics I am going to cover is an overview of the regional 4 economic analysis, and then Josue will give a description 5 of the IMPLAN model and the derivation methods for the 6 multipliers for regional economic and employment effects. 7 Then I will go over some of the economic and employment 8 9 results and describe the fiscal, or tax effects, of the 10 analysis.

So what is the logic? Based on the results of 11 SWAP, some agricultural acreage could go out of 12 production in response reduced water availability. 13 With less crop production, this means less revenue and fewer 14 jobs in the agricultural industry. Because of the 15 interconnection between every sector of the economy, 16 other sectors may also see revenue and employment impacts 17 related to the impacts in the agricultural industry. 18

And then with reduced economic activities in all of these sectors -- well, in the agricultural industry, this could reduce tax revenue for different levels of government. So from our -- from the WSE and the groundwater analysis, we knew our total applied water. With total applied water, we ran SWAP, and we determined our agricultural impacts, both in crop and revenue. With those agricultural industry revenue impacts, we can apply
 IMPLAN multipliers, impact analysis for planning to
 determine changes in the wider economy for both economics
 and employment.

5 So for this analysis -- for the regional 6 economic impacts analysis, we expanded the modeling area 7 to the entire three-county region of San Joaquin, 8 Stanislaus, and Merced counties, as these regional 9 economic impacts won't be just limited to the districts 10 themselves. They will spread out to cities and the wider 11 area.

So I will hand it off to Josue to describe theIMPLAN.

14 JOSUE MEDALLIN-AZUARA: Thank you.

As Tim said, we used the IMPLAN model that is based on the input/output analysis that was developed back in the 1950s. It was very commonly used. It helps raise the expenditures on a region's economy after an economic event has occurred. So it was developed by the MIG Corp. and is -- well, that is a typo. Sorry. It says, "Oregon," and "Washington."

But there is a database available for all of the United States at the county level and also at the state level. It provides direct and multiplier effects for employment, value added, crop revenues, and other taxing 1 impacts.

So this is how an input/output matrix looks 2 like. We have sectors, such as the ones modeled in the 3 analysis. We have commodities, factors, institutions, 4 enterprises. We have capital. And all of these words 5 are included in an input such as an accounting matrix 6 framework. So we trace expenditures among all of the 7 sectors and then obtain what are the multiplier effects, 8 9 which are illustrated here.

10 Essentially when we see a change, which is the first box, we see a direct effect. Then there are 11 leakages to the economy as a result of those changes in 12 expenses that directly -- that go out of the region. 13 This is the case when we have an enterprise that is out 14 of state where we have some imports. Then we have local 15 purchases, which are the ones that have an effect on the 16 17 local economy.

18 And when we see these changes in local purchases, we see purchases of commodities and services. 19 And we also have an impact on labor. We provide salaries 20 to employees of both directly affected sectors and 21 sectors from which the primary impact occurs on. So we 22 23 call the first -- the first kind we call "indirect 24 effect," and the second kind we call "induced effects." And with some of those two, we have -- in the indirect 25

effects, we have the total impacts, which is the sum of
 the three.

The notion of multipliers rests on the 3 difference between the initial of an exogenous change, 4 which is the final for a good, and the total effect of 5 the change. And this backwards linkage that we were 6 discussing previously is the tracking of those primary 7 effects or the direct effect purchases backwards through 8 9 the supply change. In other words, we account for what is the change for reducing or increasing agricultural 10 activity on purchases of agricultural goods, such as 11 fertilizers or services from crop advisors and other 12 13 things.

And then we account for that in the indirect effects. The employees from the directly affected sectors and the indirectly affected sectors have demand commodities and services within the regional economy, and this is what we call the induced effects. And the sum of these three is the total effects that we report in our study.

For this study, the multipliers of IMPLAN were derived using county models. We also have three county models, which is the merger of the three counties in the area. Then we match the multipliers from the ten sectors -- the ten crop sectors that are defaulted in the

1 IMPLAN model with the 19 categories for the SED study. 2 And then each -- in the three-county model, we capture 3 more of the region's economy on an individual model, 4 which captures leakages. So we used a three-county 5 model, which seems more comprehensive and has some 6 connection within the economies.

7 And these are the multipliers that we developed.8 I will pass this to Tim.

9 And this is the match that we did for the crops 10 in the IMPLAN and the crops in the SWAP model.

TIM NELSON: So this is the table of IMPLAN 11 economic multipliers that we derived for IMPLAN. 12 We see that the direct multipliers are all one because SWAP 13 output is the direct economic effects. For indirect 14 effects -- for grain there is -- for every dollar impact 15 to the agriculture sector, there is the additional 59 16 cents of impact from indirect impacts, and then there is 17 another 20 cents added for induced economic effects. 18

And the total multiplier would be -- for every dollar lost in the agricultural sector, \$1.79 is lost in total. And then here is the same or -- the table of IMPLAN employment multipliers derived. And so the direct effect is not one -- so for every dollar lost -- or no. So for every million dollars lost in the agricultural industry, 11 -- for every million dollars lost in grain, about 12 jobs will be lost, which -- and then looking at
 the indirect and induced effects in total, about 18 jobs
 would be lost for a million dollar loss of revenue for
 grain -- or for grain crops.

So now I will go over a few results. So here is 5 a time series of revenue losses for the 40 percent 6 alternative relative to the baseline, so a change in our 7 40 percent alternative. We see that the largest loss in 8 9 revenue comes in 1924 at about 350 million. So there is 10 going to be a lot of -- there is going to be times when there is really big revenue changes in these wetter -- or 11 in these drier periods, and then there will be times when 12 there aren't a lot of changes in the wetter periods. 13

So looking at the same time series plot but as 14 an exceedance plot, we see the one year that was \$350 15 million worth of revenue change at zero percent, and then 16 as you move up in exceedance percent you -- so at 10 17 percent exceedance, the revenue loss is greater than 200 18 million. At 20 percent exceedance, the revenue loss is 19 greater than 150 million. We see that in about 50 20 percent of the years, there is no revenue loss, and 50 21 percent of years, there is some revenue loss. 22

Looking at the annual averages, we see overall about \$64 million in additional losses, but with most of it coming in critical years, when there is an increase of

about 211 on average -- 211 million. Looking at the
 overall impact, we see that the total sector output,
 including the direct and indirect and induced effects is
 about 2.5 billion. And so a change of 64 million is
 about 2.5 percent.

6 Now here is the time series of annual employment 7 reduction for the 40 percent alternative relative to the 8 baseline. So it is the same pattern as we saw for the 9 economic effect, just with a different Y axis because the 10 only difference was the multiplier used. So we see the 11 same effect with the high impact jobs in these critical 12 years and low impact in the wetter periods.

So looking at it as an exceedance, we see that 13 the highest single year impact on jobs is about 2,500 in 14 1924. And in about 50 percent of years, there is no 15 employment impact, and 50 percent of years, there is. On 16 17 an annual average, about 433 jobs are lost under the 40 18 percent alternative, with critical years showing an 19 average of 1,450 jobs lost. Looking at the total employment including all of the effects, there is about 20 18,600 jobs and so a reduction of 433, you would be out 21 minus 2.3 percent. 22

23 Now I am going to quickly go over the fiscal 24 analysis and its methods. So with a reduction in 25 agricultural production, there may be tax revenue

impacts. The federal and state governments would be 1 2 insulated from regional impacts, as their total tax revenue is significantly larger than the contribution of 3 a single county. But for county and municipal 4 governments, they could experience greater impacts 5 because their revenue base is so much smaller. 6 Were there to be a significant impact from loss of tax revenue 7 from these local governments, it could result in the 8 9 impact to public services.

10 So for the fiscal analysis, we derived IMPLAN multipliers, much like in the first one. But this time 11 we were developing the multipliers for each county, 12 assuming a \$1 million loss of revenue for agriculture and 13 looking at, "What is the tax impact in IMPLAN?" The 14 multipliers then were applied to all of the whole 15 alternatives and baseline conditions to obtain estimated 16 17 changes in tax revenue for the federal and lumped state 18 and local governments, and for IMPLAN, the state and 19 local government tax impact was lumped together. So this was separated based on the information in the county and 20 local tax documents. 21

22 So here is a table of the tax revenue impact 23 that would happen assuming a \$1 million loss for the 24 agricultural sector. Thus the -- these columns. So in 25 total, the federal government would lose -- for San

Joaquin County, the government would lose about \$154,000
 for a million dollar loss in the agriculture industry,
 and the state would lose \$61,000, and the local
 governments would lose about \$44,000.

5 And then dividing these numbers by 1 million 6 will give us our fiscal impact multiplier. So for every 7 dollar lost in the agricultural sector, about 15 cents is 8 lost for the federal government in San Joaquin County, 9 and 6 cents is lost for the state, and 4.5 cents is lost 10 for the local governments.

So summarizing the results, we see that the 11 baseline tax revenue calculated using these multipliers 12 and the baseline total revenue for the federal government 13 looking at San Joaquin County is about \$91 million, 36 14 for the state, and 26 million for the local governments. 15 In the 40 percent alternative, there is a change of \$1 16 17 million for the federal government, \$400,000 for the 18 state, and \$300,000 for the local government. But if you look at the estimate of total annual tax revenue based on 19 2010 tax reports, you can see that the change in revenue 20 is virtually zero percent compared to what was estimated 21 for all three counties and all local governments. 22

23 So this analysis and further information can be 24 found in Chapter 20, The Economic Analyses Summary, and 25 Appendix G that describes the modeling methods. Thank

1 you.

2 GITA KAPAHI: Thank you, same. So we will open it up to questions. 3 ART GODWIN: Art Godwin. In looking at the 4 unemployment impacts, did you consider that this region 5 also already has one of the highest unemployment numbers 6 in the area or in the state? Did you factor that into 7 your analysis? In other words, did you look at the 8 9 cumulative effects of taking more people off of the --10 more people from not working? LES GROBER: We just looked at the comparison, 11 just showing a change from whatever the current is. 12 ART GODWIN: Assuming all of these numbers are 13 true -- your unemployment, your economical impacts, your 14 fiscal impacts -- is this something that the state board 15 is willing to accept? 16 LES GROBER: Well, that is what we are here 17 18 today about. Well, today, we are here about showing our work that formed the technical analysis. But it is that 19 trade off between the flow proposal, Southern Delta 20 salinity proposal and the effects that the board is going 21 to have to consider. That is what makes this hard. 22 23 UNIDENTIFIED SPEAKER: Could I ask you to go 24 back to slide 30? I think it was 30. It is hard to read the numbers from here. 25

TIM NELSON: There is only 27 slides. 1 UNIDENTIFIED SPEAKER: Okay. So it is not 30. 2 It is any of the column charts that show any of the 3 results -- labor or output -- by water year type. Yeah. 4 That would probably work. 5 LES GROBER: Twenty would work. 6 Something with numbers or --7 UNIDENTIFIED SPEAKER: They were there a minute 8 The column charts that you had where you are 9 ago. 10 showing results by water year type. TIM NELSON: This? 11 UNIDENTIFIED SPEAKER: Yeah. That will work 12 just fine. 13 So clearly the biggest impact is in dry and 14 critical years, as you have already said. When I read 15 through the SED, one of the things I am struck by is 16 17 because we are talking about just dry and critical year 18 impacts, you report so many of the impacts by average annual years that we are sort of obfuscating the true 19 impact of the SED. 20 I mean, although you report it here, which is 21 great. So the information is available. But I can't 22 23 help but feel like -- particularly here, like all years 24 the impact is \$64 million. When in reality, in dry and critical years, it is actually up to over \$200 million, 25

and those dry and critical years occurred two out of five 1 years. So they are just under 40 percent of the time. 2 So what we are talking about is a really big change in 3 water supply reliability to the region. And I'm not sure 4 how that has been captured in the SED. As an example, I 5 would expect that the fiscal analysis would actually also 6 include a change in land value. We all know that, you 7 know, land value in the Central Valley is tied to the 8 9 water supply reliability of the acreage.

10 So the fact that it hasn't been addressed 11 anywhere is a little -- feels like a little bit of a gap 12 to me, and I would just like to hear your comments on 13 that.

LES GROBER: Well, you can provide that comment, but as you say, we do provide -- just because there is a lot of information here, we provide averages. But then we do provide -- as here in the documents, we show what occurs in critically dry years and dry years. So it is in there, but please provide the comment.

20 UNIDENTIFIED SPEAKER: What is the base year for 21 the IMPLAN data used in the modeling?

22 JOSUE MEDALLIN-AZUARA: 2010.

23 UNIDENTIFIED SPEAKER: Okay. So it is the 2010 24 IMPLAN data, which is the same as the SWAP data? Did you 25 ever look -- IMPLAN has DOS functions for agriculture in

it, reduction functions, and so does SWAP. Have you ever
 compared them to see how well they compare in terms of,
 you know, net revenue and various input costs?

4 JOSUE MEDALLIN-AZUARA: We employed only the 5 multipliers from the 2010, and we relied on the SWAP 6 inputs for production functions.

7 UNIDENTIFIED SPEAKER: Right. So you didn't 8 make any adjustments to the -- to recalibrate IMPLAN 9 based on -- other than, sort of, what comes in the box 10 from IMPLAN?

11 JOSUE MEDALLIN-AZUARA: We just checked the 12 numbers of employment by county, and they seemed to 13 align.

UNIDENTIFIED SPEAKER: So the overall production functions -- and I am just -- you know, the percentage of cost to labor margin from growing almonds or nuts, is there significant differences in SWAP and IMPLAN on that cost data at all, or have you not looked at it?

19 JOSUE MEDALLIN-AZUARA: We looked only at the 20 production of the employment numbers. Yep. We looked at 21 the employment numbers, and they aligned the county 22 totals.

23 UNIDENTIFIED SPEAKER: So you compared the 24 direct employment numbers or the -- yeah -- the -- I 25 don't think you showed this table, but table G56 shows direct employment of 8,000. I am looking at Appendix G.
 Yeah. Right there. So that is the number that compares
 to the county employment data? I mean, it should. It is
 the same source.

JOSUE MEDALLIN-AZUARA: It is on the screen?6 Oh, sorry.

7 Yeah. That is based on direct employment for8 the area.

9 UNIDENTIFIED SPEAKER: So then this table says 10 that for all three counties then, there are 18,600 jobs 11 that are direct, indirect, or induced by agriculture in 12 the three counties.

13 JOSUE MEDALLIN-AZUARA: That is what I got out 14 of it.

15 UNIDENTIFIED SPEAKER: Do you compare that to 16 the total employment in the county, including the ag 17 services sector?

18 JOSUE MEDALLIN-AZUARA: No. That is not 19 included there. The ag services is a presector and is 20 usually double of that.

21 UNIDENTIFIED SPEAKER: It is usually what? 22 JOSUE MEDALLIN-AZUARA: The ag services sector, 23 the contract labor, if that is what you mean, is not part 24 of that direct employment and usually is accounted when 25 we have drawn the impact on IMPLAN to obtain the 1 multiplier on jobs.

2 UNIDENTIFIED SPEAKER: Do you know in the IMPLAN 3 model how much of the ag services employment is being 4 consumed locally? I mean, the 18,600 number looks a 5 little low to me for total farm employment across the 6 counties, and I am wondering how the ag service sector is 7 being accounted for.

3 JOSUE MEDALLIN-AZUARA: We can get back to that.9 I don't have the number on me.

BILL PARIS: Hi. Bill Paris, Modesto. At the beginning of today, I know you guys foreshadowed a little bit some of the analysis that we were going to see regarding San Francisco. And I know -- or at least I think I know -- from looking at that appendix, there is an emphasis on a five- or maybe six-consecutive-year drop period and what that impact would be on San Francisco.

17 Certainly from an irrigation district 18 perspective, you know, one of the things we are most 19 concerned about is getting through the '28 through '32 or 20 '87 to '92 droughts and looking at those in consecutive 21 years and trying to ascertain the impacts of that 22 particular period, not just the averages.

23 So I am wondering how we do that type of 24 analysis for ag. And if so, where is it, and if not, can 25 you comment on why not?

LES GROBER: We -- I think as we briefly put up 1 at the last workshop, we showed how the numbers for 2 consecutive years. They are actually the average over 3 that drought of record. The '87 through '92 is similar 4 to the critically dry years in terms of water supply 5 effects. But beyond that, we didn't do any specific 6 detailed analysis about the multi-drought year effects. 7 BILL PARIS: Okay. But we did those for San 8 9 Francisco; is that right? I know we are going to get to 10 that later. And if I am wrong, you can say, "No. You are wrong. Wait an hour, and we will get there." 11 LES GROBER: Well, we did, as you see in the 12 appendix. And that is because those are the years that 13 there is an effect in years like that. So it -- that was 14 the rationale for doing it for those -- for the city and 15 county of San Francisco because that is when the effect 16 occurs. There is the available effect that we described 17 18 with regards to effects on ag on all years. But you have posed the question -- or posed the comment before. And 19 you can make that as a comment about, you know, 20 consecutive dry years. But we have both the long-term 21 economic effects showing the exceedance from 1922 to 22 23 2002 -- 2004, the CalSim period? Yeah. 2003. So it is 24 encompassed in that analysis of the full record.

BILL PARIS: Okay. Thanks.

25

UNIDENTIFIED SPEAKER: I have another question. 1 2 Earlier, I asked you about using 2010 as the more recent data, and I think the answer was it was the year that 3 this proceeding started or something was filed. 4 Was there something preventing you from using more recent 5 agricultural data to run the models, or is that just 6 the -- why aren't we updating it to more recent data on 7 crops and employment and economic factors? 8

9 LES GROBER: Rather than focusing on the 10 update -- I mean, the nature of all of these analyses are to do a comparative analysis. So, you know, that is just 11 using a baseline year from which to compare the effects. 12 But, I mean, your comment is noted, and you should 13 make -- you know, make that comment, if you have 14 continued concerns with regard to using other years. But 15 the purpose is to show a change from a baseline 16 17 condition.

VALERIE KINCAID: Valerie Kincaid, San Joaquin Tributaries Authority. Kind of thinking about this dry year impact or maybe the, kind of, feast-or-famine type results that we are looking at, did either the SWAP for crops or the IMPLAN for the employment look at or assess the increase in unreliability in either water for crops or job for employment?

25

I guess, by that I mean, you know, in some years

you are going to have no jobs in the region or a massive 1 decrease in jobs. I am assuming that model just assumed 2 that in a wetter year, when the jobs came back online 3 that those jobs would actually return and that there was 4 no analysis of the fact that when you have an increased 5 reliability of jobs or water that there would be kind of 6 a lasting effect or that -- you won't be able to recover 7 in wet years what you see disappear in dry years. Does 8 9 that make sense?

10 LES GROBER: Yes. There was no other specific 11 analysis. It was just showing the full time series and 12 the effects. As shown for many of the metrics, it 13 increases the times and the amplitude of some of those 14 shortages and, therefore, some of the effects.

VALERIE KINCAID: For a permanent crop, if you 15 take it -- if you have to fallow it or if it is fallowed 16 17 for a number of years, at some point that crop obviously 18 can't recover. Was there any -- was that considered in the modeling at all? Or if so, how? I mean, a row crop, 19 you can obviously take it down and replant it. But at 20 some point, trees die, and it is not you are just 21 fallowing for a year or two. Did you consider when that 22 23 happens and build that into the analysis?

LES GROBER: I don't believe that we -- I will
look to Josue in terms of the cropping, but I don't think

that we were losing permanent crops for any of this
 analysis. So it wasn't -- that was not something that
 occurred.

4 VALERIE KINCAID: But how do you know that? I 5 mean, how do you know that you are not losing permanent 6 crops?

LES GROBER: Well, in the analysis that was done
in terms of the crop shifting that occurs, the water goes
first to permanent crops. So it didn't have that effect.
VALERIE KINCAID: But in some years, you did
have to reduce the number of permanent crops. I guess, I

12 just --

13 LES GROBER: I think there was stress and maybe 14 some reduced water availability, but there was no loss to 15 have question.

VALERIE KINCAID: But that is my question exactly there is that, did you consider when a loss of water would turn into a loss of the crop? I mean, was that considered, or did you just assume that it would come back online? If you had to not water trees for a year or two, I am assuming the model just assumed the trees would come back.

23 LES GROBER: But you are stating something that 24 I don't think we observed in our analysis. There was 25 water available for permanent crops.

VALERIE KINCAID: So are you saying that the
 results didn't have any impact on permanent crops at all,
 zero impact?

4 LES GROBER: There was some reduction stress
5 watering, but there was no full loss of permanent crops.
6 And I am looking to Josue.

JOSUE MEDALLIN-AZUARA: Yeah. As covered in the 7 previous segment, we have a constraint on perennials. 8 9 That is that default -- the fallowing up to the stated 10 rate of replacement of permanent crops. I mentioned that number being above 90 percent of the existing crops. For 11 some of them, that is a reasonable adaptation given the 12 recent drought, in which we see that some new plantings 13 occurred. And that required less water or simply they 14 are distressed. 15

16 LES GROBER: I am just looking at the chart from 17 the previous segment, which we could pull back if you are 18 interested.

19 VALERIE KINCAID: Sure.

20 LES GROBER: But it showed that almond,

21 pistachio, orchard crops -- it was the same irrigation 22 that occurred under the 40 percent alternative under 23 baseline.

24 VALERIE KINCAID: So the results do show zero
25 reduction to those permanent crops then?

LES GROBER: Very small reduction in critical
 years, but again, within the stress -- the stress
 watering.

4 VALERIE KINCAID: Okay. So just to wrap it up, 5 you didn't look at whether that stress would retire those 6 crops or otherwise affect a permanent crop, which needs 7 to be watered on a yearly basis? It was just a -- I 8 think what you were saying it was just such a small 9 number.

10 LES GROBER: It was a small number that did not 11 result in loss of the crop. There was just some stress 12 on the crop, which, as I think Josue said earlier, also 13 then gets rolled into some yield reduction, but there was 14 no loss of the crop.

VALERIE KINCAID: Okay. So you did analyze
whether the crop would be lost? I guess --

17 LES GROBER: Well, the first question is: "How 18 did we analyze when the crop was lost?" And I think what 19 I am just saying here is there was no crop loss because 20 that is part of what the SWAP model does. The water was 21 then directed towards orchard crops, vine crops, 22 permanent crops.

23 VALERIE KINCAID: Right. I understand that.
24 But let's say that the small amount of impact to
25 permanent crops exists. And I guess my question is:

"Was there an analysis of whether that small impact just reduced production or whether it actually would reduce permanently the crop and it would die?" And that analysis isn't included because you didn't ever get that because you took the low-value crops off, and they are not permanent crops. I understand that. I guess I am just wondering if the model has that built in.

8 Let's hypothetically say that the impacts to 9 permanent crops were greater than they are. When would 10 the model indicate that those crops would die and not 11 come back? Or I guess I am asking, would it? 12 LES GROBER: The limited water was not

13 sufficient to result in loss of the crop -- loss of 14 orchard crops. It was just some stress watering that 15 resulted in reduced yield.

16 VALERIE KINCAID: Had the loss been greater, 17 would this model tell you if there were permanent losses 18 and that the crop would die? I guess that is my 19 question.

20 LES GROBER: Now we are getting into a 21 hypothetical, which is something that we didn't evaluate. 22 VALERIE KINCAID: Okay. So it is something that 23 you didn't evaluate? Okay.

24 UNIDENTIFIED SPEAKER: I am going to follow up 25 on that. There is some tables in the appendix for each

irrigation district, table G4, 6, A, B, C, and so on. 1 2 That and, you know, the dominant loss is indeed, you know, pasture and field crops. But there is a loss of 3 acreage for almonds and pistachios reported. For 4 instance, 183 acres for Alternative 3 for Turlock 5 Irrigation District. Is there -- but you are saying it 6 is stress irrigation yield loss, not acreage loss. Could 7 you clarify the number in these tables? 8

9 JOSUE MEDALLIN-AZUARA: Acreage loss.

UNIDENTIFIED SPEAKER: So there is acreage loss?
 JOSUE MEDALLIN-AZUARA: That --

12 LES GROBER: 0.5 percent --

13 JOSUE MEDALLIN-AZUARA: Of baring orchards.

14 LES GROBER: Could you say that percent again,

15 Will?

16 WILL ANDERSON: It appears, according to the 17 chart, that 183 acres is 0.5 percent of the almond and 18 pistachio category.

19 UNIDENTIFIED SPEAKER: All right. So this is 20 estimating a single year? I am trying to think about how 21 this would work over a sequence of years. And you talked 22 about the constraint that was in there. Would that 23 suggest that somebody with an older orchard delayed 24 replanting for a year or two, or is that permanent loss? 25 How do I interpret that number?

JOSUE MEDALLIN-AZUARA: That is an average loss 1 in the acreage of crops, such as almonds and pistachios. 2 UNIDENTIFIED SPEAKER: So is the average loss 3 over all of the years --4 JOSUE MEDALLIN-AZUARA: Over the 82 years. 5 UNIDENTIFIED SPEAKER: So it is an average loss 6 over the 82 years? So some years it is higher; some 7 years it is lower? And then it is averaged? 8 9 JOSUE MEDALLIN-AZUARA: There is an allowance 10 for the amount of permanent crops that can go out. Ι think I went through that in the previous segment. 11 UNIDENTIFIED SPEAKER: Well, sir, could you 12 please speak a little closer to the mic? 13 JOSUE MEDALLIN-AZUARA: Sure. 14 UNIDENTIFIED SPEAKER: Thank you. 15 JOSUE MEDALLIN-AZUARA: There is a stable rate 16 of replacement of permanent crops, which is in the model, 17 18 and that is, I think, 94 percent. And depending on the life of the orchard, there is rate changes for different 19 crops. And what we take out of here is this is the 20 21 average loss over the 82 years. UNIDENTIFIED SPEAKER: So just to clarify that, 22 23 there is one year in which there is 183 acres of almonds 24 that were lost. It was in one of the tables that you

25 were just talking about. Are we to interpret that to

mean that 183 acres of almonds died in one year and then 1 came back in the next year, or is that just 183 acres 2 weren't really harvested but the trees didn't really die? 3 WILL ANDERSON: First, before Josue attempts to 4 answer, that is an average annual acreage for the 82 5 years. So we have got to keep that in mind. 6 UNIDENTIFIED SPEAKER: Okay. Thanks. 7 JOSUE MEDALLIN-AZUARA: I mean, this model 8 accounts for year -- taking into account the amount of 9 10 water available, and that is calculated, what is the loss 11 for that year.

12 UNIDENTIFIED SPEAKER: So if the trees died --13 because I didn't quite hear the answer to my question. 14 It was either the trees died or the trees didn't die --15 they just didn't produce anything and they came back the 16 next year. It was kind of one of those two things. I 17 was asking about that.

18 JOSUE MEDALLIN-AZUARA: I don't understand the 19 premise.

20 UNIDENTIFIED SPEAKER: Okay. Let's assume that 21 the SWAP model in any one year estimates that 200 acres 22 of trees come out of production. That is the information 23 that is being reported. The question is: "Do we" -- I 24 mean, I know that SWAP is a model, and it is just an 25 annual model. And it is giving that farm response to

that amount of water that is available in that year. And 1 it is not a dynamic model. So it is not looking forward; 2 right? It is not saying what is going to happen next 3 year. But how should we interpret the loss of 200 acres 4 of almonds? How should we interpret that as part of the 5 SED output? If the 200 acres of almonds didn't have any 6 production value but the trees were still there and in 7 the following year the trees come back in, is that how we 8 9 should interpret it? Or is it 200 acres of almonds dead 10 and gone?

JOSUE MEDALLIN-AZUARA: I would think it is just 200 just gone on average, and there is no -- I don't have any other further interpretation of that.

14 UNIDENTIFIED SPEAKER: It is a running average? 15 JOSUE MEDALLIN-AZUARA: I think we are reporting 16 an average of what we see as a reduction or what we think 17 is a reduction in acres in an average year.

18 UNIDENTIFIED SPEAKER: Well, I am just giving a 19 hypothetical here, but in my hypothetical, it was just a 20 one-year deal. It was just the loss of 200 acres in one 21 year. Do we interpret that to mean that the trees died 22 in that one year or that there was not production revenue 23 from those 200 acres of trees in that year and the trees 24 came back the next year?

25

JOSUE MEDALLIN-AZUARA: It is no production in

1 that year.

2 UNIDENTIFIED SPEAKER: No production in that 3 year?

JOSUE MEDALLIN-AZUARA: Uh-huh. 4 UNIDENTIFIED SPEAKER: But it is not really 5 assuming that the trees would die. I mean, because it 6 would be a huge capital loss, if that is what we should 7 interpret; right? I mean, it is \$25,000 an acre. So 8 9 even if it is only 183 acres on average, that is \$5 10 million in farm capital that is gone. So we should just interpret it that the trees live through the hydrologic 11 record here; it is just that the almond production falls? 12 JOSUE MEDALLIN-AZUARA: I'm sorry. 13 UNIDENTIFIED SPEAKER: I am just verifying that 14 the trees aren't dying. 15 JOSUE MEDALLIN-AZUARA: We don't have production 16 of 162 acres on average over the 82 years, indeed. 17 18 UNIDENTIFIED SPEAKER: Okay. Yeah. We couldn't really hear that. 19 JOSUE MEDALLIN-AZUARA: Okay. I will repeat it. 20 21 UNIDENTIFIED SPEAKER: Thank you. JOSUE MEDALLIN-AZUARA: So in this table, what 22 23 we are seeing is we see a loss in production of 162 acres 24 over the 82-year time period model on average. 25 UNIDENTIFIED SPEAKER: Okay. Thank you.

GITA KAPAHI: Any more questions on this topic?
 Okay. So at this juncture, let's take a 15-minute break,
 resume at 2:45 on the back wall clock. Thank you.

4 (Whereupon a break was taken.)

5 GITA KAPAHI: If you want to all take your 6 seats, we will begin in a second here, and the next part 7 of the staff presentation is on the South Delta salinity. 8 Les and Tim --

LES GROBER: Welcome back. We are now going to 9 10 cover Southern Delta salinity. Topics we are going to cover are the current and proposed Southern Delta 11 Salinity Objectives; some of the key points of what is 12 known as the "Hoffman report," a report done several 13 years ago to determine what are the salinity levels that 14 are sufficient to reasonably protect crops in the 15 Southern Delta; some of the modeling that was done as it 16 relates to the water supply effects model, and a summary 17 18 of the antidegredation analysis with respect to salinity.

First covering -- so just so this can be a stand-alone, covering some of the same information we have done at the other workshops and hearing. The Southern Delta Salinity Objectives are seasonal. They vary from 0.7 millimhos per centimeter for the April through August period at the three interior stations and at the San Joaquin River at Vernalis and 1.0 millimhos per centimeter during the non-irrigation season. And
 this is based on the growing season and of salt
 sensitivities of alfalfa during the seasoning stage for
 the 1.0 and beans for the 0.7.

And there are four Southern Delta Salinity 5 compliance locations. Three, as I said, are in the 6 interior Southern Delta and one in the San Joaquin River 7 at Vernalis just upstream to the inflow at the Delta. 8 The proposed objectives are for year-round 1.0 millimhos, 9 10 and the SI unit is correcting that now in the basin plan. 1.0 deciSiemens per centimeter and the three compliance 11 locations in the Southern Delta are changed to channel 12 13 segments.

So the first reach for Brandt Bridge -- rather 14 than one location on the San Joaquin River on Brandt 15 Bridge, it now includes a reach from the San Joaquin 16 17 River at Vernalis to Brandt Bridge. And rather than just 18 this single location from Old River to Middle River, the Middle River from Old River to Victoria Canal. And for 19 the Tracy site, it is now Old River and Grantline Canal 20 from the head of Old River to West Canal. 21

22 So this is intended to provide more 23 representative salinities in the Southern Delta rather 24 than measuring at a single location, looking at it in 25 these reaches. So part of the program calls for the assessment of salinity at the reaches to see how it
 relates to the single station and the proposed reach
 area.

As part of the program implementation, the 4 Department of Water Resources and Bureau of Reclamation 5 would continue to operate ag barriers and to address 6 their impacts on the state water project and the central 7 valley project operations on the water levels and 8 9 salinity locations. It would also continue to require 10 the bureau to meet the 0.7 EC objective at Vernalis for April through August so as to provide a simulative 11 capacity during the irrigation season in those downstream 12 locations -- those downstream reaches. 13

14 So the other requirements include a 15 comprehensive operations plan, which is intended to 16 provide information actions on other things that can be 17 done to control water levels and salinity in the Southern 18 Delta, monitoring and reporting, and as I have mentioned 19 a study to characterize the dynamics of the conditions in 20 the Southern Delta and how it affects salinity

21 conditions.

And a point to make -- and what you will see, because it is germane to the antidegredation analysis, is that the combined Southern Delta salinity and San Joaquin River flow objectives is a package. The San Joaquin
River flow objectives are expected to improve salinity
 conditions in the Southern Delta. So aside from that,
 there really is no change in the fiscal environment that
 is expected to happen as a result of the change of the
 salinity objectives.

I am now going to move to the Hoffman report. 6 The main conclusions from that are the salinity in the 7 Southern Delta in the current condition is suitable for 8 9 agricultural crops, even with the variability that is 10 there and even though we are not currently meeting at all times the 0.7 seasonal objective in the interior Southern 11 Delta stations, and that all salt-sensitive crops of 12 significance, including almonds, apricots, dry beans, and 13 walnuts, they are all protected. 14

Also, the relatively high leaching fractions 15 that are associated with irrigation efficiencies of 75 16 percent for furlough and border irrigation methods, they 17 18 are predominant in the Southern Delta. And the information with that and with data from drains in the 19 western part of the Southern Delta suggest that leaching 20 fractions are between 21 percent and 27 percent with 21 minimums ranging from 0.11 to 0.22. Even with higher 22 23 more variable leaching fractions, however, there would be 24 general protection of all crops in the Southern Delta. So the major finding of the report is that 25

salinity could be increased from up to 0.9 to 1.1 1 2 deciSiemens per meter and still be protective of all crops in the Southern Delta. That being said -- and this 3 kind of brings us back to remarks that I have made with 4 regard to both the flow objectives but applied to the 5 salinity protection -- it is not about the absolute 6 protection but the reasonable protection, so some 7 excursions still. And if you have leaching fractions 8 9 that are more variable over a certain area, it could lead 10 to yield losses of up to about 5 percent during low rainfall years. That is important because during low 11 rainfall years, you wouldn't have the additional leaching 12 that happens with that fresh water. 13

So to demonstrate some of this information as it 14 is presented in the Hoffman report, two different steady 15 state models were run based on assumed water uptake of 16 different amounts at different areas of the soil column 17 18 and exponential rates. But in any case -- and also, on two different assumptions for precipitation -- with or 19 without. Being without precipitation would result in 20 generally higher salinities because you wouldn't have 21 that benefit of leaching of salts that occurs during the 22 23 irrigation season.

And the analysis was done on three crops -bean, alfalfa, and almond. And just to give you a flavor 1 of what the report showed, this is for alfalfa. And it 2 shows a relationship between -- on the Y axis -- the 3 relative yield of the crop compared to the irrigation 4 water salinity, when you consider the two different 5 steady state models -- the 40, 30, 20, 10, and the 6 exponential.

And as you can see on this for the dashed line 7 even with the minimum precipitation, when you expect to 8 9 have the earlier effects -- the earliest results and 10 least negative effects is that you start seeing yield reductions below 100 percent at approximately 1.3 11 deciSiemens per meter, and it is higher for the other 12 models. And even at a leaching fraction of 0.10, you 13 still have no yield reduction under the minimum 14 precipitation model until you get to a salinity of higher 15 than 1.0. 16

17 So that gives a flavor of what was presented in 18 the Hoffman report. Again, it was done for other crops 19 and with and without salinity and for those two different 20 steady state models.

21 So with that, I am going to hand it over to Tim 22 to talk about how we did the modeling for the program 23 analysis of the salinity effects in the Southern Delta.

TIM NELSON: All right. So salinity at Vernalisas well as the increase in salinity at the downstream

locations is estimated in the WSE based on three 1 equations. So first, salinity at Vernalis is calculated 2 based on CalSim 2's estimates of salinity over the 3 82-year period of record. So the adjusted Vernalis 4 CalSim baseline salinity, or EC, times the ratio times 5 the CalSim baseline flow to whatever the flow is in our 6 base LSJR alternative. So we are just adjusting it by 7 the ratio of flows. 8

9 So this assumes that CalSim is a reasonable approximation for Vernalis salinity, and it assumes that 10 the salinity change is adversely proportional to the 11 change in flow. So as an example of how this works, so 12 if Vernalis' flow increases by 10 percent over the CalSim 13 baseline flow, then the EC will go down by 10 percent. 14 And if the flow is reduced by 10 percent, then the EC 15 will increase by 10 percent. So that is how we get 16 salinity at Vernalis. 17

18 For the downstream compliance locations, the increase in EC at those locations is estimated based on 19 the Vernalis flow. So the EC increment -- that is what 20 21 we are calling the increase in salinity between Vernalis and wherever the reach is -- so Tracy and Brandt Bridge 22 23 and Union Island. So the EC increment can be described 24 as the increase in salinity from Vernalis to that station due to additional salt introduced downstream at Vernalis. 25

And this assumes that there is a constant monthly load of
 salt downstream at Vernalis so that the EC increases
 would still be inversely related to the Vernalis flow.

So the EC increase from Vernalis to the Tracy 4 Boulevard Bridge is equal to 300,000 divided by the San 5 Joaquin River flow at Vernalis. So where did we get this 6 equation? So if we look at -- so the plot here is of the 7 increase in salinity from Vernalis to the Tracy Boulevard 8 9 Bridge over different flows at Vernalis. And this data 10 is from, I believe, 1985 to 2010 for the monthly average 11 increase.

12 So if we look at -- so these lines here, the 13 green line represents an imperial fit line of 100,000 14 divided by the flow at Vernalis. So what that says is 15 that if the flow at Vernalis is 1 CFS, then EC would 16 increase by 100,000 microSiemens per centimeter. Oh, 17 200. Sorry. The green line is 200,000 divided by the 18 flow at Vernalis.

19 The red line similarly is a fit line of 400,000 20 divided by the flow at Vernalis. So what we were doing 21 with these fit lines was trying to just somewhat 22 approximate how the cloud of data points -- just how EC 23 increases between Vernalis and these downstream locations 24 as best we could. We chose a line in-between the green 25 and red line for 300,000 divided by the flow at Vernalis. 1 Similarly at Brandt Bridge and Union Island, we 2 looked at clouds of data points for increase in salinity 3 for Vernalis compared to flow. And in trying to fit 4 these lines to it, we decided to go with -- we determined 5 that a fit line of 100,000 divided by the flow at 6 Vernalis was the best approximation for both sets of 7 data.

So just looking at some results for salinity 8 9 over the 1990 to '95 period, we see -- first under 10 baseline and then under the 40 percent alternative, there is a dashed line. We see significant decreases in the 11 February through June period because of the increased 12 flow. One thing to note here is '93, this was a very wet 13 year, and we see that the EC under the 40 percent 14 alternative is actually higher under baseline. This is 15 because -- so the flow at Vernalis is lower than under 16 baseline. So that is why we see an increase. And this 17 18 is because there is reduced flood spills under our 40 percent alternative. 19

20 So similarly, we can look at the salinity at 21 Brandt Bridge and Union Island, and we see that it 22 slightly increases. And then looking at the Tracy 23 Boulevard Bridge, there is a further increase.

Now I will hand it over to Les to go over the antidegredation.

1 LES GROBER: Just some remarks on the nature of 2 this analysis, as those kind of scatter plots show for 3 the interior Southern Delta stations, it is very 4 difficult to find a correlation between Vernalis and 5 those other stations. So flow is an important element. 6 It is the location conditions that are really driving it 7 to a very large extent.

That being said, the concept behind these 8 9 relationships is that in general, the higher increases in 10 flow will help to reduce salinity to some extent, not to get too bogged down into the absolute nature of it but 11 just the general -- the relative effect of changes in 12 flow on Southern Delta salinity. I think to call out, 13 there is no change here in Southern Delta salinity 14 happening from the proposed change in the Southern Delta 15 Salinity Objectives. So the only effect and the only 16 17 antidegredation analysis had to do with the effects of the San Joaquin River flow proposal. 18

19 So the conclusion of the antidegredation 20 analysis is that the proposed change to the lower San 21 Joaquin River Flow Objectives and the Southern Delta 22 Salinity Objectives would not result in reduced water 23 quality. We did this antidegredation analysis because 24 raising the salinity objectives may appear to allow for a 25 water quality degradation, but this analysis shows that

1 it is actually just the opposite.

The principal change that could affect the water 2 quality is the lower San Joaquin River flow with 3 increased flows during the February through June period 4 and no change or slight decreases in July through 5 January. Some of that shifting in flow then can 6 result -- you know, happen from changes in spill releases 7 and things like that. And then based on those equations, 8 9 you would see an effect on salinity.

10 So the results show that there is no change in water quality that is coming from the new salinity 11 objectives. It maintains the current condition, but in 12 fact the metric that we use for the antidegredation 13 analysis is how would increasing salinity -- how would 14 increasing flows in the San Joaquin River overall help 15 with Southern Delta salinity and salinity at Vernalis. I 16 17 think we have heard oftentimes that much of the problem 18 associated with Southern Delta salinity is the reduction of fresh water flows on the San Joaquin River and flowing 19 into the Southern Delta. So this actually cures some of 20 that by increasing some of the high quality water that 21 flows into the Southern Delta. 22

23 So that analysis has a series of charts. This 24 is yet another exceedance chart showing the monthly 25 average EC, the Southern Delta monitoring locations for

irrigation months from 1995 to 2015. So the one that has
 the poorest water quality, one of the interior Southern
 Delta stations, that top line, the light blue is the
 Tracy Road Bridge.

And the other lines, the two that are clustered 5 together, that is the Brandt Bridge and the Old River 6 near Middle River, as you can see. That is the reason 7 for using some of the same equations. They tend to have 8 fairly similar water quality and are closer to the San 9 10 Joaquin River, which is that lowermost line, which is the San Joaquin River at Vernalis, shown in pink. And shown 11 there for reference is the current salinity objective of 12 0.7. 13

Here is the similar graphic that shows the same information -- but it is now for the non-irrigation season, for September through March -- and again, showing the three interior Southern Delta locations and Vernalis. The one that stands out again is the Tracy Boulevard Bridge, which has some of the highest numbers.

20 So the way we did the analysis is using those 21 equations and to see, "Well, what happens if you shift 22 the flows, that you have more of those February through 23 June flows and have the other things that would occur in 24 terms of flow effects and changes in Vernalis?" And this 25 is a summary table that shows the annual average change

in salinity, so that grand metric is showing overall, 1 even though there is changes that will occur. And I will 2 show you a chart that shows some of the variability. But 3 in general the changes, as you would expect, at Vernalis 4 is that you have an overall change in salinity at 5 Vernalis because of the higher flows, and that is 6 propagated through the three interior Southern Delta 7 stations. 8

9 Let's look a little bit now at the seasonality 10 of that effect. Because, again, flows change throughout the year. This is not to suggest that it is always an 11 improvement. There can be some -- because there is some 12 shifting in flow that is occurring here and resulting 13 shifting in water quality, this is now showing an 14 exceedance chart of the change of the monthly EC values 15 for Vernalis based on unimpaired flows of 20 to 60 16 17 percent.

18 So those are changes from the baseline, and you can see where you have got the positive numbers, that is 19 saying that there is an increase at certain times of the 20 year. And those are generally associated with times when 21 there might be reduced spills, reduced water flows in the 22 23 San Joaquin River resulting in higher salinities 24 associated with those lower flows. But those are more than offset by the percent of the time that you have on 25

1 the right side where you have lower salinity at Vernalis.

And this is propagated through the system. So 2 this is showing the combined Brandt Bridge and Old River 3 near Middle River, showing the same pattern. You have 4 some increases. You have -- most of the time during that 5 February through June period when you are increasing 6 flow, you have improvements in salinity. So it is a 7 point to note with regard to Southern Delta salinity and 8 9 providing reasonable protection of agricultural 10 objectives. This is during the, kind of, salt-sensitive stage of many crops too, that February through June 11 period. 12

So for germination -- and it is also 13 providing -- if you don't have that higher rainfall, it 14 is providing, during those early irrigations, the 15 improved water quality that provides for the leaching of 16 17 salts. And the pattern continues for the Old River at 18 Tracy Boulevard. But again, it is the same with some 19 increases on the left side but more than offset by the overall improvement in most of the months of the year. 20

21 So the conclusion is that the proposed salinity 22 objective and the program implementation would not result 23 in change in salinity conditions at the Southern Delta 24 and that the proposed objectives would generally improve 25 the salinity objectives -- improve salinity conditions. And that is consistent with the Hoffman findings that the
 salinity under the -- and the current condition -- with
 new flow conditions is that the surface water appears
 suitable for all agricultural crops.

5 So this is pulling from information from another 6 source, and more information on the salinity is available 7 in Chapter 5. Most of this was pulled from the 8 antidegredation analysis and some of the modeling that 9 Tim had gone through and some of the equations are in the 10 Appendices F1 and F2, and the Hoffman report that we 11 referred to is in Appendix E, all on our website.

12

So with that, we can take questions.

MAUREEN MARTIN: Good afternoon. I am Maureen 13 Martin from the Contra Costa Water District, and I 14 understand the simple flow salinity relationship that you 15 have used. But as Les mentioned, the relationship is 16 quite weak for a lot of the stations. I was wondering if 17 18 you guys could provide or if you have analyzed what, kind of, your leach squares -- like, kind of, an R square or 19 fit for the relationships that you developed to the 20 plotted data. Do you have that? 21

LES GROBER: Sorry. Those were not on the plot. I think it was actually pretty low because of the scatter there. We could provide that to you, but it was quite low. And maybe to make the -- because it is related to this question, you know, the complexity of coming up with a relationship is tied to lots of other things that happened in the Southern Delta. So it is a difficult thing to model. This was intended to just provide what one could expect, you know, in the gross average, you know, for the purposes of the analysis.

MAUREEN MARTIN: Exactly. And just to further 7 that point, so when you are looking at the salinity 8 9 change in the South Delta, I know you didn't evaluate 10 changes in exports or changes in other local factors. Is there any efforts going to be made in the future, like 11 maybe in phase two, to evaluate better relationships that 12 incorporate more variables besides just the flow at 13 Vernalis? 14

LES GROBER: I would say a qualified yes, but I 15 wouldn't characterize it as so much better because this 16 17 analysis was done to answer the questions of the changes 18 that are being proposed here and the potential physical effects. For phase two, phase two is specifically going 19 to be looking at the operations in the Delta and 20 hydrodynamics of the Delta. So there, it would be more 21 important to look at the effects of barrier operation, 22 23 Delta cross-channel gates, and things like that, and 24 export pumping rates, and all of those things because all of those things, in a very complicated way, affect 25

1 salinity in the Delta.

MAUREEN MARTIN: And just one more question --2 and I know you have already talked to me about the 3 sensitivity studies not being available at this moment. 4 But most of what I can tell from reviewing the salinity 5 analysis and the antidegredation analysis is that more 6 flow will be coming in on the San Joaquin pretty much all 7 the time and under most circumstances, including in the 8 9 fall months. And that is due in part to some of the flow 10 shifting that is incorporated under the adaptive management. And so I was just wondering if you could or 11 may consider reevaluating some of the changes in Delta 12 salinity if you were to remove some of those adaptive 13 management components or be able to do this analysis 14 again without some of those adaptive management 15 components included. 16 LES GROBER: So you are saying if there were no 17 adaptive implementation or adaptive management element, 18

19 would we redo the analysis?

20 MAUREEN MARTIN: No. I think that we talked 21 about, you know, removing some -- in the WSE model, 22 getting rid of some of those adaptive management 23 provisions that have currently been included, like the 24 carryover storage or the flow shifting -- and I don't 25 know exactly what you are planning on doing.

But it is my understanding that if you were to 1 2 say -- not include flow shifting as you currently modeled it, there is a potential for the flow to be reduced 3 during the fall, let's say, maybe not below the baseline 4 condition but certainly below what is currently being 5 attributed in the alternatives. And so, you know, 6 depending on how you implement it, there could be a 7 reduction in flows and a corresponding increase in 8 9 salinity potentially outside of the February through June 10 window.

LES GROBER: And just to maybe restate the 11 question because I think it is two part because there is 12 the adaptive implementation, and then there is the 13 carryover storage, that we have discussed, to provide 14 that sensitivity. And I think I am hearing your request 15 as well, this is another thing that you, and perhaps 16 17 others, would be interested in seeing. What would be the 18 effects if there was no carryover storage? Am I hearing that correctly? 19

20 MAUREEN MARTIN: Yeah. And we -- and I will 21 provide written comments more to this. But as I 22 understand it -- and I know you talked about the flow 23 shifting quite a bit at the workshop last Monday. But 24 requiring a perfect foresight and the ability to know 25 what type of water year it will be in advance of really 1 knowing -- so having the block of water and then the way 2 the model -- if I understand as you look at it, you know, 3 you take the block of water and then you are able to 4 decide at this current month that you need to be able to 5 shift water to the fall.

And so without that perfect foresight, you know, 6 it seems to me that there is a real possibility there 7 will be reduced flows in ways that haven't currently been 8 9 modeled in other times outside of the February through 10 June implementation of the flow objects. And so just to get a more complete range of the possibilities given the 11 full range of potential adaptive management -- so say you 12 won't know in advance or you won't be able to retain some 13 of that water in storage to shift to it later. So from a 14 Delta perspective, just to be able to have more of a 15 bookend analysis. And if that is not possible, it is 16 17 just a request.

LES GROBER: Well, it is a big question, but I 18 just want to -- well, just as a reminder because the 19 document in total has, you know, itself evaluated a range 20 of 20 to 40 percent. And some, especially at those lower 21 numbers, don't involve any flow shifting and don't have 22 23 to. So that information is already in there. The one piece that is not in there, though -- it is part of the 24 project because it is the carryover storage, so not a 25

requirement per se. It is part of the project that is included in here because as had been discussed, for those of you that weren't part of that, it is a necessary element once you start hitting the reservoirs, or if you don't have some assumptions about that, then you start having, you know, big temperature effects if you try to maintain water supply and things like that.

So the short answer is that I think that the 8 9 results that you are asking for in terms of if there were 10 no adaptive implementation is already in there because we are looking at that range of 20 to 60 percent, and there 11 is certainly no flow shifting at the 20 percent. What we 12 don't have in there as a sensitivity is what if there 13 were no carryover storage in that reservoir reoperation. 14 We are going to try to get that information as it would 15 affect temperature. I don't know that we would be able 16 17 to spill it on through to show what the -- you know, it just shows how complicated things like that are. Because 18 19 if you unravel that, then you start to -- you are changing some of the overall operations and flows. 20

But my short answer to that as well is that the document, by evaluating the 20 to 60 percent range, has evaluated -- you know, especially at the lower percent, the 30 percent which doesn't necessarily involve any of the flow shifting likely captures the full range of

possible effects. And also the main take-home from all of these graphics is that in general, more flow will tend to provide higher water quality, and to the extent that you are at the lower end of flow requirements, it requires less shifting and time and any kind of reoperation so that it wouldn't change the other times of year.

8 But your comments and concerns are noted, and9 please provide them.

10 MAUREEN MARTIN: Okay. One last question -- and 11 so just to clarify, you know, there are places in the 12 Delta, particularly like Victoria Canal, where we have 13 one of our intakes and other places where, you know, the 14 mix of water -- where there is a mix of San Joaquin water 15 and Sacramento water.

So relative to your baseline, I know that you 16 just analyzed really just the flow at Vernalis, this EC 17 18 relationship. But there are places where the dynamics are quite complex, and the EC on the Sacramento is much 19 lower than the EC coming in from the San Joaquin. So in 20 times, you know, when the percentage of water is 21 increasing -- you know, if there is a shift basically in 22 23 the amount of water there that is from the San Joaquin 24 relative to what it may have been from the Sacramento, that would result in an increase in salinity. But 25

1 since -- maybe we will get to that in phase two.

But one other question, just briefly, on the 2 process and -- I noticed that the baseline is different 3 than the no-project alternative, Alternative 1. So I was 4 wondering if you could speak to -- and as I understand 5 it, the no-project alternative is different in that it 6 operates New Malones to achieve the salinity objectives, 7 particularly at Tracy, all the time. So it is a pretty 8 9 different, you know, salinity analysis than the other 10 alternatives and than the baseline.

11 So I was wondering if you could speak to a 12 little bit about the difference between the baseline and 13 the significance of not choosing the no-project 14 alternative in order to assess the changes in salinity.

LES GROBER: I would just make the comment that 15 we didn't show the no-project here. But that actually --16 it is germane to what a tough problem we have in this 17 18 Southern Delta. It is that if you are trying to fix it just with additional flow, you know, for all times of the 19 year to meet the current objectives, it takes a lot of 20 So that is not something -- we didn't show those 21 water. results because they were not particularly useful. 22

23 Did we even -- did we do the no -- do we have 24 the no-project?

25

WILL ANDERSON: We have got a lot of description

of the no-project alternative. But you are right. 1 То meet the lower criteria on Tracy, it does require a lot 2 of water. So the no-project alternative basically 3 assigns that responsibility to the Bureau of Reclamation 4 to release from New Malones. And in order to meet that 5 standard, it basically drains New Malones quite a bit of 6 the time. So it is not really considered a very feasible 7 kind of alternative. But it does show, kind of, what 8 9 would be required to meet that standard as opposed to the 10 existing environment in 2009, which did include VAMP, and it did not include meeting those from New Malones. 11

MAUREEN MARTIN: Okay. And yeah. Just to 12 clarify, I just wanted to know that not -- even though 13 you are evaluating it as an alternative moving forward --14 I mean, I think that when I read the baseline salinity 15 analysis that was done -- because those plots show that 16 17 salinity at the stations can be lower than they are at 18 Vernalis, particularly at Brandt Bridge. And so your 19 analysis automatically is assuming that it is going to be higher -- you know, that increment is always going to be 20 an increase whereas you can clearly see on the plot 21 sometimes it is decreasing. 22

23 So you are choosing the baseline rather than the 24 no-project alternative. I would surmise that it is 25 actually in reality somewhere closer to the middle of

those two, where I'm sure you are not draining New 1 2 Malones, and you know, we are not operating it like that. But fundamentally your baseline shows a higher EC than I 3 think is actually observed there, and it is biased 4 towards the higher side most of the time. So that 5 will -- when we are evaluating the incremental change, 6 you know, it will bias your analysis towards no change or 7 less of a change that might actually be expected in 8 9 reality.

10

So with that, I am done. Thank you.

11 LES GROBER: Thank you.

12 UNIDENTIFIED SPEAKER: Quick question, why was 13 HEC5Q not used to evaluate salinity? As I understand it, 14 it had the ability to compute salinity at multiple 15 locations.

LES GROBER: For -- since we are not doing -because of the complexity of all of the other assumptions in the Southern Delta, this was a sufficient tool to just sum up the relative changes that would occur in response to the increase or changes in the San Joaquin River flows.

22 UNIDENTIFIED SPEAKER: So just was HEC5Q
23 evaluated, or was it just not simple enough to run? I
24 really don't understand why it wasn't --

25 LES GROBER: Just we did not run it.

1 UNIDENTIFIED SPEAKER: Okay. Second question, 2 just following in the same vein about quantifying the fit 3 and the possible error in the relationships. Was it 4 calibrated? Is there anywhere in the report that this 5 calibration is described? Can you point me towards that? 6 LES GROBER: The calibration of what?

7 UNIDENTIFIED SPEAKER: The calibration of EC
8 versus flow relationships that you are using to estimate
9 salinity.

10

LES GROBER: Did we show any --

WILL ANDERSON: Well, you are seeing the curve 11 fit there. I'd take note of the scale of the increment 12 versus the scale of the ambient. If you think of it, 13 ambient EC is around 0.4, 0.5, somewhere in that range 14 that we are talking about, an increment of 0.1 at 3,000 15 CFS or 0.2 at 1,000 CFS. And there is a fiscal reason 16 for that. We don't have any tighter statistics on the 17 18 validity of that. But it is a physical --

19 UNIDENTIFIED SPEAKER: So if I were to look in 20 the SED, I could find supporting documentation of, you 21 know, what the numbers were, or would you be able to 22 provide those?

WILL ANDERSON: At the data site, you mean?
UNIDENTIFIED SPEAKER: Yeah. The calibration
data.

1 WILL ANDERSON: For this curve fit?

2 UNIDENTIFIED SPEAKER: Yes.

3 WILL ANDERSON: Okay. I'm sure we can dig that4 up.

UNIDENTIFIED SPEAKER: Last question, I notice 5 the equation that you put up towards the beginning of the 6 presentation multiplied CalSim EC times CalSim flow over 7 the lower San Joaquin River alternative. Was that at 8 9 Vernalis, first of all? And was there not a flow versus EC relationship developed for Vernalis? Because the way 10 I understood that slide, it was just proportional to 11 flow, and no other relationship was applied at Vernalis. 12

13

Yes, that slide.

14 WILL ANDERSON: Right. This is assuming a very15 high water quality in the tributaries.

16 UNIDENTIFIED SPEAKER: Okay. But later on, 17 there was a description of EC at Vernalis. So there was 18 data there, data of flow and salinity that a relationship 19 could have been prepared instead of assuming one to one 20 with flow.

21 WILL ANDERSON: Anne Huber would like to answer22 the question.

ANNE HUBER: Just on that one topic, the data --I mean, you can make a plot that shows flow at Vernalis and EC at Vernalis. But that flow in the plot is flow

1 that comes from, you know, all sources. And some of the 2 higher flows are coming from the upper San Joaquin River, 3 where as the in -- what we are doing is we are actually 4 modifying the amount of fresh water that is coming in.

5 So using measured data is not, you know, a 6 completely representative way of evaluating EC at 7 Vernalis.

8 UNIDENTIFIED SPEAKER: So sorry to interrupt 9 you. But why use that at Vernalis because you didn't 10 trust the validity but then other locations further into 11 the Delta, why were those relationships used there? I 12 just don't understand. It is just a clarifying question. 13 LES GROBER: When you say, "other relationship 14 used in the Delta," so the ones in the Delta were tied

14 used in the Delta," so the ones in the Delta were tied 15 then to an incremental change in salinity at Vernalis.

16 UNIDENTIFIED SPEAKER: Okay. This first
17 location --

18 LES GROBER: So the first step is just the Vernalis salinity based on the changes in flow. And it 19 is just a simple analysis. But as Anne had said, using 20 historical information in this case would not necessarily 21 be appropriate either because this is a big change in 22 23 terms of where the flow is coming from, when it is 24 coming. But then after determining the adjusted Vernalis EC based on the change in flow based on the CalSim 25

baseline, if you will, then that is used to 1 2 estimate, "Well, how would you expect the higher flows at Vernalis to affect salinity at the other stations?" 3 UNIDENTIFIED SPEAKER: So incrementally as you, 4 you know, move away from Vernalis, it becomes okay to use 5 the historical relationships because you are looking at 6 it on an incremental basis. 7 LES GROBER: That is what we did in the 8 9 analysis. 10 UNIDENTIFIED SPEAKER: Okay. Thanks. UNIDENTIFIED SPEAKER: So I have got just a 11 clarifying question. Can you go to the second to the 12 last slide, I think, the conclusions? 13 So the first bullet point says that, "The 14 proposal in the objectives and program implementation 15 will not result in changed salinity conditions in the 16 Southern Delta." But then this next point 17 18 says, "Proposed flow objectives would generally improve salinity conditions in the Southern Delta." 19 Can you explain -- I may just not be following 20 it -- how those two things coincide? 21 22 LES GROBER: The proposed salinity objectives 23 will have no fiscal effect because we are just basically 24 changing the objectives to comport with what the current condition is. 25

UNIDENTIFIED SPEAKER: Which includes
 exceedances of what the current condition is?
 LES GROBER: Yes. Yes.

4 UNIDENTIFIED SPEAKER: Okay.

LES GROBER: So there is not going to be any 5 physical change that occurs as a result of that change in 6 the salinity objectives or the program implementation of 7 the objectives. But the San Joaquin River flow element 8 of the proposal will change flows and will have an effect 9 10 on the salinity in the Southern Delta. And as we have analyzed in the programmatic analysis, it will be 11 generally an improvement in the conditions or lowering of 12 salinity, which is a good question, which is -- again, 13 there is many -- there is always another model and 14 another way of doing an analysis. 15

But because of what the principal change is and 16 17 the principal effect, we kept it the same just in 18 recognition of the physical system in that if you are increasing the quantity of water that is coming from the 19 highest quality waters in the watershed, you are going to 20 certainly be improving the water quality at Vernalis, and 21 to the extent that Vernalis affects those other stations, 22 23 it will improve salinity at those interior stations.

24 That being said, there are many other factors 25 that affect salinity in the Southern Delta, and we didn't

get into the details of that analysis because none of
 that is changing.

ANNA BRATHWAITE: Hi. This is Anna Brathwaite with Modesto Irrigation District. If we could turn to slide 15 super quick, I just wanted to clarify an issue. And maybe just to restate what has already been said, EC is simply an inverse relationship to the volume of flow, and that is the salinity impact.

9 TIM NELSON: At Vernalis the EC is calculated as 10 the inverse -- it is inversely proportional to the flow.

11 ANNA BRATHWAITE: That was just the formula that 12 was being discussed prior; right?

13 Great. So if you move on to slides 25 and 26, 14 when you are going through potential exceedances. So I 15 remember hearing at the prior technical workshop that 16 flow shifting is involved in every single alternative; is 17 that correct?

LES GROBER: Well, actually, no. At the lower flows, there was no flow shifting that had to be added. I think it only needed to start to be added at 35; correct? Yeah. So at 30 percent, there is no flow shifting because there is adequate water to achieve the increased February through June flows, and it didn't have any temperature effects any other time of year.

25

ANNA BRATHWAITE: And the flow shifting was part

1 of the 40, 50, and 60 percent analyses then; right?

2 LES GROBER: That is correct.

3 ANNA BRATHWAITE: Okay. So if I am looking at 4 this chart, does this show the exceedances with the flow 5 shifting already built in? Does that make sense?

6 WILL ANDERSON: Yes. The answer is yes at 40 7 percent and above.

8 ANNA BRATHWAITE: The flow shifting is already9 built into this?

10

WILL ANDERSON: Right.

LES GROBER: Well, some portion of flow shifting but though not -- say at the 40 percent, they require some flow shifting, a small increment of that to prevent the temperature effects but not the full flow shifting that is allowed at 40 percent up to 10 percent of that amount, though, shifting it to the fall. Because that is covered by looking at the 50 percent alternative.

18 ANNA BRATHWAITE: Okay. And that takes you19 outside the February through June time period, though.

20 LES GROBER: That is correct.

ANNA BRATHWAITE: Okay. And then maybe just one last question. I believe it is the next slide. There is a title that speaks to relative to baseline. Maybe one more slide forward. Oh, no. Maybe two back then. Did you pass it? Okay. Well, I will hold that last question until I get a better handle on what slide it came from.
 Thank you.

MAUREEN MARTIN: Hi. It is Maureen again from 3 the Contra Costa Water District, and I have just one more 4 question. And it is really just your thoughts on the 5 CalSim EC relationship at Vernalis remaining unchanged. 6 And so one -- and it is really just a question. I 7 haven't looked at any data or anything like that. Is 8 9 there a possibility that given you have modeled that 10 there will be an increase in groundwater usage throughout the basin, that there may be an increase in EC that is 11 seen at Vernalis as a result of the change in the surface 12 groundwater dynamics and that the relationship that has 13 currently been used in CalSim might change? 14

15 LES GROBER: We didn't look at any changes in 16 the relationship.

MAUREEN MARTIN: I know you didn't. I was just wondering if you thought that that was a reasonable assumption or that there was a possibility, even a qualitative way that that relationship may change in the future given the change in surface water/groundwater use that you have anticipated. So if you use more groundwater, groundwater is more saline.

LES GROBER: That is an interesting question,but it is not something that we had analyzed. And again

1 at the level of the analysis that we are doing here that 2 we are looking at, you know, as many people know, there 3 is lots of sources of extremely poor water quality in the 4 basin. I think what you are suggesting would be a 5 refinement if you had now some in-between source of 6 groundwater, but we didn't look at that.

7 ANNE HUBER: I think it would be pretty 8 complicated because you might be using more groundwater 9 and to the extent that would run out, that might increase 10 salinity a little bit. There would also be an issue of 11 if there is actually less land in production, then runoff 12 might be reduced, which would help water quality. There 13 are multiple factors.

14 MAUREEN MARTIN: Okay. Thank you.

JEFF MICHAEL: Hi. Jeff Michael from the University of Pacific. I had a question about that first bullet point and the conclusion. I was a little confused by it.

19 All right. So changing a subjective would not 20 result in a change in salinity conditions in the Southern 21 Delta, but you also talked about how you haven't analyzed 22 all of those other factors that can affect salinity in 23 the Southern Delta. So how can you make that conclusion 24 if you haven't evaluated all of these other effects --25 local sources, CVP -- and how they might be affected by 1 this change?

LES GROBER: There is lots of different projects and things going on in the Delta. So we didn't analyze the possible effects of all of those things except for in our cumulative impact analysis where we acknowledged that there is going to be other things that could have effects on salinity in the Southern Delta. But we didn't do any quantitative modeling to try to assess them.

9 JEFF MICHAEL: So what is the justification for 10 the first bullet point? I guess I am not understanding 11 how you reached that conclusion.

12 LES GROBER: So we are proposing salinity 13 objectives. So changing the salinity objective in the 14 Southern Delta from 0.7 to 1.0 year-round, with the 15 admonitions component of continuing to require the Bureau 16 of Reclamation to meet the 0.7 at Vernalis doesn't change 17 the current condition. So that can't be affecting the 18 salinity conditions in the Southern Delta.

19 JEFF MICHAEL: So the current objectives don't 20 constrain any of these other sources in any way? Would 21 moving this allow them to do anything differently?

LES GROBER: You know, there has been difficulty in obtaining the current salinity objectives in the Southern Delta. So this isn't going to provide an opportunity or a chance for any changed condition. 1 UNIDENTIFIED SPEAKER: I had a question about 2 the Hoffman report and those yield curves. Leaching 3 fraction is something that I have heard discussed a lot. 4 And if you look at the mathematics, there is a critical 5 assumption there. I have heard people say that leaching 6 fractions in the Delta are much lower than what you have 7 assumed here.

8 And I was wondering, in preparing this report,
9 did your staff go out and collect data about leaching
10 fractions at all?

11 LES GROBER: No.

12 UNIDENTIFIED SPEAKER: Why not?

LES GROBER: We were doing a programmatic 13 analysis, and the report that was done recognizes that 14 there could be a range of leaching fractions. In fact, 15 some information was provided to us showing that some 16 work subsequent the Hoffman report shows leaching 17 18 fractions can be in some areas lower. Though, that 19 information also shows that yields aren't necessarily affected. 20

21 So the report is showing -- is based on 22 information that was available at the time but also makes 23 conclusions with regard to how the information can be 24 used. And even if you had somewhat different leaching 25 fractions -- and as those charts show -- you could start encouraging on some yield reductions if you had higher
 leaching fractions. But -- and this speaks to the
 program goal is to provide objectives that are not
 absolutely protective of all crops at all times but
 reasonably protective. And the conclusion of the Hoffman
 report shows that year-round 1.0 achieves that.

GITA KAPAHI: Looks like we have exhaustedquestions on this one.

9 LES GROBER: Then we are 20 minutes ahead.
10 GITA KAPAHI: We are ahead, which is okay. So
11 let's move on then to the next section, which is part
12 six, city and county of San Francisco effects.

WILL ANDERSON: Good afternoon. Will Anderson, 13 water resource control engineer at the division of water 14 rights. This afternoon, I am going to speak with you 15 about the effects of the project on the city and county 16 17 of San Francisco, particularly with regard to water 18 diverted from the Tuolumne River. And on my left is Tom Wegge from TCW Economics. He is going to assist to talk 19 about the economic effects of the potential changes in 20 water supply, but I am going to first address how we did 21 it. 22

23 So the question is what is the potential and 24 likely effects of the project on the city and county of 25 San Francisco with regard to water diverted from the

Tuolumne River? First we need to talk about the Tuolumne 1 2 River in context of water rights. I am going to go through the method of this analysis, the potential 3 project effects on the CCFS New Don Pedro Reservoir water 4 bank and the accounting there, calculations that were 5 required to determine the amount of replacement water 6 that might be needed, the potential actions to meet the 7 water supply demand. And like I said, Tom is going to 8 jump in on the economic analysis. 9

10 So here is an old project diagram of the 11 watershed. We see Hetch Hetchy in the upper watershed 12 and Yosemite National Park. Don Pedro Reservoir is more 13 in the middle, and the Turlock and Modesto Irrigation 14 Districts are down in the lower part of the watershed.

So these irrigation districts have pre-1914 water rights, and essentially when Hetch Hetchy was built, the Raker Act was an act of congress that delineated the water rights -- at least to the regard of what is being diverted and stored -- at Hetch Hetchy and how that leaves a certain entitlement to the senior water rights of the districts.

In 1966, upon the construction of -- or the planning for the New Don Pedro project, the districts and the city and county of San Francisco got together. And they had a series of these agreements prior regarding

when they would -- how they could operate the projects to
 allow flows from Hetch Hetchy at certain times of the
 year, et cetera.

The fourth agreement established a water bank in the new reservoir and the accounting of that water bank. In Article 8, it describes that the accounting of this water bank, it is a provision that the accounting would change to apportion the burdening of future flow requirements -- instream flow requirements and mentioned, at the time, the Federal Power Administration.

Now, we call it the Federal Energy Regulatory 11 Commission. So anticipating new FERC flow requirements 12 on the Tuolumne were to be apportioned 51.7 percent to 13 the city. And so that is apportioning the burden of the 14 increased flow requirements, 51.7 percent, to the account 15 of the water bank. And I am going to attempt to describe 16 to you and clarify how that works and how we accounted 17 18 for the changes of the project.

19 So the Raker Act require, just in the simplest 20 perspective, the city and county of San Francisco is 21 required to bypass 250 -- 300 CFS or the entire natural 22 flow of the Tuolumne River, if the flow is less than that 23 amount. And that is the district senior entitlement. 24 From April 15th to June 13th, the peak snowmelt period, 25 the city and county of San Francisco must bypass 4,066

1 CFS.

So here is what that looks like in a wet year --2 well, following a dry year. So in the lower part of the 3 graph, this is the natural streamflow of the Tuolumne, 4 and we see the 2,350 CFS level. So for most of the year, 5 the CSF would have to bypass that amount and would be 6 otherwise able to divert and store anything above that 7 amount. And in that peak snowmelt period, you can see 8 9 that we didn't really get much of that in '92, but in 10 '93, there is kind of a more substantial amount.

11 So the essence of the water banking relies on 12 additional water from the wet years to be stored in Don 13 Pedro. In '92, there was only 68,000 acre-feet in that 14 Raker Act category, and we will show an example of that 15 six-year drought period and the fact that the water bank 16 was drawn down.

So the sources of data for this analysis are the 17 18 CCSF Tuolumne River flow accounting that we reference as PUC form P-173. It covers basically daily operations for 19 the Hetch Hetchy project and the Tuolumne River and also 20 provides a baseline accounting for the water bank. We 21 have also used the WSE model, which will provide an 22 23 amount of what is the increased flow requirement in the 24 Tuolumne River for the 20 percent, 40 percent, and 60 percent unimpaired flow alternatives. And we also 25
account for the need for flood releases based on the
 reoperation in the WSE model.

The water credit account modeling is not super 3 sophisticated. It is a basic addition and subtraction. 4 The current balance cannot exceed 570 acre-feet, except 5 for if there is permitted encroachment into the flood 6 control -- or the top of conservation storage. We start 7 at the previous day's balance. Whatever comes in credits 8 9 to that account. Whatever is a Raker Act entitlement is 10 removed from that account, and the evaporation is assigned equally. Flood spills are assigned proportional 11 to the net credit balance, and the accounting for the 12 increased FERC flows are an additional debit in the 13 amount of 51.7 percent of what the increased flow 14 requirement is. 15

16 So essentially, this allows the districts and 17 the city and county to -- well, the city and county to 18 use some water at times when it is more convenient to 19 divert to Hetch Hetchy Reservoir and allow for the peak 20 flows that are -- on the Raker Act side could be diverted 21 by the city and county to go down to Don Pedro Reservoir 22 and then balance that account.

23 At this time, are there any clarifying questions 24 about how that works?

25 Mr. Godwin --

1

Oh, maybe wait on the microphone.

ART GODWIN: Some of your numbers are a little wrong. Backing up, you had 2,350 CFS and 4,066. The Raker Act has 4,000, not 4,066. Here on this slide, you have 4,066 and 2,416.

6 WILL ANDERSON: Well, I will have to definitely 7 check into that. There is a little bit of a difference 8 in what -- there is additional agreements as to the 9 original Raker Act. So thank you for pointing that out. 10 ART GODWIN: Correct. You need to get to the 11 bottom of that.

12 WILL ANDERSON: We will certainly get to the13 bottom of that.

So what we have done is taken the baseline 14 accounting from the PSE from 173 and compared that to --15 based on WSE what we think is the baseline credit 16 17 balance. We see in the years 1988 to '92 that our 18 calculated baseline that we have calculated that the bank has drawn down below zero. And the fourth agreement 19 doesn't allow for that. It says that it must not go 20 below zero. So essentially there is a meet and 21 confer-type clause. And so what happens between the city 22 23 and the districts is a contractual relationship.

24 But when we go into the impacts of the projects, 25 we have to interpret what could plausibly happen, and we are going to look at the bookends of what could happen
 and how much water is acquired to keep a positive credit
 balance, essentially.

4 So we have got two scenarios that we have 5 evaluated because we haven't been able to determine from 6 the record specifically how to interpret the fourth 7 agreement with regards to additional instream flow 8 requirements.

9 Scenario one would require reallocation of 10 storage credits only if there is a positive credit 11 balance. So this reallocation of credits is the term in 12 the fourth agreement essentially assigning an additional 13 burden to the city and county.

14 Scenario two really indicates storage credits, 15 even if there is a negative balance. And so that 16 basically is if the balance is zero, we are evaluating 17 what the additional water cost is, that number continues 18 to go up, even if there is no Raker Act water available.

19 So scenario one -- so the city and county is 20 responsible for 51.7 percent of increased requirements 21 when the account is positive. And so we see in the 22 six-year drought period of '87 to '92 that baseline is 23 the upper line, the blue line. We saw the baseline plot 24 earlier. It goes below zero a couple times and just 25 barely in water year 1988, a little more so in '89, '90,

'91, and it gets back above zero after that. And so this
 is saying when the account is less than zero, we are not
 accruing additional responsibility for increased flow
 requirements.

So that is just the zero line, the dotted red 5 point I wanted to show just so you are clear, when the 6 account is below zero. It continues to accrue debits 7 based on operations. We assume that the Hetch Hetchy 8 9 diversion will operate the same and that amount of water 10 will continue to be available. But there would be a burden, and there would be -- there is a contractual cost 11 certainly there. It only accrues the increased flow 12 required debits in scenario two. 13

So scenario two, we do see that that draws the 14 account far more negative in the 20 percent, 40 percent, 15 and 60 percent unimpaired flow requirements. So 16 17 basically, we can account for the six-year drought 18 period, '87 through '92, as the largest drought in the period that we have data available for, which is this 19 21-year period covered by the PUC form 173 that describes 20 the operations for the Hetch Hetchy and the accountings 21 of the water bank. 22

23 So we can evaluate that in baseline there is a 24 supplement needed. So basically in the drought, there is 25 a need to confer under the fourth agreement and come up

1 with the responsibility for how to make up for what is 2 the supplement that is needed to keep the account above 3 zero. In the 40 percent alternatives, we can see that 4 for that six-year period, the average is about 45,000 5 acre-feet. That is for scenario one.

6 And then scenario two, we have got a six-year 7 average of 137,000 acre-feet. If we average that over a 8 longer period, such as if this is an event that could be 9 reasonably planned for, we can look at a longer term 10 average, and that lowers those numbers respectively to 11 12.8 and 39.2 thousand acre-feet per year for the 21-year 12 average.

We also observe, if we look at the 60 percent alternative here, there is a couple of other years that would be of concern, but we are going to stay focused on the 40 percent for the six-year drought and for the general proposal at 40 percent.

18 Now I am going to pass it over to Tom Wegge to19 talk about the economic analysis.

TOM WEGGE: Good afternoon. There is nothing like having an economist in the late afternoon to inject a little energy into the room at this time. My name is Tom Wegge. I am a resource economist at TCW Economics. I am going to be presenting our analysis -- do you hear that -- of potential effects of the proposed project and alternatives that was conducted for the Substitute
 Environmental Document. These right here.

3 So the presentation topics that I am going to be 4 covering, first the SFPUC water district profile. For 5 those of you that aren't as familiar with the district, 6 this information is sort of the institutional context 7 that helps, I think, to understand how the district 8 operates and why the analysis was done the way it was.

9 Then I will move into an overview of the 10 economic analysis. From that point, there is sort of three steps in the process of our analysis. First being 11 estimating water supply costs. Then following up from 12 that, looking at potential ratepayer effects, and then 13 lastly, looking at estimated regional economic impacts in 14 the Bay Area, where service is provided by the San 15 16 Francisco Public Utilities Commission.

17 Just as far as a little background on the SFPUC 18 water district, the city and county of San Francisco through this district owns and operates a regional water 19 system providing service to approximately 2.6 million 20 residents in the four-county area. It is also the retail 21 water supplier in the city and county of San Francisco. 22 23 It provides water to 27 wholesale providers and water 24 companies within the three counties of Alameda, San Mateo, and Santa Clara counties. 25

1 The overall capacity of the district's water 2 system is about 265 million gallons per day or 296,000 3 acre-feet on average. Approximately 85 percent of the 4 water comes from the Tuolumne River watershed through the 5 district's Hetch Hetchy project. And the other 15 6 percent comes from combined Alameda and peninsula 7 watersheds.

During the drought periods, sometimes the water 8 9 provided by the Hetch Hetchy project can actually account 10 for more than 93 percent of the district's total water. The individual water agencies rely on the district's 11 supplies to varying extents, and water use by customer 12 class varies widely among the wholesale agencies. 13 This information is shown in the SED document at the table 14 identified -- in the table identified here. 15

About 59 percent of the water is delivered to residential customers, 21 percent to commercial and industrial, 11 percent to government and other users, and 9 percent to dedicated irrigation users.

Okay. Now I am going to present a little information about the -- how the economic analysis was conducted. The -- in hopes that a profile of the district will help to understand how some of the divisions were made and how we did this analysis.

25 This flowchart here presents the sequence of

steps that we went through for the analysis. The -- as
 far as assumptions, there were, sort of, two key
 overarching assumptions that were made, the first being
 that the San Francisco PUC would purchase water to offset
 water shortages during extended drought periods.

The second overarching assumption is that SFPUC 6 would pass the additional cost on to its retail 7 customers. These -- particularly the first overarching 8 9 assumption here is important in that we are assuming that 10 the water would be replaced and that the district would pay to replace that water. And the reason why this is 11 important is other analyses in which shortages of water 12 to the district were looked at, such as in the 13 relicensing study -- the hydroelectrical relicensing 14 studies in New Don Pedro, a different assumption was made 15 that rather than replacing the water, a rationing would 16 occur. And that assumption does have different 17 18 implications for the analysis.

19 So with these assumptions, we estimated what the 20 additional water supply cost would be, and then based on 21 that, we looked at how those additional costs would 22 affect ratepayers with the general conclusion that there 23 would be a decrease in discretionary income of water 24 customers and net income of proprietors and that this 25 would result in -- as far as the retail customers to

1 SFPUC -- a temporary rate change.

And in the case of their wholesale customer, which it is mentioned that there are 27 wholesale agencies that they provide water to, that would translate into higher wholesale water rates that would be passed on to their customers in terms of temporary rates or charges.

8 And then the last component of your analysis 9 looked at potential changes in the regional economic 10 impacts. This included changes in economic output within 11 the four-county Bay Area region, decreases in jobs, and 12 some -- although we didn't look at other effects, there 13 are some other effects that will include -- like fiscal 14 effects -- revenue generated for public agencies.

15 So the first step that was mentioned was to 16 estimate the water supply cost associated with the 17 shortages that the district would experience under 18 different scenarios and assumptions. As economists 19 always say, we need to have assumptions for just about 20 everything. And with an analysis this complex, there 21 certainly had to be a number of them.

22 So to the step of estimating water supply costs, 23 we assume that the water demands during severe drought 24 periods, such as the six-year extended drought period 25 that Will was mentioning before from 1987 to 1992, that those shortages would be offset by purchases of water
 from irrigation districts. For example, MID and TID.

We assumed that the water purchase price for this water would be on average \$1,000 per acre-foot. We assumed that there would be no other cost to the district, such as costs to hold, treat, or distribute the water from the Hetch Hetchy system. And lastly, that O&M cost to obtain water from that system would not vary on the amount of water delivered annually.

10 As mentioned, we did assume for purposes of our analysis that water transfers from irrigation districts 11 would be the source of water to meet the shortage to the 12 district -- to the SFPUC. However, we did look at, in 13 the SED, some alternatives to this. The two primary ones 14 were evaluating potential in-Delta diversions. This was 15 looked at, as indicated on this slide, by SFPUC in a 2007 16 17 study. These are some of the capital costs and O&M costs 18 associated with that, but as mentioned, for our analysis, we used water transfer as the mechanism for replacement 19 water. The second major source was looking at water 20 supply desalinization projects. And, again, some 21 information is included in the SED related to that. 22

The -- this particular slide identifies the water supply costs on both a short term -- this slide is on a short-term basis. By "short term," I mean during

the extended drought period, which as mentioned was the 1987 to 1992 period. So this shows the required water transfer under scenario one and scenario two as it relates to the water bank account and how that would be operated.

Under scenario one, the water -- the average 6 water transfer amount would be 14,000 to 30,000 acre-feet 7 for the 20 percent, 40 percent, and 60 percent flow 8 9 alternatives at \$1,000 an acre-foot. The math is pretty 10 straightforward here. It would incur a cost of \$14 to \$30 million per year to acquire that water supply. Under 11 scenario two in the short term, the water transfer needs 12 are 35 to 208 thousand acre-feet per year, and the 13 associated costs with that range from 35 million to 208 14 million. 15

The next slide here looks at this cost over the 16 longer period of time. As Will had mentioned, the 17 analysis of the water supply effects was -- there was 21 18 years of data on SFPUC operations. So this extended 19 drought of six years was part of this 21-year period. 20 And so the longer period is represented by the 21 years 21 in the period of record. Because the longer period of 22 23 time has 21 years as opposed to six years for estimating costs, the -- the annual average transfers and annual 24 average costs are reduced under scenario one from 4 to 9 25

million per year and under scenario two, from 10 to 71
 million dollars a year.

And I would just like to point out at this point 3 that while this analysis focuses on the costs to the 4 SFPUC for replacing water and the revenue, or the 5 costs -- it provided an estimate of these costs, you need 6 to keep in mind that although these are costs to the city 7 and county of San Francisco, they also represent a 8 9 transfer of revenue from the city and county of San 10 Francisco to the agricultural districts and the growers where it assumes that that is where the water would be 11 transferred to. So there is two sides of this equation, 12 both a cost and a potential revenue enhancement. 13

14 The next slide here shows the annual costs 15 averaged over a longer period of time. This focuses on 16 the boxed information here. It is the costs associated 17 with the Alternative 3, the 40 percent unimpaired flow. 18 As previously shown, the cost would range from 8 million 19 to 34 million dollars per year.

20 Now the water supply costs, as that flowchart 21 indicated earlier, those costs then become costs that are 22 passed on to the ratepayers within the four-county Bay 23 Area. And this next component looked at how these 24 ratepayer effects might occur. A couple of key 25 assumptions here that we use for baseline purposes, in the combined SFPUC, you see water enterprise and Hetch Hetchy water budgets. They are separated for the SFPUC for the fiscal year of 2013-2014, and that total budget was \$483 million.

5 The second key budget for the ratepayer analysis 6 is that the budgetary cost increase that we looked at was 7 to include the water supply cost to this baseline 8 condition -- budgetary condition, and we assumed that 9 there would be a proportional rate increase within terms 10 of the district's retail and wholesale water rates.

This slide just steps through three main -- or 11 walks through three main steps for the ratepayer 12 analysis. We first estimated the baseline water budget. 13 Second, we used the estimates of water supply replacement 14 costs for determining the change in the baseline annual 15 water budget. And then the third step was to estimate 16 17 the annual percent change from the baseline water budget 18 and use that as a basis for approximating the annual effect on customer rates. 19

20 This slide actually shows the calculations. The 21 first step is to determine the total baseline budget, 22 which is the 483 million that I previously mentioned. 23 The second step is to determine what the short-term water 24 supply costs do to the budget and then the long-term 25 water supply costs. And then the third step is to estimate what the percent change is in the budget. And
 then both the short term and the long term are used to
 approximate what the change would be to ratepayers.

So during the six-year drought, under scenario one, what we show is that the percent change in the subject represents from about 3 percent under the 20 percent alternative. Under the 40 percent alternative -unimpaired flow alternative, it is a 5.6 percent increase. And then the 60 percent flow alternative, we estimate a little over 6 percent.

This just highlights the changes specific to the 11 40 percent unimpaired flow alternative. Over the longer 12 21-year period, the full extent of data that we had, 13 which based on work that Will looked at, seemed to be 14 fairly representative in terms of water year type to a 15 longer historical period. So we felt that using this 16 17 21-year period to determine what the average cost would 18 be was appropriate. And the annual change in ratepayer effects is reduced from essentially 2 percent to 6 19 percent to, in this case, less than 1 percent to about 2 20 percent under Alternative 4. 21

This slide presents the same information but on -- for scenario two. Again, it is showing the effects across the alternatives in terms of the percent change in potential ratepayer effects. In the short term, that 1 range is 7.2 percent under Alternative 2 to 43 percent 2 under Alternative 4. In the probably more realistic, 3 reasonable, long-term period, which is the 21-year slice 4 of years, the increase in ratepayer effects would be 5 about 2 percent to about 15 percent. Again, this box 6 here highlights the values associated with the 7 Alternative 3, 40 percent, unimpaired flow.

Okay. The last component of our analysis was to 8 9 look at the regional economic impacts, just a quick 10 overview. To do this, what we are trying to do is estimate, "Were the analyzed impacts on the Bay Area 11 regional economy from purchasing replacement water 12 supplies?" It should be noted that the analysis that we 13 did here was broken out by the four counties, and then 14 what I am going to be presenting is just for the 15 four-county region as a whole. But the analysis actually 16 shows the effects within each of these counties. 17

So the water supply costs were further broken 18 out by water district, customer type, and county. We 19 evaluated how different customer types would likely 20 respond to higher water rates and then developed modeling 21 assumptions for that analysis. And then we used --22 23 similar to what was done for the agricultural economic 24 analysis, we used IMPLAN to estimate both the county level and region-wide effects as measured by economic 25

output and jobs based on expected changes in the demand
 for goods and services in the region.

The key assumptions relate to the different 3 types of water categories or client/customer categories. 4 Again, discretionary income was assumed to be reduced as 5 a result of higher water costs to the various groups. I 6 won't go through each of these, but we broke customers 7 out into households, commercial, industrial, government, 8 9 and dedicated water users and developed appropriate 10 assumptions for IMPLAN modeling.

This next slide shows the results of the IMPLAN 11 analysis. This slide focuses on scenario one. I have 12 highlighted the effects with the effects of the 40 13 percent unimpaired flow alternative. What we are showing 14 in terms of changes in economic output are -- and these 15 are annual changes -- an estimated \$31 million under 16 scenario one, which represents about 0.05 percent of the 17 18 total economic output in the economic region. And in terms of jobs, we estimated a loss of about 226 jobs, 19 which is less than 0.1 percent of the total jobs in the 20 region. 21

This slide shows the similar effects but under scenario two. As Will had defined it, the effects become larger under scenario two because of the bigger hits that the water districts would incur. This highlights the

\$140 million annual loss in economic output and about
 1,000 jobs annually within the four-county region.

Now, we also -- as I mentioned, we used the 3 \$1,000 per-acre-foot price for purposes of estimating 4 water supply costs to the district. This was based on a 5 review of the literature as well as an investigation of 6 the prices used in recent water transfers. Because of 7 the uncertainty of this price, we felt that doing a 8 9 sensitivity analysis, at least as it related to the 10 regional economic impacts, was appropriate. And so we looked at what those effects on economic output and jobs 11 were -- or would be under assumptions of \$500 an 12 acre-foot water and then \$2,000 an acre-foot water. 13 And so this first slide shows the effect on output, and then 14 the next and last slide shows the effect of the 15 sensitivity analysis on total jobs. 16

17 So with that, I will --

18 GITA KAPAHI: Open it up to questions.

19 TOM WEGGE: -- turn it over to questions.

20 GITA KAPAHI: Okay.

21 WILL ANDERSON: First, I would just like to 22 clarify for Mr. Godwin's original pointing out that there 23 was inconsistencies in the numbers in the slides, there 24 is another -- I don't have the fourth agreement right in 25 front of me right now, but there is an additional amount of what looks like 66,000 acre-feet that is added in the
 fourth agreement. So that is -- excuse me, 66 CFS. You
 are correct, sir. That is what is in the calculations,
 and I apologize for the inconsistency in the slides
 there.

6 MATT MOSES: Hi. Matt Moses. I am with SFPUC 7 Regional Water System. Thanks for walking through what 8 is not such a simple analysis. Don't sell it too short.

9 I have a question about the basis for scenario 10 one. As I understand, you used a historical water bank 11 account balance over the 20-or-so-year period that you 12 evaluated. And can you describe again -- maybe with more 13 detail -- what happens in scenario one, specifically when 14 the bank account goes to zero?

WILL ANDERSON: Right. As I'm sure you are 15 aware, in the fourth agreement, it has a provision that 16 17 the account shall not go negative. And in the case that it would be heading that way or that would -- the numbers 18 would add up that way, there is a clause in Article 8 19 that the city and the districts would need to find a 20 solution to that, whether it be arbitration or some other 21 agreement. 22

23 So specifically in the analysis, what we are 24 saying is that the increased burden of the flow 25 requirement would not continue to accrue at the point

that the balance is going negative. And that is -- you 1 could consider that, kind of, a lower limit. But 2 scenario two is where that continues to accrue no matter 3 what. And essentially, kind of, the thought behind that 4 is that we don't know exactly how the parties would tend 5 to sort this out, but the increased flow requirement 6 causes the balance to be zero more often. So that is a 7 dilemma. 8

9 We can see what the high-end items limit of the 10 costs, if that were determined to be the interpretation 11 of that. And scenario one is an attempt to have a lower 12 end cost of -- in the course of operations when that --13 when the water is available under the account that the 14 city would bear that burden at 51 percent. And we see 15 that when the account is negative.

It is going that way primarily because -- and I 16 am going to go back to the -- I will move back to this 17 18 slide here. So if you have successive dry years where essentially there is minimal flow that is accruing to the 19 bank account, then that would cause that dilemma. Т 20 don't know if that helps answer the question. Because if 21 you have -- it is difficult to accrue an obligation based 22 23 on something you don't have. The contract can say it is 24 so, but that would certainly be something to resolve. UNIDENTIFIED SPEAKER: (Microphone error.) 25

WILL ANDERSON: So this evaluation is -- to 1 answer the second part first, no, we didn't feed that 2 cost back into the model because we are assuming that 3 there is some resolution to the issue of the water bank, 4 whether that be bypass flows, which is not a primary 5 assumption of the analysis. But in the wider view, that 6 is the obligation, if the flows would need to be 7 bypassed, or some other arrangement. 8

9 So in the case that flows would be bypassed, 10 then the district entitlements would be kept whole in 11 that case, and that would be a water shortage, as is seen 12 in droughts in baseline -- in the severe drought.

13 LES GROBER: Could you restate your question? I 14 think what you are asking is: Did we fold this back 15 into -- and how would it change the water supply effects 16 in the basin?

17 And the short answer is "no" and that these 18 would not be additive effects. So depending on how this 19 shortage is revived, it wouldn't be an additional water 20 supply effect. It would be either here or in the valley 21 floor, in the basin.

22 UNIDENTIFIED SPEAKER: (Microphone error.)
23 UNIDENTIFIED SPEAKER: Test.

24 TOM WEGGE: I understand the assumption you made25 for the economic analysis about purchasing water, but

then did you look at -- did you run that back through the water supply effects analysis to see what the effects are to the districts of transferring 120,000 acre-feet of water to San Francisco?

UNIDENTIFIED SPEAKER: No, we did not.

5

6 LES GROBER: There would be only -- the water 7 supply effect, that is not an additive effect. So when 8 we come up with the mean annual in terms of obtaining the 9 instream flows, it would not be an additional water 10 supply impact, say, over the 290,000 acre-feet on average 11 per year, correct.

12 WILL ANDERSON: If they did in fact transfer and 13 sell the water --

14 LES GROBER: Then they would have the water 15 supply effect that was described, so the 290,000 on 16 average. It wouldn't increase it by transferring that 17 water.

18 UNIDENTIFIED SPEAKER: So it would just be 19 replacing the water that they were shorted, that they 20 otherwise would have received?

21 ANNA BRATHWAITE: Hi. This is Anna Brathwaite 22 from the Modesto Irrigation District. It sounded like 23 you had three different options to choose from to 24 mitigate the water supply impact. It could be water 25 transfer, building new treatment or storage facilities, and then building a desal plant it sounded like were the
 three options.

And I was just -- I have a follow-up question. 3 But maybe, first, why did you choose the water transfer 4 between the three of those projects, especially since the 5 service provider's significant and unavoidable impacts 6 were due to construction from water treatment or other 7 waterworks? So I thought maybe the more protective 8 9 standard would be to acknowledge that and apply those 10 same principals to San Francisco. But I thought maybe you could explain to me, kind of, why the change. 11

LES GROBER: When you say, "the change," I mean, 12 we looked at all -- as you said, all three of those. But 13 here -- the focus here is if you were to do it through 14 the transfers, which that is something that has happened 15 in the past but not of this magnitude. We focused on 16 17 that because it is something that is more -- you know, 18 everything was in place to achieve all of that. So it would just be changing hands for them to achieve the 19 transfers. 20

21 ANNA BRATHWAITE: Okay. And so -- okay. And so 22 just maybe you could explain the thinking. So I would 23 have thought with the larger rate base, larger revenue 24 stream, easier access to capital, that if you were 25 proposing construction projects for smaller agencies that

you would also look and take the more protective view of
 the environmental analysis and look at the potential
 construction projects.

TOM WEGGE: Well, I mean, we considered all of 4 the options, but we felt that the most reasonable 5 assumption, given the existing infrastructure, the 6 history of having transfers, the fact that the 7 district -- the SFPUC -- has identified transfers between 8 9 MID and TID and their water supply plan, that based on those factors and the fact that, like I said, the 10 infrastructure was in place, that seemed like the most 11 reasonable assumption for purposes of analysis. 12

ANNA BRATHWAITE: Okay. Thank you. And I just note that you also cited to the SFPUC plans for the reasonable assumption of the construction projects, but thank you.

NICOLE WILLIAMS: This is Nicole Williams with 17 18 ICF, and maybe I can just add to Tom's answer. It is that those two types of construction projects -- or 19 would-be construction projects are identified in the 20 document. We just didn't necessarily do a regional 21 economic analysis on them. So we identified the costs 22 23 and the information related to operation and maintenance 24 that had been identified to give a price point, but the regional economic analysis was really coming from the 25

1 water transfer side.

VALERIE KINCAID: Valerie Kincaid from the San Joaquin Tributaries. I have two questions. On page 21, there were a list of assumptions, which are really helpful and explained the inputs and how the analysis was driven. Can you explain how those assumptions were developed?

TOM WEGGE: The first assumption, I think we 8 9 just talked about, that -- you know, with various options 10 available, including in-Delta diversions and desalinization and other potential water supply sources, 11 we felt that purchasing water from irrigation 12 districts -- again, just for purposes of analysis -- was 13 a reasonable assumption to make, and the cost that we 14 assumed was based on a review of the literature and what 15 seemed like a reasonable price. And then we did the 16 sensitivity analysis. 17

18 VALERIE KINCAID: Did you develop those as a 19 consultant, or were those inputs given to you before you 20 ran your economic analysis?

21 WILL ANDERSON: I don't know. Tom needs to 22 answer that. I will say that the record includes 23 examples of the city pursuing such sales and don't in 24 fact note the details of what has actually occurred in 25 the past but that it would certainly be something that would be possible. And in terms of prices, the drought
 has seen all different kinds of pricing, and we have got
 a lot of substantial information to say what the prices
 might be for such a transfer. And we have also looked at
 the sensitivity of that.

And to answer that for Tom --

7 VALERIE KINCAID: It looks like it was staff8 generated.

9

6

WILL ANDERSON: Yes.

10 VALERIE KINCAID: Okay. Was there any analysis 11 about whether the water was actually available? So in 12 those drought years, it looked like you ran the numbers 13 of how much water would have to be purchased. Did you 14 look to see if the water was actually available for 15 purchase and what inches per acre-foot that would bring 16 the districts down to delivering to their own customers?

17 LES GROBER: That is included in the water 18 supply effects for what would occur with those shortages, as we have shown in the earlier segments in terms of the 19 effects and the plan area on the districts. So there is 20 no other specific additional analysis -- when you 21 say, "water availability," it would just be -- that would 22 23 be -- then the full shortage would be borne by the 24 districts and those others in the watershed.

25

VALERIE KINCAID: Okay. So this analysis took

into account -- because it is built off the WSE -- is that what you are saying, that it took into account the reservoir storage operations, too? You would be able to transfer this amount of water and keep the carryover that is assumed in the WSE model? You would physically be able to do that?

WILL ANDERSON: So I think it might help to 7 clarify Mr. Godwin's original question to say that the 8 9 PUC-173 operations as the baseline are the diversions at 10 the Hetch Hetchy that did happen. So assuming that these continued to happen in the alternatives, that water is at 11 that point not included in our analysis, but the city and 12 county will continue to receive their supply. That is 13 pretty much the base assumption there. 14

And as to inflows to the reservoir, they are not seen in Don Pedro, simply the credit account that we are evaluating after that point. So the amount of water in the reservoir that the districts see would be as a result of the alternatives, if that makes sense.

20 VALERIE KINCAID: Yeah. Just a layperson's sort 21 of follow-up to that. So because this is already 22 included, you wouldn't see any reservoir fluctuation from 23 this assumed transfer; is that what you are saying? 24 WILL ANDERSON: No, I am not saying that.

25 VALERIE KINCAID: Thanks.

1 UNIDENTIFIED SPEAKER: Does it work this time? 2 Yes. Thanks for your earlier clarification on the 3 scenario one assumptions. It sounds like you came up 4 with some assumptions to set low estimates for what the 5 cost to the San Francisco system might be. So unless I 6 am wrong about that, I will just leave that alone for 7 right now.

I think it is important to note that the water 8 9 bank account is something that is actively operated by 10 the San Francisco water system. And so in your post-processing of the historical account balance, you 11 are debiting in scenario two from the operations that 12 were conducted to try to maintain water supply for 13 delivery to the service area in the Hetch Hetchy. What 14 we do with the water bank account is make sure that we 15 will be able to divert water into the Hetch Hetchy and 16 17 the San Francisco regional service area when we need it, 18 including in the dry times of the year.

19 So if the water bank account balance were at 20 zero more often, it could lead the San Francisco regional 21 water system in trying to plan ahead and maintain future 22 M&I supply reliability. It could lead the system to 23 ration deliveries more often. Did you consider the 24 effects of additional water supply rationing by the 25 system in response to contributions to the instream 1 flows?

2 LES GROBER: No. I was looking to Nicole -- or
3 I think the answer is no. Okay. No.

4 UNIDENTIFIED SPEAKER: So thank you. I 5 understand the answer. I would propose that including 6 additional water supply rationing could set your high bar 7 regarding costs to the San Francisco water system higher. 8 And if you could, respond to that.

9 LES GROBER: Provide that comment. Thank you.
10 CHRIS SHUTES: Hi. Chris Shutes with CSPA. Did
11 you consider transfers from any other sources other than
12 the districts of Turlock and Modesto?

13 LES GROBER: No.

14 CHRIS SHUTES: Would that have an economic 15 impact that would be different if it came from the north 16 of the Delta, for instance?

LES GROBER: Well, the reason for no is because 17 18 it is within the system -- the plumbing is all there using the current water bank -- the current facilities. 19 So we didn't look at other sources; is that correct? 20 CHRIS SHUTES: Did you consider the likelihood 21 of future additional infrastructure construction by the 22 23 city and BOSQUA as part of the regional drought planning? 24 LES GROBER: No. CHRIS SHUTES: And is the reason you didn't 25

1 consider in-Delta conversions strictly because of the 2 additional treatment costs and conveyance costs once 3 water got to the Bay Area -- or once water got to the 4 point of diversion?

5

LES GROBER: Nicole --

6 NICOLE WILLIAMS: All right. So I will have to 7 look back -- I'm sorry. But the in-Delta diversion, that 8 may have actually been included in our document -- and I 9 will have to double-check where -- a cost associated with 10 a water transfer that might have come outside of the 11 irrigation districts. But I will have to check the 12 document and get back to you.

13 CHRIS SHUTES: All right. Thank you. I would 14 just point out that it appears that the city is on a 15 trajectory to construct some of these facilities, and 16 that might be a more reasonable -- or another reasonable 17 approach and would likely be less expensive than desal.

18 UNIDENTIFIED SPEAKER: I should have asked this earlier regarding South Delta salinity and the 19 assumptions about exports from the South Delta, and Chris 20 just reminded me to ask it now. We talked this morning 21 22 about how the possibility of export pumping from the 23 South Delta could change in response to changes to 24 inflows on the San Joaquin. Was any consideration given in the Delta water quality change analysis to the effects 25

of changes in export pumping? And then you can see where
 I am going with this. If you were to look at San
 Francisco making diversions from the Delta, what effect
 would that have?

LES GROBER: We didn't look at any changes with
regard to those types of active changes and export
pumping.

8 UNIDENTIFIED SPEAKER: Okay. Thanks.

9 BILL PARIS: Bill Paris, Modesto. I may be very 10 dense. So I apologize, but I am going to ask the same 11 question for the fourth or fifth time. But I want to get 12 to this question of additive and what has been wrapped 13 back around or what has been included.

Last week -- and please bear with me. I may get the numbers wrong, but hopefully you will get the gist of what I am saying. Last week we put up a chart at the last technical workshop, and I think it said during critical years the average reduction was 38 percent. That may not be right, but hopefully that will recall the information that was provided.

If I am understanding right, is that number sort of a generic number that is sort of a basin-wide 38 percent reduction, not to each and every entity, but that is just sort of a mathematical equation result? Is that a fair way to say it?

LES GROBER: Yeah. That is the average over the
 entire affected area.

3 BILL PARIS: Okay.

Under what we are talking about today, though, 4 if the districts went ahead with the water sale, scenario 5 one or scenario two would have a larger individual 6 reduction during those dry and critical years than 38 7 percent; is that fair? That would be absorbing San 8 9 Francisco's share of that; is that accurate? 10 LES GROBER: Yeah. Not an additive effect but there would be perhaps --11 BILL PARIS: Understood. 12 LES GROBER: Yeah. 13 BILL PARIS: Okay. So I think what a lot of us 14 are asking is: "Has that element been wrapped back 15 around, say, through SWAP and IMPLAN at any point?" 16 LES GROBER: To show the reduced effect that it 17 18 might have -- not a reduced but what the effect would be. No. There hasn't been any kind of mix and match of 19 scenarios where -- in the scenario where there is that 20 transfer that occurs so you have the water supply effect 21 translated to the area. No, that was not done. 22 23 BILL PARIS: Okay. Can I ask why that wasn't --24 oh, go ahead. I'm sorry. 25 ANNE HUBER: I am just thinking -- oops. Let

1 me --

25

WILL ANDERSON: Anne Huber from ICF. 2 ANNE HUBER: I don't know if it was clear in the 3 way the analysis was done, but the full shortage was 4 assigned to agriculture, for the purpose of assessing 5 agricultural impacts. And so in that sense, the effect 6 of MID and TID giving water to CCSF is accounted for in 7 the analysis. If some of the CCFS water were to -- if 8 9 CCFS were shorted, then the agricultural impact would be 10 less than what was modeled. I don't know if that was --BILL PARIS: That is very helpful. I did not 11 realize that. Thank you. 12 WILL ANDERSON: If that is the case, then the 13 water has to be bypassed, which is more so than in the 14 baseline. They have found some other alternative supply. 15 BILL PARIS: Okay. Thanks. I am going to hand 16 this over to Art. 17 18 ART GODWIN: So in the WSE that we learned last week, you made no assumptions of San Francisco. So you 19 just had an inflow number into Don Pedro based on CalSim; 20 21 right? That is correct. 22 WILL ANDERSON: 23 ART GODWIN: Okay. 24 ANNA BRATHWAITE: This is Anna from Modesto

Irrigation District. So just to confirm, that same point

is true for all of the service providers in the WSE
 analysis? Was there ever a time that you looked at the
 impacts to irrigation and M&I supply at the same time?

LES GROBER: This seems to be a recurring 4 question/thought/theme. The importance of the mean 5 annual water supply effect of the 293,000 acre-feet a 6 year varies by year. That is the total maximum water 7 supply effect over all impact areas and all uses. It can 8 9 then be moderated, as we are shown, by doing some 10 groundwater pumping. Although, that then just translates some of the effects into groundwater. 11

But as Anna just said, there is not an 12 additional city and county of San Francisco effect. 13 То the extent that there is a shortage in San Francisco, it 14 reduces the ag effect in the valley. So it is a zero-sum 15 So there is no additional effect on drinking water 16 qame. or municipal or anything else. The total is 293. 17 The 18 nature of the analysis is to show, "Well, what is the effect of that?" And also as Anna said, it puts all of 19 that on the ag water supply, but there could be 20 differences in where that shows up. 21

ANNA BRATHWAITE: I have to admit, I didn't find that a helpful answer. So maybe it is just something to think about. I am just trying to understand if there was ever an impact analysis that looked at the same time that water was missing from any municipality and the
 irrigation at the same time.

And again, if it is the same answer as last 3 time, then perhaps state that, and then we will move on. 4 But I am just not finding your answer helpful. There is 5 a specific citation in the revised SED that says that 6 municipal supply is not reviewed at the same time as the 7 agricultural water impacts for groundwater. So I am just 8 9 trying to resolve that one statement in Chapter 9 with, 10 kind of, what we are discussing here.

11 LES GROBER: I'm sorry. What is that statement?
12 Can you say that again?

ANNA BRATHWAITE: Sure. That the groundwater impact analysis did not look -- no. It was that the municipal supply was presumed to be fully met. That was the gist of it. And quite frankly -- now might be a good time to actually find the citation. I have it somewhere.

ANNE HUBER: Is it ringing a bell? It is through that, for agriculture and groundwater, the assumption was that the full shortage would affect just agriculture? I mean, those two analyses were linked. However, in Chapter 13, Service Providers, there is a discussion of what might happen if municipalities experienced a reduction.

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That approach let us, sort of, estimate the

maximum possible agricultural effect. Yet, in 1 2 Chapter 13, there was a qualitative discussion of what happened if municipalities experienced a reduction. And 3 it was -- it would be hard to model with certainty 4 because it is unclear to what extent municipalities would 5 experience a shortage. Although CCSF was modeled 6 quantitatively, the other municipalities were 7 qualitative. 8

9 ANNA BRATHWAITE: That was helpful. So the 10 service providers locally were not modeled. That was 11 purely qualitative, the assumptions about the impacts. 12 But San Francisco was modeled, and that was quantitative. 13 And that is a difference.

ANNE HUBER: Yes, that is correct. Because it was easier to model CCSF in a quantitative manner because there are known rules about water banking.

17 ANNA BRATHWAITE: Gotcha. And so maybe just, kind of, something to -- we will put it in our comment. 18 But, you know, for those of us trying to analyze the 19 document, it would be very helpful if you could treat 20 like-entities a little more alike. So MID is looking at 21 various service providers, both local and a bit further 22 23 away. And it looks like you are choosing the less 24 expensive, less environmentally protective analysis for San Francisco citing ease of facilities. 25

1 And I would say that all of those same factors 2 exist for our local service providers. And so to the 3 extent that you have identified water transfers as a less 4 expensive, more efficient means to look at the analysis, 5 I would just encourage you to perhaps treat them a little 6 more alike in your analysis.

7 LES GROBER: It is not just because it was 8 simple, but it is also a water supply for a large 9 metropolitan area, the single largest population that is 10 served almost exclusively by surface water of the project 11 area. So there is that recognition as well.

Thanks for acknowledging it. 12 ANNA BRATHWAITE: UNIDENTIFIED SPEAKER: I don't want to quibble 13 too much over terminology, but I would like to suggest 14 that San Francisco's operations were not actually modeled 15 16 in that historical account balance of the water bank. Ιt was actually just decremented by the amount of flow 17 18 estimated to be contributed to the new flow standard.

To my earlier point, in operating to the proposed flow regime in a scenario where San Francisco is contributing, San Francisco would reoperate the reservoir system to retain more carryover storage in the Hetch Hetchy, which is our water supply reservoir, so that we would be able to make it through extended dry periods. We would do that by making the contributions a lot like
what you have estimated in the scenario two calculation
 and also by rationing our supplies to the service area to
 make sure that we could get through periods of multiple
 dry years.

5 LES GROBER: And I am curious, would you be6 doing that to reduce the costs?

7 UNIDENTIFIED SPEAKER: We would be doing that to 8 ensure a consistent water supply for the service area, a 9 reduced but not failing water supply. So like I said, 10 quibbling over terminology, maybe we were treated more 11 equally than you proposed.

12 UNIDENTIFIED SPEAKER: I am just curious why you 13 made the decision to model the district separately from 14 San Francisco. Why didn't you look at the entire 15 watershed?

16 LES GROBER: I'm sorry. "Look at the entire 17 watershed"?

UNIDENTIFIED SPEAKER: Yeah. San Francisco and
the districts together, why wasn't that analysis done?
Instead you did the districts over here, and then you did
this whole separate appendix for San Francisco.

LES GROBER: Well, not to lose sight of this is supposed to be a programmatic analysis of things that could happen. But we can't know exactly where the water supply costs and where the water supply effects will lie. So that starts becoming a very difficult problem to
 answer. We have already -- in response to comments from
 the last round, we have made more assumptions about
 replacing water supply with groundwater pumping.

Each time one makes such an additional analysis, 5 there is a greater likelihood that someone will 6 say, "Well, no. It is going to actually be something 7 else." So this is our best effort to show a series 8 of, "This is a thing that could happen, recognizing that 9 10 any of a number of other things could also happen." But that is why the comments will be useful to say, "Well, 11 No. It is actually this other thing that would 12 no. happen, and it would be a very different effect. And 13 here are the reasons." 14

But we tried to bracket what could be the possible effects without doing an even more exhaustive analysis by coming up with one possible outcome, as it seems to be you are suggesting.

19 UNIDENTIFIED SPEAKER: No. I am not suggesting 20 one possible outcome. What I am suggesting is -- I mean, 21 the watershed -- San Francisco and the districts operate 22 their projects cooperatively, and yet you treat them as 23 totally separate. I mean, Hetch Hetchy could be in an 24 entirely different watershed for all you know. End of 25 comment. 1 CHRIS SHUTES: Chris Shutes with CSPA. Well, in 2 defense of board staff on that one, in the last round of 3 the SED, people assumed that there was only one way to 4 operate and to divide responsibility, and therefore, the 5 economic impacts were shifted enormously to the Bay Area. 6 And that was used by some parties to suggest that the 7 whole scheme was unworkable and unreasonable.

So while I think that it might have been a good 8 idea to look at additional alternatives -- and we 9 10 suggested some in a couple of comment letters in the interim -- I think do think that it is a good thing that 11 at least one alternative, operational or resolution, was 12 considered. And I think there are more. But one of the 13 games that I have confronted for a long time is the idea 14 that there is nothing that we can do because it is all 15 going to get transferred economically to San Francisco, 16 and there just has to be an answer to that loop. 17

18 LES GROBER: Thank you. It seems we are moving 19 more into comments. So I suggest we have reached the end 20 of our workshop.

GITA KAPAHI: So again, if there are things that need to be followed up on, there are cards at the back of the room. Check off the subject matter, and put your contact information. Give those cards to staff, please. There are additional -- not technical workshops but board

1 workshops coming up. The next one is --

2	LES GROBER: Yes. We have coming up this
3	Friday, we have the second day of hearing in Stockton,
4	and that is followed by Merced on the following Monday
5	and Modesto next Tuesday. And then the final day of
б	hearing will be January 3rd back here. And the comment
7	period closes January 17th.
8	GITA KAPAHI: Thank you. So thank you all for
9	your attention today. And I understand that the
10	presentations will be posted in the next few days;
11	correct, Katie? Thank you.
12	(End of recording.)
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1	I, AMANDA L. JOHNSON, CSR No. 13922, do hereby
2	declare as follows:
3	That pursuant to the request of Shelly McLean, I
4	did transcribe video files as requested by Shelly McLean.
5	I declare under the penalty of perjury that the
6	foregoing is transcribed as true and correct to the best
7	of my ability.
8	DATED at Modesto, California, this
9	day of, 2016.
10	
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12	
13	Amanda L. Johnson
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## **EXHIBIT 6**



### **November 2016 Statewide Conservation Data**

#### **November Conservation Summary**

November 2016 marks the 18<sup>th</sup> month since the state's 400-plus urban water suppliers were directed to be in compliance with the emergency <u>conservation standards</u> that followed the Governor's April 1, 2015, <u>Executive Order</u>. The State Water Board has been requiring water delivery information from urban water suppliers for 30 consecutive months, following the historic <u>July 2014</u> board action to adopt emergency water conservation regulation.

On May 18, following the Governor's May 9 <u>Executive Order</u>, the Board <u>adopted</u> a statewide water conservation approach that replaces the prior percentage reduction-based water conservation standard with a localized "stress test" approach that mandates urban water suppliers act now to ensure at least a three-year supply of water to their customers under drought conditions. This fact sheet summarizes the results for November 2016 and illustrates the progress made since June 2015 when urban water suppliers were first required to comply with state-mandated conservation standards. Current conservation summary data are posted <u>here</u>.

In November 2016 the monthly water savings were 18.8 percent compared to November of 2013 potable water production. In November of 2015 the savings were 20.2 percent. Since June 2015, Californians have saved nearly 765 billion gallons (2,347,125 acre-feet), which equates to an 18-month cumulative savings of 22.6 percent. Based on the estimate that the average person uses 0.2 acre-feet of water per year, this savings is enough to supply 11.7 million Californians with water for one-year; approximately the combined population of San Diego, Orange, San Bernardino, Alameda, and Sacramento counties, or more than 30 percent of the state's population.

The data from November 2016 continue to show a mixed picture of performance by agencies across the state, with many continuing to conserve significantly and other showing a trend of declining conservation. Average percent water savings in eight out of ten hydrologic regions increased over conservation levels in October 2016, and conservation levels in five hydrologic regions – North Coast, North Lahontan, Sacramento River, San Francisco Bay, and Central Coast, were greater than in November 2015. The increase over the water savings achieved in November 2015 could be due to wet conditions in November 2016, and turning off outdoor irrigation, which is both appropriate and required by the regulation. Where conservation levels dropped compared to last year, the decline may be due to one or more of multiple factors, including low precipitation, a reduction in conservation messaging, less restrictive irrigation rules, or additional irrigation to establish new landscapes.







#### **Breakdown of Water Savings**

The chart below shows the number of suppliers achieving various levels of water savings in November 2016 compared to the same month in 2013, which serves as a baseline for water conservation. Thirty four percent of suppliers reporting in November 2016 achieved water savings between 10 and 20 percent compared to the same month in 2013; these suppliers serve more than 14.5 million people. Forty four percent of suppliers, serving more than 13.2 million Californians, reported water savings of 20 percent or more. Fifteen suppliers reported water production exceeding the November 2013 volume.



- Sixty six out of 86 suppliers that reported water savings greater than 30 percent in November 2016, also increased water savings over what they saved in November 2015. Among suppliers that saved more than 30 percent in November 2016, and increased water savings by 10 percent or more over the conservation in 2015 are: Patterson, Olivehurst Public Utility District, San Juan Water District, Ripon, Galt, Del Oro Water Company, Lemoore, Redding, Sonoma, Windsor, Millbrae, Tustin, and Goleta Water District.
- There are additional examples of efforts that resulted in yet more savings this year compared to November 2015 savings, such as Whittier, Morro Bay, Ventura County Waterworks District No 1, San Buenaventura, Sacramento Suburban Water District, West Valley Water District, and Tahoe City Public Utilities District.
- On the other hand, there are examples of suppliers with conservation performance dropping compared to November 2015, and with average R-GPCD exceeding 230 gallons, such as Santa Fe Irrigation District, Los Angeles County Public Works Waterworks District 29 (Malibu), Vaughn Water Company, and Valley Water Company.
- Among those saving more than 20 percent in November 2016, 155 suppliers passed their stress test and are not required by the emergency regulation to reduce total potable water production from their 2013 production. These suppliers include East Bay Municipal Utilities District, Alameda County Water District, Los Angeles County Public Works Waterworks District 40 (Antelope Valley), Contra Costa Water District, Stockton, Sacramento Suburban Water District, California Water Service Company Stockton, Escondido, California Water Service Company Mid-Peninsula, Vallejo, Santa Clara, San



Jose, Downey, Clovis, Fairfield, Santa Maria, California-American Water Company Los Angeles District, and Santa Monica.

 Several suppliers among the 71 that reported water savings below 10 percent in November 2016 had achieved water conservation above 20 percent in November 2015. Among formerly high water savers but conserving less than 10 percent this year were Rubio Canyon Land and Water Association, Rancho California Water District, Riverside Highland Water Company, and Coalinga.

In looking at the data, percentage savings alone do not tell a complete story of conservation achievement. Suppliers with already low R-GPCD use are taking more significant efforts to save water with small percentage reductions than big users of water for whom it easier to save water, particularly on outdoor ornamental landscapes. Despite less than 10 percent water savings in November 2016, examples of communities with low R-GPCD and already significant conservation and efficiency achievements include San Diego, Irvine Ranch Water District, Sweetwater Authority, Park Water Company, California-American Water Company San Diego District, Compton, Golden State Water Company Florence Graham, Paramount, Estero Municipal Improvement District, and Eureka.

#### **Statewide Water Production Trends**

The graph below shows the statewide trends in water production from June 2014 through November 2016.

Statewide Water Conservation Results Water Production June 2014 - November 2016 (Billion Gallons)





#### Water Savings by Hydrologic Region June 2015 to November 2016

Hydrologic Region	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May 16	Jun	Jul	Aug	Sep	Oct	Nov
	15	15	15	15	15	15	15	16	16	16	16	Iviay 10	16	16	16	16	16	16
Central Coast	30.6%	31.9%	28.1%	26.9%	24.1%	27.3%	24.7%	19.2%	20.7%	30.4%	29.0%	31.5%	24.7%	26.4%	25.4%	24.9%	26.8%	27.9%
Colorado River	25.2%	34.0%	24.7%	17.4%	24.4%	21.3%	10.8%	28.5%	18.0%	17.6%	30.2%	29.3%	23.8%	23.7%	15.1%	7.2%	11.1%	20.8%
North Coast	16.0%	32.5%	19.7%	20.0%	16.8%	18.0%	20.3%	19.5%	14.4%	13.6%	27.7%	29.5%	8.9%	23.5%	15.5%	11.7%	21.8%	24.0%
North Lahontan	29.8%	32.4%	25.0%	16.2%	10.0%	12.9%	18.8%	27.7%	23.2%	18.4%	30.7%	42.7%	19.5%	13.9%	10.6%	7.6%	16.4%	16.6%
Sacramento River	36.3%	37.4%	34.5%	28.2%	25.5%	31.3%	24.6%	13.4%	20.6%	36.6%	30.4%	35.4%	23.4%	23.6%	18.7%	15.5%	30.7%	35.5%
San Francisco Bay	32.3%	32.3%	30.5%	25.3%	23.3%	26.8%	23.5%	13.2%	18.1%	25.1%	28.8%	30.9%	22.5%	22.4%	21.1%	17.9%	26.0%	27.5%
San Joaquin River	33.4%	34.7%	30.0%	26.7%	26.7%	31.1%	20.2%	15.4%	17.1%	35.2%	32.7%	34.3%	24.7%	24.3%	19.7%	19.2%	26.2%	29.3%
South Coast	22.9%	28.2%	23.7%	26.7%	20.6%	14.1%	15.9%	17.9%	6.9%	20.9%	22.8%	24.2%	19.9%	17.0%	15.3%	19.4%	15.6%	12.2%
South Lahontan	31.1%	35.9%	29.3%	25.8%	22.9%	18.8%	5.0%	18.4%	13.1%	27.8%	27.5%	25.3%	24.0%	17.0%	23.5%	13.4%	17.5%	15.2%
Tulare Lake	29.4%	32.2%	28.0%	25.9%	22.1%	28.3%	21.7%	15.8%	17.2%	27.0%	30.1%	31.1%	24.2%	22.7%	18.6%	18.9%	15.5%	18.2%
Statewide	27.5%	31.3%	27.0%	26.2%	22.2%	20.2%	18. <b>2</b> %	17.2%	11.9%	24.3%	26.1%	28.1%	21.7%	20.1%	17.6%	18.2%	19.6%	18.8%



Water production by hydrologic region (in billions of gallons) for November 2016\* (blue bars) compared to November 2015 (orange bars).

\*Preliminary water production for November 2016, as 16 suppliers have not reported by December 20, 2016 when data were downloaded for analysis.

November 2016 savings by hydrologic region ranged from 12.2 percent to 35.5 percent. In November 2016, eight hydrologic regions reported higher percentage of water saved than in October 2016. Five hydrologic regions reported greater monthly savings in November 2016 than November 2015.



### **Fact Sheet**

#### **R-GPCD by Hydrologic Region June 2015 to November 2016**

Hydrologic Region	Jun 15	Jul 15	Aug	Sep	Oct	Nov	Dec	Jan 16	Feb	Mar	Apr 16	May	Jun 16	Jul 16	Aug	Sep	Oct	Nov
Central Coast	75.9	76.2	76.4	76.2	70.5	59.5	53.3	49.1	53.2	52.2	62.9	70.7	80.4	82.6	80.0	79.3	70.0	58.1
Colorado Biver	169.9	153.8	171.8	161.9	132.0	138.4	111 3	93.0	105.5	110.2	127.2	141 5	169.9	179.5	195.8	181.6	161.3	151.6
North Coast	78.7	73.5	75.7	73.3	70.7	53.4	52.5	50.1	52.3	52.0	55.3	62.4	85.8	82.8	81.6	82.3	68.8	51.6
North Labortan	115.2	113.5	117.7	113.4	81.4	56.2	61.6	57.9	54.7	54.0	57.7	78.5	133.8	142.8	127.6	128.1	77.1	54.5
Sacramento River	137.1	152.8	147.3	141.6	117.9	80.5	68.5	68.1	66.4	68.5	92.3	121.0	163.3	186.8	178.2	160.5	108.1	75.6
San Francisco Bay	70.0	72.0	72.3	72.2	67.4	55.1	51.0	49.5	51.1	50.9	57.4	65.9	79.3	81.3	82.0	79.8	65.1	54.6
San Joaquin River	127.2	130.7	131.5	123.4	102.5	76.8	66.7	61.6	67.0	67.1	84.3	107.5	138.1	150.0	149.5	130.8	103.2	75.7
South Coast	91.4	88.6	94.8	89.3	83.6	78.5	70.4	62.4	71.6	68.1	77.0	81.6	94.4	101.5	103.4	96.5	87.2	78.8
South Lahontan	133.3	131.3	148.3	129.7	107.1	90.6	73.9	68.0	69.3	78.1	98.5	116.4	145.4	160.9	149.2	146.4	109.0	94.1
Tulare Lake	154.9	162.5	164.0	150.2	124.4	88.8	76.8	69.7	70.6	79.3	99.3	128.2	167.0	190.4	187.6	176.0	143.5	112.2
Statewide	98.1	98.1	102.2	96.9	87.2	75.6	67.2	61.1	67.2	66.0	77.0	86.9	105.0	113.5	113.7	106.4	89.8	76.6



Residential Gallons per Capita per day (R-GPCD) for November 2016 (blue circles) compared to November 2015 (orange circles).

As stated above, The table provides the average monthly R-GPCD for June 2015 through November 2016, by hydrologic region. The average statewide R-GPCD for November 2016 was 76.6. Average hydrologic region R-GPCDs for November 2016 range from 52 to 152, with six hydrologic regions reporting lower R-GPCDs in November 2016 than they did in November 2015. All ten hydrologic regions had the average R-GPCD in November 2016 lower than in 2013.



#### Compliance

The stress-test based regulation that went into effect in June 2016 resulted in many suppliers having a zero percent conservation mandate, and nearly all of those suppliers are in compliance by having water production levels below 2013 levels (the baseline year for the emergency regulation). Information about the Board's compliance actions is located <u>here</u>

With 393 water supplier reports submitted for November, 384 suppliers (98 percent) met or were within one percentage point of their conservation standard; three suppliers (1 percent) were between one and five percentage points of meeting their conservation standard; five suppliers (1 percent) were between five and 15 percentage points of meeting their conservation standard, and one supplier was more than 15 percentage points from their conservation standard.



\* Includes suppliers under alternative compliance orders. Alternate compliance orders do not substitute for individual conservation standards, however, suppliers meeting the terms of their alternate compliance orders are not priorities for enforcement.

#### **Caring for Trees While Conserving Water**

Saving trees is important for cooling city streets and public safety, and watering them is essential and requires some care. That is why the <u>Save Our Water campaign</u> has partnered with California ReLeaf to provide residents with tips on how to maintain trees while reducing outdoor water use. Information is available at: <u>www.saveourwater.com/trees</u>.

#### **Rebate Programs for Turf Removal and Toilet Replacement**

Inefficient toilets and turf grass use large volumes of water, and present opportunities for significant water savings. Rebates are now available at: <u>http://saveourwaterrebates.com/</u>.





#### Background

In his April 1, 2015 Executive Order, in light of three unusually dry years, including the worst snowpack in 500 years, Gov. Edmund G. Brown Jr. mandated a 25 percent water use reduction by users of urban water supplies across California. In May 2015, the State Water Board adopted an emergency regulation requiring a 25 percent reduction in overall potable urban water use statewide from June 2015 through February 2016 compared with 2013. The board implemented tiered conservation requirements, ranging from 8 percent to 32 percent, so that areas that had reduced their per capita water use over the years had lower targets than those areas using more water per person.

On Feb. 2, 2016, based on Gov. Brown's <u>November 2015 Executive Order</u>, the State Water Board approved an updated and extended emergency regulation. The extended regulation responded to calls for continuing the conservation structure that had spurred such dramatic savings while providing greater consideration of some factors that influence water use: climate, population growth and significant investments in new local, drought-resilient water supplies such as wastewater reuse and desalination.

On May 9, 2016, Governor Edmund G. Brown Jr. issued <u>Executive Order B-37-16</u>, requiring the Board to adjust its emergency water conservation regulation through the end of January 2017 in recognition of improved urban water supply conditions across the state and, separately, take action to make some of the requirements of the regulation permanent. The Board <u>adopted the revised regulation</u> on May 18. June was the first month under the revised regulation.

Since June 2014, the State Water Board has been tracking water conservation for each of the state's larger urban water suppliers (those with more than 3,000 connections) on a monthly basis. Compliance with individual water supplier conservation requirements is based on cumulative savings. Cumulative tracking means that conservation savings will be added together from one month to the next and compared to the amount of water used during the same months in 2013.

California has been dealing with the effects of an unprecedented drought. To learn about all the actions the state has taken to manage our water system and cope with the impacts of the drought, visit <u>Drought.CA.Gov</u>. Every Californian should take steps to conserve water. Find out how at <u>SaveOurWater.com</u>. While saving water, it is important to properly water trees. Find out how at <u>www.saveourwater.com/trees</u>. In addition to many effective local programs, state-funded turf removal and toilet replacement rebates are also available. Information and rebate applications can be found at: <u>www.saveourwaterrebates.com/</u>.

(This fact sheet was last updated Jan. 3, 2017)

## **EXHIBIT 7**

UNITED STATES OF AMERICA 1 FEDERAL ENERGY REGULATORY COMMISSION 2 Turlock Irrigation District Project No. 2299 3 and Modesto Irrigation District 4 5 AFFIDAVIT OF ANSON B. MORAN 6 I, Anson B. Moran, do hereby declare as follows: 7 I am General Manager of the Public Utilities Commission 8 1. for the City and County of San Francisco, and have been so employed 9 since December, 1993. Prior to my appointment to this position, I 10 was General Manager of the Hetch Hetchy Water and Power Department 11 Prior to that position, I was Assistant General since 1988. 12 Manager, Finance for the San Francisco Public Utilities Commission. 13 I Joined the Public Utilities Commission in 1980. 14

I serve on the Boards of the California Water Education 2. 15 Foundation and California Municipal Utilities Association, and am 16 currently Chairman of the California Urban Water Agencies. I have 17 a Bachelor of Science in Electrical Engineering from Worcester 18 Polytechnic Institute and a Master of Arts in Urban Studies from 19 Occidental College. 20

I am responsible for the actions of the Hetch Hetchy 21 3. Water and Power Department and San Francisco Water Department which 22 supply water to a population of approximately 2.3 million people 23 within the counties of Tuolumne, Alameda, Santa Clara, San Mateo, 24 and San Francisco. 25

In this affidavit, I address the subject of the planning 26 4. and operation the City's water facilities during drought. 27 1

Specifically, I address the basis of the procedures the City used
 to determine the rationing that was implemented during the recent
 drought, and which are incorporated in the City's water supply
 planning studies.

The City's "operation rule" was developed during the 5 5. course of the recent 1987-1992 drought. Never before had such a 6 sustained drought been experienced by the City. The onset of the 7 drought really began in 1986, the point in time when the City's 8 reservoirs were last filled, and continued until June, 1993 when 9 the City's reservoirs finally refilled to full capacity. 10 This drought spanned approximately 7 years. 11

12 Water deliveries to City customers at the time the 6. 13 drought began amounted to approximately 293 million gallons per day (MGD) (328,000 acre-feet per year). During the 1987-1992 period the 14 15 City received from Tuolumne River runoff an average of only 151,500 acre-feet per year, and from local Bay area water sources 16 approximately 20,700 acre-feet per year. The deficit between water 17 supplies and water demands during the drought became readily 18 apparent as the drought progressed, requiring an extreme dependence 19 20 on Tuolumne River reservoir storage to partially close the gap.

7. The City proceeded with operations at the onset of the drought in accordance with procedures based on the experience of many years of historical operation, including the knowledge of previous drought events such as had occurred in 1976-1977. The operation of the City's facilities in accordance with rules based only on historical data proved to be a mistake.

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The City learned the painful lesson as to the adverse 8. 1 impacts that are caused by not planning for a drought worse than 2 This lesson was driven home when the any experienced to date. 3 hydrology of the Tuolumne River and the City's operations through 4 1990 and early 1991 had created a situation where a 45 percent 5 rationing program among City customers was initiated - a level of 6 rationing that was found to be intolerable and not achievable. 7

The City and its customers implemented numerous 9. 8 drought-related and long-term water conservation programs to lessen 9 water demand, with water demand ultimately being reduced by 10 approximately 30 percent as compared to pre-drought deliveries. 11 The City also purchased water from other entities to narrow the gap 12 These actions 'along with a between supplies and demands. 13 fortuitous storm during the spring of 1991 allowed the City to 14 regain control of its system and efforts moved forward to better 15 plan for the reliability of the City's water deliveries. 16

10. Significant questions regarding how the City would
operate its water system had to be addressed. Several of these
questions were as follows:

How much water should the City maintain in storage in one year to assure water deliveries during the next year?
To what level and for what duration can the City expect its customers to reduce water use?
How long a period should the City expect the drought to continue?
During the drought period, what water supplies (e.g., inflow to City reservoirs) should be expected to occur?

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The answers to these fundamental questions are intertwined, and
 result in the operation rule that the City now uses to guide City
 water delivery operations.

However, underlying the answers to these questions is an
appreciation of the risk that is inherent in operating to any rule.
In the case of the City's water deliveries, risk is the product of
the probability (frequency) of water shortages and the consequences
of those shortages.

9 12. The frequency of potential shortages is forecasted with 10 modeling tools that integrate assumptions for each of the above 11 questions.

12 13. The consequences of shortages include economic, socio-13 economic, environmental, and personal (human) impacts.

14 14. What makes San Francisco's situation unusual is the 15 consequence of being wrong in our forecast. Because of our 16 entitlement structure, and limited conveyance and treatment 17 capacity, an additional, unforecasted year of drought could 18 literally result in empty reservoirs, no entitlements, and little 19 or no alternate source of water. We could have <u>no</u> water to serve 20 our 2.3 million customers.

In the spring of 1991 these consequences achieve a 15. 21 I became acutely aware of the physical sobering clarity. 22 constraints of the City's water conveyance, treatment and delivery 23 facilities; the availability of, and limitations to movement of 24 supplemental emergency water supplies into the City's system; and 25 the uncertainty as to when the drought would finally end. Due to 26 the extremely limited conveyance and treatment capacity system to 27

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bring other emergency sources of water to the City, the City must rely on storage in the Tuolumne River basin to ride out droughts. The City just does not have other sources to call on during drought, such as turning on pumps. In addition, I had first-hand information as to the direct and indirect adverse impacts that were occurring to the City's customers as the result of water shortages.

Situated within the drought, I weighed all the above 7 16. factors and supported the operation rule that is currently used by 8 the City in practice, and incorporated in the planning studies 9 submitted to FERC. That plan was tested as it was developed and is 10 the direct product of real, on-the-line decision making. When 11 considering all the factors associated with the City's entitlements 12 to water, its physical system, and the dire consequences of just 13 being wrong in the forecasting of the length of drought that may 14 hit the City, I can not agree with any comment that the City's 15 operation rule is overly conservative. 16

18 I declare under penalty of perjury that the foregoing is true and 19 correct.

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## **EXHIBIT 8**

# **Budget Workshop**

#### BOARD MEETING

MAY 26, 2016





## Agenda

- Who, What, Where
- Drought Impact
- Budget Review
- Capital Improvement Program (CIP) Review
- Financial Forecasting
- Customer Usage Analysis
- Drought Surcharge/Ordinance
- Next Steps



## A Few Words and the BIG Picture

- Commitment to Customer Service
  - Water supply, Water Quality, Reasonable Price
- Drought Impact
- Water Rates
- Other Ongoing and Future Challenges
- Commitment to Transparency
- Financial Practices

# Who We Are



## **Mission Statement**

It is the mission of the District to provide a reliable supply of high quality water at a reasonable price to our customers. To fulfill this mission, the District will:

- Provide prompt, courteous, and responsive customer service.
- Ensure that sound, responsible financial management practices are observed in the conduct of district business.
- Plan, design, and operate district facilities efficiently, effectively, and safely, bearing in mind our responsibility to be a good neighbor and a good steward of the environment.
- Promote ethical behavior in the conduct of district affairs and facilitate the public's involvement in the planning and development of district policy.
- Recruit and retain a qualified, productive workforce and maintain a workplace environment where diversity and excellence are valued and where creativity, teamwork, and open communication are actively encouraged.



### Who We Are

- Established in 1913
  - County Water District Law: Water Code §30000 et seq.
- Service Area: Cities of Fremont, Newark, and Union City
  - Population: 344,000
  - Connections: 82,000
- Special District Form of Local Government
- Elected Board: 5 Directors
- Personnel: 230 Authorized FTEs
- Credit Ratings
  - Standard & Poor's: AAA
  - Moody's: Aa2





## Water Supply Sources – Average Year



- Local Rainwater Runoff and Percolation
- State Water Project (SWP)
- San Francisco Public Utilities Commission (SFPUC)



## **Niles Cone Groundwater Basin**





## **Peralta-Tyson Blending Facility**

- Groundwater from pumped wells is blended with water from SFPUC Hetch-Hetchy
- Capacity: 50 MGD





## **Newark Desalination Facility**

- Desalination of brackish groundwater
- Capacity: 12.5 MGD
- Constructed in 2003
- Expanded in 2009







## **Mission San Jose Treatment Plant (TP1)**

- Constructed: 1975
- Upgraded: 2004
- Decommissioned: 2015
- 4 MGD Capacity







## Water Treatment Plant No. 2 (TP2)

Constructed: 1992
Upgraded: 2014
Capacity: 26 MGD
Ozone Generation







## ~900 Miles of Water Mains





# What We Do



### What We Do (Responsibilities)

#### Ensure a Reliable, High Quality, Water Supply

- Maximize water supply reliability through the optimization of multiple sources of supply
- Consistently meet or surpass all State and Federal drinking water regulations
- Protect and manage the Niles Cone Groundwater Basin
- Comply with all environmental regulations, including the Endangered Species Act
- Attract and retain highly qualified employees to operate and maintain complex system

## Provide Excellent Customer Service, including Conservation Assistance and Education

#### **Ensure District Financial Sustainability and Resiliency**

- Use lower cost water supplies as much as possible
- Improve productivity and efficiency
- Maintain reasonable rates (lower half of major Bay Area water providers)
- Maintain AAA bond rating

#### **Maintain Capital Infrastructure**

- Identify, prioritize and successfully complete highest priority CIP Projects
- Seismically improve critical infrastructure

# Where We Are


# Where We Are - District Overall

#### (Accomplishments)

# Improved Water Supply as a result of Operational Adjustments and Strategic Partnerships

#### Maintained High Level of Water Service Reliability and Water Quality

#### Addressing Financial Challenges due to the Drought and Low Water Demands

Multiple Financial Board Workshops

#### **Maintaining and Improving Critical Infrastructure**

- Completing Most Essential Highest Priority Capital Projects Due to Financial Challenges
- Planned Seismic Improvements Implemented

#### **Productivity and Efficiency**

- Reorganization Complete increased synergies
- Organizational Assessment / benchmarking with other agencies
- Implementation of New Technology
  - Sharepoint Rollout
  - CityWorks Implementation



### Where We Are - Office of the General Manager (Accomplishments)

# Improved transparency and accountability to the customers of the District through a comprehensive revision of the Board Rules

#### Maximize productivity and efficiency

- Ongoing organizational assessment of the District's Departments
- Maintaining current staffing levels in challenging environment
- Consolidating several Management/Supervisor positions
- Continued focus on staff development

#### Increased community and media relations activities

#### Strategically worked with other organizations to benefit ACWD's ratepayers

- ACWA Pursuing legislation to facilitate Low Income Assistance programs
- CUWA Opposing proposed Public Goods Charge
- BAWAC Bay Area Regional Reliability (BARR) Project



### Where We Are - Operations (Accomplishments)

#### Met or surpassed all primary drinking water regulations 100% of the time

- Completed triennial Lead & Copper Tap Sampling program
- Performed over 30,000 water quality analyses

#### Environmental Stewardship – Complied with all Federal, State and local regulations

Developed asset management programs to ensure equipment, facility, and distribution system reliability

#### Conducted NIMS/SEMS ICS emergency response training w/ DMD staff

Collaborated with USD to repair sinkhole on Alvarado Blvd, UC

#### **Operational efficiencies and cost savings**

- Decommissioned San Jose Treatment Plant #1 (\$4.0M)
- Maximized use of Newark Desalination Plant (\$2.3M annually)
- WTP2 treatment process and power optimization (\$500K annually)
- Interagency bulk buying of water treatment chemicals (\$400K to date)



### Where We Are - Engineering and Technology Svcs (Accomplishments)

#### Information Technology

- Video recording and online-posting regular Board Meetings
- Cityworks (new GIS-based work order system)
- Sharepoint (enterprise collaboration/document platform)
- Alternate Disaster Recovery (DR) site at WTP2

#### **Project Engineering**

- Large Diameter Hayward Fault Seismic Retrofit Project
- Rubber Dam #1 Replacement following vandalism
- Appian Tank Project and Pipeline Seismic Upgrades

#### **Development Services**

- Improvement plans, Agreements, Permits- meeting target completion dates
- Processed over 306 customer job orders for over 114 customer projects



### Where We Are - Water Resources (Accomplishments)

#### **Implemented Planning and Conservation Programs**

- Met extraordinary demand for conservation programs during water shortage emergency
- Completed draft Urban Water Management Plan
- Submitted Concept Paper for the Lake Del Valle Storage Expansion Project

#### **Managed Water Supplies and Protected Watershed**

- Placed newly-replaced Rubber Dam 1 into full operation
- Optimized imported water supply sources during the drought
- Responded to water quality threats in watershed

#### Managed and Protected the Groundwater Basin

- Completed draft Salt and Nutrient Management Plan
- Completed Niles Cone Saltwater Intrusion grant project
- Submitted a SGMA Basin Boundary Modification Request



### Where We Are - Finance (Accomplishments)

#### **Customer Service and Meter Reading**

- Developed stronger cash internal controls and billing system audits in Customer Service.
- Review of AMI future and improvements in Meter Reading
- Developed Customer Assistance Program alternatives

#### **Procurement and Contracts**

Improved business processes

#### **Budgets and Financial Analysis**

- Conducted multiple finance workshops for Board
- Insight Budget software milestone of training managers to use software

#### **Accounting and Treasury**

- Received a clean audit. Maintaining AAA status.
- JDE implementation and new chart of accounts is stabilizing. Better, faster, quicker reporting
- Business processes improved for more efficiency, less redundancy and writing Standard Operating Procedures

# Where We Are Going



#### **Maintaining Financial Health**

- Debt Service Coverage, Bond Requirements
- Income Statement Bottom Line, AAA Status
- Fixed Operating Costs are 70% of all Operating Costs
- Staff working on efficiencies and cost savings
- Identify and apply for grant funding

#### **Drought Impacts**

- Reduced Water Consumption
- Reduced Rate Revenue
- Deferral of capital projects
- Governor's Executive Orders and State Board's Emergency Regulations

#### Infrastructure Replacement and Seismic Improvements

- Reservoir Structural Improvements (Roofs, etc.): ~ \$28M
- Main Replacement and Seismic Improvement Program (MRSUP): ~\$10 M/yr

#### **Groundwater Basin Issues**

- City of Hayward attempting to leverage SGMA to redefine ACWD's boundaries
- SGMA Implementation



#### Water Supply Reliability

- Vallecitos Channel Improvements: ~\$1M \$7M
- Kaiser Pond Embankment Improvements \$ ~300K \$1.6M
- Rock Pond Pipeline ~\$900K

#### **Regulatory – Comply with Endangered Species Act**

- Fish Ladder and Fish Screen Projects: ~\$38M (anticipated reimbursement of ~\$8M from ACFC)
- Environmental Stewardship Implement new State NPDES Drinking Water System Discharge Permit

#### **Ongoing Statewide Drought**

Maintain conservation efforts with conservation assistance program, and community outreach

#### **SFPUC Rate Increases**

- 9.3% for FY 2016/17 ~\$2.2 million
- Effective increase of 127% over last six years
- Projected increase of 47% over next five years

#### **Regional and Local Water Supply Projects**

- Optimize water supply sources
- Joint Recycled Water Evaluation with Union Sanitary District



#### **District Productivity and Efficiency**

- Implementation of SharePoint collaboration platform
- Advanced Metering Infrastructure (AMI) Pilot Planning Study
- Continue implementation of asset management programs for Facilities and Distribution System
- Continue process improvements related to new development
- CyberSecurity, Disaster Recovery, Telephone System Improvements

#### **CalPERS and OPEB Liabilities**

- Continued funding of Annual Required Contribution (ARC)
- Accelerated payment plan delayed to FY 2021/2022
- CalPERS Employer Contribution Rate increased 15% over last five years
- CalPERS Employer Contribution Rate projected to increase 24% over next five years

#### **Staffing Levels and Staff Development**

- Employee attrition, internal reorganizations, and retirements: 17 recruitments YTD
- Koff and Associates Organizational Assessment Study scheduled to be completed by June 30, 2016
- Participate and maintain involvement in BAYWORK, a regional collaborative of water and wastewater agencies working together to ensure workforce reliability and succession planning



#### **Emergency Response and Security**

- Expand emergency preparedness and response training District-wide
- Evaluate District security measures to develop new strategic security improvement plan

#### **Water Quality**

Continue providing high quality water to our customers

#### Transparency

- Begin posting Board Meeting videos on District's website
- Improve website information and reporting

#### **Community and media relations**

- Conduct several public meetings on various topics of interest
- Conduct public tours of key District facilities

#### **Potential Major Initiatives for Future Board Consideration**

- Projected Costs not included in Budget/Financial Planning Model (ACWD Share)
  - California Water Fix (Studies: \$200K/Project: \$120M)
  - Los Vaqueros (Studies: \$100K)
  - LVE w/ Trans-Bethany pipeline: (\$267M)
  - Lake Del Valle (Studies: \$100K-\$200K)
  - Sites Reservoir (Studies & "Down Payment": \$600K-\$1.8M)
  - Bay Desalination: \$323M-\$464M

## **District Financial Planning Process**



# **Drought Impact**



# **Drought Timeline**

#### January 17, 2014

- Governor declares drought State of Emergency
- ACWD issues request for 20% voluntary reduction

#### March 13, 2014

 ACWD adopts Declaration of Water Shortage Emergency and Water Use Ordinance to achieve 20% reduction service area-wide

#### July 17, 2014

ACWD adopts Drought Surcharge

#### April 1, 2015

Governor directs State Water Resources Control Board to implement 25% statewide mandatory water reductions

#### May 5, 2015

 State Water Resources Control Board adopts conservation standards; ACWD assigned a conservation standard of 16%

#### May 9, 2016

- Governor issues Executive Order B-37-16, "Making Water Conservation A California Way of Life"
- Governor directs State Water Resources Control Board to adjust emergency water conservation regulations

#### May 18, 2016

State Water Resources Control Board adopts self-certification of supply reliability



## **Drought Impact (Production Demand)**





# **Drought Impact (Consumption)**

	FY 2013/14 Actual	FY 2014/15 Actual	% Variance Prior FY	FY 2015/16 Estimate	% Variance Prior FY	% Variance Cumulative
Residential Single Family	9,426,499	7,225,175	-23.4%	6,178,857	-14.5%	-34.5%
Residential Multi-Family	3,534,663	3,117,916	-11.8%	2,955,414	-5.2%	-16.4%
Residential Landscape	703,862	473,510	-32.7%	352,409	-25.6%	-49.9%
Total Residential	13,665,024	10,816,601	-20.8%	9,486,680	-12.3%	-30.6%
Business	2,072,443	2,019,549	-2.6%	1,903,010	-5.8%	-8.2%
Business Landscape	693,195	382,507	-44.8%	283,953	-25.8%	-59.0%
Industrial	1,012,568	970,957	-4.1%	928,700	-4.4%	-8.3%
Industrial Landscape	486,804	370,171	-24.0%	266,515	-28.0%	-45.3%
Others (e.g., Cities, Churches)	775,132	569,210	-26.6%	442,300	-22.3%	-42.9%
Others Landscape	510,725	364,583	-28.6%	291,546	-20.0%	-42.9%
Total Non-Residential	5,550,867	4,676,977	-15.7%	4,116,024	-12.0%	-25.8%
Malle Agriculture	21.0	117	46.40/	221	07.00/	C 10/
Wells Agriculture	218	11/	-46.1%	231	97.0%	6.1%
wells industrial & Joint Use	1,237	1,224	-1.1%	1,473	20.3%	19.1%
Wells Municipal	612	671	9.7%	622	-7.3%	1.7%
Total Wells	2,066	2,012	-2.6%	2,326	15.6%	12.5%
Hydrant	101,622	90,263	-11.2%	105,916	17.3%	4.2%
Total Billed Demand	19,319,580	15,585,854	-19.3%	13,710,945	-12.0%	-29.0%



# **Drought Impact (Rate Revenue)**

	FY 2013/14 Actual	FY 2014/15 Actual	% Variance Prior FY	FY 2015/16 Estimate	% Variance Prior FY	% Variance Cumulative
Service Charges						
Residential	15,040,914	17,045,024	13.3%	22,268,762	30.6%	48.1%
Business	1,521,311	1,738,333	14.3%	2,378,733	36.8%	56.4%
Industrial	807,187	955,482	18.4%	1,306,418	36.7%	61.8%
Others (e.g., Cities, Churches)	840,073	959,069	14.2%	1,227,276	28.0%	46.1%
Hydrant	234,180	305,312	30.4%	349,452	14.5%	49.2%
Total Service Charges	18,443,665	21,003,219	13.9%	27,530,642	31.1%	49.3%
Commodity Rates						
Residential	41,744,388	33,303,016	-20.2%	30,982,478	-7.0%	-25.8%
Business	8,749,502	7,886,517	-9.9%	7,897,171	0.1%	-9.7%
Industrial	4,714,438	4,386,092	-7.0%	3,795,485	-13.5%	-19.5%
Others (e.g., Cities, Churches)	4,102,981	3,133,057	-23.6%	2,724,031	-13.1%	-33.6%
Wells	335,679	376,540	12.2%	479,958	27.5%	43.0%
Hydrant	309,286	215,763	-30.2%	362,019	67.8%	17.0%
Total Commodity Charges	59,956,274	49,300,986	-17.8%	46,241,142	-6.2%	-22.9%
Drought Surcharge	-	5,576,657		5,655,094	1.4%	
Total Rate Revenue	78,399,940	75,880,862	-3.2%	79,426,878	4.7%	1.3%



# **Drought Impact – Consumption and Revenue**

	FY 2013/14 Actual	FY 2014/15 Actual	FY 2015/16 Estimate	Cumulative	
Consumption (CCF)	19,319,580	15,585,854	13,710,945		
Consumption Reduction Compared to FY 2013/14		(3,733,726)	(5,608,635)	(9,342,361)	)
Commodity Rate Impact (\$3.373/CCF)		(\$12,593,858)	(\$18,917,926)	(\$31,511,784)	
Drought Surcharge		\$5,576,657	\$5,655,094	\$11,231,751	
Net Commodity Rate Impact				(\$20,280,033)	
TP1 Decommission Savings (One-Time)			\$3,936,600	\$3,936,600	)
TP1 Decommission Savings (Ongoing)			\$300,000	\$300,000/yı	-

# **Budget Review**



# **Budget Comparison**

	FY 2014/15		FY 2015/16			FY 2016/17		
	Actual	Amended Budget	Estimated Actual	% Variance	Adopted Budget	Proposed Budget	% Variance	FY17 Prop FY 16 Est % Variance
BEGINNING CASH BALANCE	\$127,842,294	\$115,844,100	\$120,606,074		\$104,504,700	\$109,202,321		
REVENUES	74 570 457	00 400 400	74 000 400	10.10/	00 000 000	70 000 000	44.00/	0.70/
Water Revenue	74,573,457	86,162,100	74,632,429	-13.4%	93,222,200	79,638,669	-14.6%	6.7%
Drought Surcharge	5,576,657	6,900,000	5,655,000	-18.0%	6,900,000	-	-100.0%	-100.0%
Ground Water Revenue	334,181	447,600	429,423	-4.1%	485,300	467,212	-3.7%	8.8%
Proceeds From Taxation	9,535,109	9,243,100	8,790,100	-4.9%	8,921,300	8,921,300	0.0%	1.5%
Interest Revenue	634,868	948,400	1,149,042	21.2%	889,100	1,016,839	14.4%	-11.5%
Facilities Connection Charges	1,937,104	2,019,000	4,375,177	116.7%	2,038,000	4,657,037	128.5%	6.4%
Other Revenue	1,021,219	2,938,700	1,332,756	-54.6%	2,513,100	4,646,150	84.9%	248.6%
Customer Jobs	4,950,705	2,472,000	2,800,000	13.3%	634,900	4,176,000	557.7%	49.1%
TOTAL REVENUES	98,563,300	111,130,900	99,163,927	-10.8%	115,603,900	103,523,207	-10.5%	4.4%
EXPENSES								
Source of Supply	30,405,945	36,792,700	33.512.817	-8.9%	35,761,200	38.474.351	7.6%	14.8%
Pumping	1.813.654	1.368.600	1.618.554	18.3%	1.420.400	1.420.387	0.0%	-12.2%
Water Treatment	14.949.323	16,790,300	14.232.695	-15.2%	17,244,100	15.711.059	-8.9%	10.4%
Transmission & Distribution	13.157.609	15.697.800	15.609.209	-0.6%	16.947.200	18.124.018	6.9%	16.1%
Customer Accounts	1,472,611	1,753,600	1.500.000	-14.5%	1.620.900	1.620.938	0.0%	8.1%
Administrative & General	37,553,506	37,850,900	38,468,895	1.6%	39,277,200	38,641,606	-1.6%	0.4%
	(04,000,070)	(05 500 000)	(00 700 004)		(00.000.500)	(07.005.070)	5.00/	
Expenses Credit - Overnead	(24,882,076)	(25,523,900)	(23,793,821)	-6.8%	(26,233,500)	(27,605,373)	5.2%	16.0%
Expense Projects	2,020,358	1,869,200	814,000	-56.5%	313,700	1,503,390	379.2%	84.7%
TOTAL OPERATING EXPENSES	76,490,930	86,599,200	81,962,349	-5.4%	86,351,200	87,890,376	1.8%	7.2%
Capital Projects - GF	5,808,437	4,798,300	4,335,632	-9.6%	5,615,900	11,294,542	101.1%	160.5%
Capital Projects - Bond	11,843,167	17,436,300	11,909,108	-31.7%	11,156,700	5,119,088	-54.1%	-57.0%
Capital Projects - FIF	2.895.240	4,983,400	3.179.460	-36.2%	1.681.000	3.693.570	119.7%	16.2%
Customer Jobs	3.762.312	2.471.900	2.800.000	13.3%	2.513.100	4.176.000	66.2%	49.1%
Debt Service	4 999 434	6 381 200	6 381 131	0.0%	6 386 400	6 386 406	0.0%	0.1%
TOTAL NON-OPERATING EXPENSES	29,308,590	36,071,100	28,605,331	<b>-20.7%</b>	27,353,100	30,669,606	12.1%	7.2%
TOTAL EXPENSES	105.799.520	122.670.300	110.567.680	-9.9%	113.704.300	118.559.982	4.3%	7.2%
	,,,	,,	-,,			-,,/-		
NET of REVENUES & EXPENSES	(7,236,220)	(11,539,400)	(11,403,753)		1,899,600	(15,036,775)		
ENDING CASH BALANCE	\$120,606,074	\$104,304,700	\$109,202,321		\$106,404,300	\$ 94,165,546		



# **Reserves/Financial Indicators**

	FY 2014/15	FY 20	15/16	FY 20	)16/17	
	Actual	Amended Budget	Estimated Actual	Adopted Budget	Proposed Budget	Benchmark
General Fund						
Debt Service	\$ 2,874,298	\$ 2,860,634	\$ 2,860,634	\$ 2,860,634	\$ 2,860,634	\$ 3,000,000
Self-Insurance	1,745,200	-	-	-	-	-
Management Retirement Bonus	-	1,753,000	1,753,000	1,745,200	1,753,000	2,000,000
Emergency/Rate Stabilization	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000
<b>Operations &amp; Maintenance and Capital</b>	55,270,043	59,496,666	54,240,961	60,969,066	43,000,910	37,000,000
2015 Revenue Bond Fund	17,028,196	63,700	5,119,088	<u> </u>	<u>-</u>	<u> </u>
TOTAL GENERAL FUND RESERVES	86,917,737	74,174,000	73,973,683	75,574,900	57,614,544	52,000,000
FACILITIES IMPROVEMENT FUND RESERVES	33,688,337	30,130,700	35,228,639	30,829,400	36,551,004	30,130,700
TOTAL RESERVES	\$120,606,074	<u>\$104,304,700</u>	<u>\$109,202,322</u>	<u>\$106,404,300</u>	<u>\$ 94,165,548</u>	<u>\$82,130,700</u>

Debt Service Coverage	4.41	3.37	2.58	4.09	2.03	1.5 - 3.0
Debt Ratio	0.17	0.18	0.17	0.18	0.17	0.2 - 0.4
Current Ratio	6.58	7.00	6.58	7.00	6.58	2.0 - 2.5



# **Budget Comparison– Revenues**

		FY 2015/16			FY 2016/17		
	Amended Budget	Estimated Actuals	% Variance	Amended Budget	Proposed Budget	% Variance	FY17 Prop FY16 Est % Variance
REVENUES							
Water Revenue	\$ 86,162,100	\$ 74,632,429	-13.4%	\$ 93,222,200	\$ 79,638,669	-14.6%	6.7%
Drought Surcharge	\$ 6,900,000	\$ 5,655,000	-18.0%	\$ 6,900,000	\$ -	-100.0%	-100.0%
Ground Water Revenue	447,600	429,423	-4.1%	485,300	467,212	-3.7%	8.8%
Proceeds From Taxation	9,243,100	8,790,100	-4.9%	8,921,300	8,921,300	0.0%	1.5%
Interest Revenue	948,400	1,149,042	21.2%	889,100	1,016,839	14.4%	-11.5%
Facilities Connection Charges	2,019,000	4,375,177	116.7%	2,038,000	4,657,037	128.5%	6.4%
Other Revenue	2,938,700	1,332,756	-54.6%	2,513,100	4,646,150	84.9%	248.6%
Customer Jobs	2,472,000	2,800,000	13.3%	634,900	4,176,000	557.7%	49.1%
TOTAL REVENUES	<u>111,130,900</u>	<u>99,163,927</u>	-10.8%	<u>115,603,900</u>	103,523,207	-10.5%	4.4%



### **Budget Comparison – Expenses (Cost Centers)**

		FY 2015/16			FY 2016/17		
	Amended Budget	Estimated Actuals	% Variance	Amended Budget	Proposed Budget	% Variance	FY17 Prop FY16 Est % Variance
EXPENSES							
Source of Supply	36,792,700	33,512,817	-8.9%	35,761,200	38,474,351	7.6%	14.8%
Pumping	1,368,600	1,618,554	18.3%	1,420,400	1,420,387	0.0%	-12.2%
Water Treatment	16,790,300	14,232,695	-15.2%	17,244,100	15,711,059	-8.9%	10.4%
Transmission & Distribution	15,697,800	15,609,209	-0.6%	16,947,200	18,124,018	6.9%	16.1%
Customer Accounts	1,753,600	1,500,000	-14.5%	1,620,900	1,620,938	0.0%	8.1%
Administrative & General	37,850,900	38,468,895	1.6%	39,277,200	38,641,606	-1.6%	0.4%
Expense Transfer - Overhead	(25,523,900)	(23,793,821)	-6.8%	(26,233,500)	(27,605,373)	5.2%	16.0%
Expense Projects	1,869,200	814,000	-56.5%	313,700	1,503,390	379.2%	84.7%
TOTAL OPERATING EXPENSES	86,599,200	81,962,349	-5.4%	86,351,200	87,890,376	1.8%	7.2%
Capital Projects - GF	4,798,300	4,335,632	-9.6%	5,615,900	11,294,542	101.1%	160.5%
Capital Projects - Bond	17,436,300	11,909,108	-31.7%	11,156,700	5,119,088	-54.1%	-57.0%
Capital Projects - FIF	4,983,400	3,179,460	-36.2%	1,681,000	3,693,570	119.7%	16.2%
Customer Jobs	2,471,900	2,800,000	13.3%	2,513,100	4,176,000	66.2%	49.1%
Debt Service	6,381,200	6,381,131	0.0%	6,386,400	6,386,406	0.0%	0.1%
TOTAL EXPENSES	<u>\$122,670,300</u>	<u>\$110,567,680</u>	-9.9%	<u>\$113,704,300</u>	<u>\$118,559,982</u>	4.3%	7.2%



### **Budget Comparison– Expenses (Cost Elements)**

		FY 2015/16			FY 2016/17			
	Amended Budget	Estimated Actual	% Variance	Adopted Budget	Proposed Budget	% Variance		FY16 Est '% Variance
Labor								
Operating	\$ 24,936,352	\$ 24,347,065	-2.4%	\$ 26,267,749	\$ 25,888,559	-1.4%		6.3%
Capital	2,223,200	1,590,607	-28.5%	2,012,100	1,872,005	-7.0%		17.7%
Customer Jobs	586,400	664,234	13.3%	593,700	937,800	58.0%		41.2%
Total Labor	27,745,952	26,601,906	-4.1%	28,873,549	28,698,364	-0.6%		7.9%
Purchased Water	27 792 582	25 307 217	<b>8</b> 0%	26 349 105	20 062 260	10.3%		1/ 90/
i urchased water	21,192,002	20,007,217	-0.976	20,040,100	23,002,203	10.376		14.078
Employee Benefits	14,679,900	14,672,774	0.0%	15,933,310	15,643,310	-1.8%		6.6%
OPEB	4,079,000	4,079,100	0.0%	4,211,000	4,211,000	0.0%		3.2%
Other Expenses								
Operating	15,111,366	13,556,193	-10.3%	13,590,036	13,085,238	-3.7%		-3.5%
Capital	24,994,800	17,833,593	-28.7%	16,441,500	18,235,195	10.9%		2.3%
Customer Jobs	1,885,500	2,135,766	13.3%	1,919,400	3,238,200	68.7%		51.6%
Total Other Expenses	41,991,666	33,525,552	-20.2%	31,950,936	34,558,633	8.2%		3.1%
Debt Service	6,381,200	6,381,131	0.0%	6,386,400	6,386,406	0.0%		0.1%
Total Expanses	¢122 670 200	¢110 567 690	0.0%	¢113 704 200	¢119 550 092	4 29/		7 20/
i utai Expenses	<u></u>	<u>000,106,0119</u>	-9.9%	<u>9113,704,300</u>	<u>\$110,009,302</u>	4.3%		1.2%



### **Revenues**





### **Revenues**

	FY 2015/16				FY 2016/17				
	Amended Budget	Estimated Actual	% Variance	Adopted Budget	Proposed Budget	% Variance		FY17 Prop FY16 Est % Variance	
Commodity Rate	\$ 58,098,000	\$ 46,241,142	-20.4%	\$ 62,745,900	\$ 49,790,136	-20.6%		7.7%	
Service Charges	27,192,700	27,530,642	1.2%	29,597,800	28,984,531	-2.1%		5.3%	
Other Wtr. Rev.	1,319,000	1,290,068	-2.2%	1,363,800	1,331,214	-2.4%		3.2%	
Drought Surcharge	6,900,000	5,655,000	-18.0%	6,900,000	-			-100.0%	
Property Tax Proceeds	9,243,100	8,790,100	-4.9%	8,921,300	8,921,300	0.0%		1.5%	
Interest Revenue	948,400	1,149,042	21.2%	889,100	1,016,839	14.4%		-11.5%	
Development Charges	2,019,000	4,375,177	116.7%	2,038,000	4,657,037	128.5%		6.4%	
Other Revenue	2,938,700	1,332,756	-54.6%	634,900	4,646,150	631.8%		248.6%	
Customer Jobs	2,472,000	2,800,000	13.3%	2,513,100	4,176,000	66.2%		49.1%	
	<u>\$111,130,900</u>	<u>\$ 99,163,927</u>	-10.8%	<u>\$115,603,900</u>	<u>\$103,523,207</u>	-10.5%		4.4%	



### **Operating Expenses**



#### May 26, 2016



### **Operating Expenses**

	Amended Budget	FY 2015/16 Estimated Actual	% Variance	Adopted Budget	FY 2016/17 Proposed Budget	% Variance	FY17 Prop FY16 Est % Variance
Source of Supply	\$ 36,792,700	\$ 33,512,817	-8.9%	\$ 35,761,200	\$ 38,474,351	7.6%	14.8%
Pumping	1,368,600	1,618,554	18.3%	1,420,400	1,420,387	0.0%	-12.2%
Water Treatment	16,790,300	14,232,695	-15.2%	17,244,100	15,711,059	-8.9%	10.4%
<b>Transmission &amp; Distribution</b>	15,697,800	15,609,209	-0.6%	16,947,200	18,124,018	6.9%	16.1%
Customer Accounts	1,753,600	1,500,000	-14.5%	1,620,900	1,620,938	0.0%	8.1%
Administration & General	12,327,000	14,675,074	19.0%	13,043,700	11,036,233	-15.4%	-24.8%
Expense Projects	1,869,200	814,000	-56.5%	313,700	1,503,390	379.2%	84.7%
	<u>\$ 86,599,200</u>	<u>\$81,962,349</u>	-5.4%	<u>\$ 86,351,200</u>	<u>\$ 87,890,376</u>	1.8%	7.2%

	FY 2015/16						
	Amended Budget	Estimated Actual	% Variance	Adopted Budget	Proposed Budget	% Variance	FY17 Prop FY16 Est % Variance
Labor	\$ 24,936,352	\$ 24,347,065	-2.4%	\$ 26,267,749	\$ 25,888,559	-1.4%	6.3%
Fringe & Overhead	21,773,887	19,735,108	-9.4%	22,905,848	22,547,723	-1.6%	14.3%
Purchased Water	27,792,582	25,307,217	-8.9%	26,349,105	29,062,269	10.3%	14.8%
Other	12,096,379	12,572,959	3.9%	10,828,498	10,391,825	-4.0%	-17.3%
	<u>\$ 86,599,200</u>	<u>\$ 81,962,349</u>	-5.4%	<u>\$ 86,351,200</u>	<u>\$ 87,890,376</u>	1.8%	7.2%



### **Operation and Maintenance**



#### FY 2016/17 Proposed Budget



## **Operation and Maintenance**

	FY 2015/16							
	Amended Budget	Estimated Actual	% Variance	ļ	Adopted Budget	Proposed Budget	% Variance	FY17 Prop FY16 Est % Variance
Source of Supply SEWD	¢ 15 601 626	¢ 10 776 071	44 70/	¢ 15	670 207	¢ 17.062.700	40.00/	00.70/
Source of Supply - SFWD		φ 13,770,271	-11.7%	ຸລຸ ເວ, 7	711,070	φ 17,003,700 0.029 FC0	13.9%	29.7%
Source of Supply - SBA	8,326,406	8,326,406	0.0%	7,	,711,278	9,038,569	17.2%	8.6%
Source of Supply - STP	3,204,540	3,204,540	0.0%	2,	,959,620	1,500,000	-49.3%	-53.2%
Source of Supply-CCWD	660,000	-	-100.0%	_	-	660,000		
Source of Supply-Other	9,000,118	8,205,600	-8.8%	9,	,412,095	9,412,082	0.0%	14.7%
Pumping	1,368,600	1,618,554	18.3%	1,	420,400	1,420,387	0.0%	-12.2%
Water Treatment	16,790,300	14,232,695	-15.2%	17,	,244,100	15,711,059	-8.9%	10.4%
<b>Transmission &amp; Distribution</b>	15,697,800	15,609,209	-0.6%	16,	947,200	18,124,018	6.9%	16.1%
	<u>\$ 70,649,400</u>	<u>\$ 64,973,275</u>	-8.0%	<u>\$ 71</u> ,	<u>372,900</u>	<u>\$ 73,729,815</u>	3.3%	13.5%
		FY 2015/16				FY 2016/17		
	Amended Budget	Estimated Actual	% Variance		Adopted Budget	Proposed Budget	% Variance	FY17 Prop FY16 Est % Variance
Labor	\$ 11,895,647	\$ 10,876,436	-8.6%	\$12,	695,071	\$ 12,475,977	-1.7%	14.7%
Fringe & Overhead	21,412,165	19,577,585	-8.6%	22,	851,128	22,456,759	-1.7%	14.7%
Purchased Water	27,792,582	25,307,217	-8.9%	26,	349,105	29,062,269	10.3%	14.8%
Other	9,549,006	9,212,037	-3.5%	9,	477,596	9,734,810	2.7%	5.7%
	<u>\$ 70,649,400</u>	<u>\$ 64,973,275</u>	-8.0%	<u>\$ 71,</u>	<u>372,900</u>	<u>\$ 73,729,815</u>	3.3%	13.5%



### **Administrative and General**





# **Administrative and General**

	FY 2015/16			FY 2016/17					
	Amended Budget	Estimated Actual	% Variance		Adopted Budget	Proposed Budget	% Variance		FY17 Prop FY16 Est % Variance
A&C Solorias	¢ E 100 070	¢ 5 612 000	0.5%		¢ E 470 074	¢ E 600 494	0.00/		0.00/
A&G Salaries		\$ 5,612,000 5,400,000	9.5%		φ 5,470,271 5,496,700		2.8%		0.2%
A&G Other Pay	4,929,040	5,400,000 14,672,774	9.6%		0,100,790	4,091,009	-5.7%		-9.4%
Employee Benefits	14,679,900	14,072,774	0.0%		10,933,310	15,643,310	-1.8%		6.6%
Froperty & Liability Insurance	764,436	CO0,100	-15.7%		004,070 265,000	604,070 265,000	0.0%		21.5%
Election Expense	101 050	145.000	0.0%		205,000	203,000	0.0%		45.00/
	244 425	145,000	-20.3%		256 650	240 650	-4.0%		15.9%
Office Supplies	344,435	291,000	-15.5%		300,000	349,000	-2.0%		20.2%
Onice Supplies	109,330	95,000	-13.1%		114,330	114,300	0.0%		20.4%
Fosiage	240,020	240,020	0.0%		200,020	203,020	0.0%		10.4%
Small Tools/Supplies	130,130	123,130	-10.9%		139,130	139,130	0.0%		13.0%
	235,950	220,000	-0.8%		200,000	200,000	0.0%		7.2%
Brofossional Sarvicas	1,000,000	1,000,000	60.0%		700,000	700,000	0.0%		-30.3%
	1,072,050	1,022,333	-4.7%		4 211 000	43,700	-3.0%		-27.2%
Unformation Taphnology	4,079,000	4,079,100	0.0%		4,211,000	4,211,000	0.0%		3.2%
Health & Safety/Emorgency Sycs	1,312,133	1,000,132	-17.1%		1,306,000	840.005	-10.0%		8.2% 5.0%
Public Information/Conservation	1 9/9 561	1 400 000	-3.0%		1 674 215	1 674 315	-0.0%		-5.6%
Equipment/Auto Maintenance	752 557	780 717	-24.3%		780 807	780 807	0.0%		19.0%
Equipment/Auto Maintenance	1 190 072	1 006 162	4.0%		1 099 690	1 162 690	0.0%		-1.1%
Property Maintenance	1,109,972	1,090,102	-7.9%		1,000,000	1,103,000	0.9%		0.2%
Other A&G	328,300	448,812	36.7%		245,200	372,700	52.0%		-17.0%
	39,288,245	39,885,425	1.5%		40,636,249	40,173,017	-1.1%		0.7%
Expense Credit Equipment	(1,437,300)	(1,416,530)	-1.4%		(1,359,000)	(1,531,411)	12.7%		8.1%
Expense Credit Overhead	(25.523.900)	(23.793.821)	-6.8%		(26.233.500)	(27.605.373)	5.2%		16.0%
	(,00,000)	(20,100,021)	0.070		(,,,)	(,000,010)	0.270		10.070
	<u>\$ 12,327,045</u>	<u>\$ 14,675,074</u>	19.0%		<u>\$ 13,043,749</u>	<u>\$ 11,036,233</u>	-15.4%		-24.8%

# Labor

		FY 2015/16			FY 2016/17				
	Amended Budget	Estimated Actual	% Variance	Adopted Budget	Proposed Budget	% Variance	FY17 Prop FY16 Est '% Variance		
Operating									
General Fund									
Source of Supply	\$ 2,440,346	\$ 2,175,407	-10.9%	\$ 2,607,418	\$ 2,607,418	0.0%	19.9%		
Pumping	165,763	231,576	39.7%	170,281	170,281	0.0%	-26.5%		
Water Treatment	4,591,608	3,836,558	-16.4%	4,774,875	4,133,327	-13.4%	7.7%		
Transmission & Distribution	4,697,930	4,632,895	-1.4%	5,142,497	5,564,951	8.2%	20.1%		
Customer Accounts	1,275,388	1,090,925	-14.5%	1,315,138	1,315,138	0.0%	20.6%		
Administration	5,126,678	5,612,000	9.5%	5,470,271	5,622,481	2.8%	0.2%		
Vacation, Sick Leave, Etc.	4,976,226	5,414,989	8.8%	5,236,561	4,941,440	-5.6%	-8.7%		
General	1,461,456	1,265,202	-13.4%	1,520,308	1,482,987	-2.5%	17.2%		
Expense Projects	200,957	87,513	-56.5%	30,400	50,536	66.2%	-42.3%		
Total Operating Labor									
Expenses	24,936,352	24,347,065	-2.4%	26,267,749	25,888,559	-1.4%	6.3%		
Capital									
General Fund	1,859,500	1,358,563	-26.9%	1,847,900	1,562,964	-15.4%	15.0%		
Facilities Improvement Fund	363,700	232,044	-36.2%	164,200	309,042	88.2%	33.2%		
Total Capital Labor Expenses	2,223,200	1,590,607	-28.5%	2,012,100	1,872,005	-7.0%	17.7%		
Customer Jobs	586,400	664,234	13.3%	593,700	937,800	58.0%	41.2%		
Total Labor Expenses	\$ 27.745.952	\$ 26.601.906	-4.1%	\$ 28.873.549	\$ 28.698.364	-0.6%	7.9%		



## **Employee Benefits**

	FY 2015/16					FY 2016/17					5¥47 Base
		Amended Budget		Estimated Actual	% Variance		Adopted Budget		Proposed Budget	% Variance	FY17 Prop FY16 Est '% Variance
PERS Employer Percent PERS EE Portion Paid by	\$	6,955,000	\$	6,780,000	-2.5%	\$	7,759,700	\$	7,584,700	-2.3%	11.9%
ACWD Deferred Comp		359,700		315,000	-12.4%		375,300		375,300	0.0%	19.1%
Contribution		61,000		80,000	31.1%		61,000		61,000	0.0%	-23.8%
Social Security		13,800		5,500	-60.1%		14,800		14,800	0.0%	169.1%
Benefit		5,074,700		4,975,000	-2.0%		5,458,400		5,233,400	-4.1%	5.2%
Medicare		394,700		405,000	2.6%		411,300		411,300	0.0%	1.6%
AD&D		6,400		6,400	0.0%		6,700		6,700	0.0%	4.7%
Life Insurance		59,500		62,000	4.2%		61,700		61,700	0.0%	-0.5%
Dental		470,900		450,000	-4.4%		485,000		485,000	0.0%	7.8%
Vision		66,300		65,000	-2.0%		68,300		68,300	0.0%	5.1%
Employee Assistance											
Program		7,000		7,000	0.0%		7,000		7,000	0.0%	0.0%
Short Term Disability		59,900		59,900	0.0%		61,400		61,400	0.0%	2.5%
LTD/Wage Continuation		108,500		108,500	0.0%		111,210		111,210	0.0%	2.5%
Unemployment Insurance		13,000		20,000	53.8%		13,000		13,000	0.0%	-35.0%
Workers' Comp		980,000		1,180,000	20.4%		989,000		1,099,000	11.1%	-6.9%
Misc Other Benefits		-		105,000			-		-		-100.0%
MCP Allowance		49,500		48,474	-2.1%		49,500		49,500	0.0%	2.1%
	\$	14,679,900	\$	14,672,774	0.0%	\$	<u>15,933,310</u>	\$	15,643,310	-1.8%	6.6%
OPEB/ARC	\$	4,079,000	\$	4,079,100	0.0%	\$	4,211,000	\$	4,211,000	0.0%	3.2%



## **FTEs and Retirements**

	FY 2012/13 Actual	FY 2013/14 Actual	FY 2014/15 Actual	FY 2015/16 YTD	FY 2016/17 Proposed Budget
Autorized Positions	233	238	238	230	230
Vacancies	23	19	27	16	
	CY 2012	CY 2013	CY 2014	CY 2015	CY 2016
	Actual	Actual	Actual	Actual	YTD
Retirements	17	5	8	11	5



### **Purchased Water**




#### **Chemicals**





#### **Purchased Power**





#### **Debt Service**

	FY 14/15	FY 15/16		FY 16/17	
	Actual	Amended Budget	Estimated Actual	Adopted Budget	Proposed Budget
Debt Service:					
2009 Refunding Revenue Bonds	\$ 2,868,100	\$ 2,863,200	\$ 2,863,200	\$ 2,866,800	\$ 2,866,800
2012 Revenue Bonds	1,890,900	1,893,300	1,893,300	1,892,700	1,892,700
2015 Revenue Bonds	240,400	1,624,700	1,624,700	1,626,900	1,626,900
	<u>\$ 4,999,400</u>	<u>\$ 6,381,200</u>	<u>\$ 6,381,200</u>	<u>\$ 6,386,400</u>	<u>\$ 6,386,400</u>
Outstanding Principal:					
2009 Refunding Revenue Bonds	\$ 13.050.000	\$ 10.595.000	\$ 10.595.000	\$ 8.070.000	\$ 8.070.000
2012 Revenue Bonds	44,495,000	44,230,000	44,230,000	43,955,000	43,955,000
2015 Revenue Bonds	27,810,000	27,355,000	27,355,000	26,875,000	26,875,000
	<u>\$ 85,355,000</u>	<u>\$ 82,180,000</u>	<u>\$ 82,180,000</u>	<u>\$ 78,900,000</u>	<u>\$ 78,900,000</u>



#### **Capital Expenditures**

	FY 14/15	FY 15/16		<b>FY</b> 1	6/17
	Actual	Amended Budget	Estimated Actual	Adopted Budget	Proposed Budget
Capital Projects - GF	\$ 5,808,437	\$ 4,798,300	\$ 4,335,632	\$ 5,615,900	\$ 11,294,542
Capital Projects - Bond	11,843,167	17,436,300	11,909,108	11,156,700	5,119,088
Total General Fund Capital	17,651,604	22,234,600	16,244,740	16,772,600	16,413,630
Capital Expenditures-FIF	2,895,240	4,983,400	3,179,460	1,681,000	3,693,570
Customer Jobs	3,762,312	2,471,900	2,800,000	2,513,100	4,176,000
Total Capital Expenditures	<u>\$24,309,156</u>	<u>\$ 29,689,900</u>	<u>\$ 22,224,200</u>	<u>\$20,966,700</u>	<u>\$ 24,283,200</u>



#### Major initiatives: Water Supply Reliability Concepts

### District is currently considering a number of water supply reliability concepts

#### Estimated ACWD share expenses for FY 2016/17 (unbudgeted):

- WaterFix Studies \$200,000
- Los Vaqueros Studies \$100,000
- Lake Del Valle studies \$100,000-\$200,000
- Sites Reservoir Studies & 'down payment' \$600,000 to \$1.8M (for 10 to 30 TAF participation)

#### Total FY 16/17 Cost to continue all options: ~\$1.0M to \$2.3M

#### **Proposed FY 2016/17 budget includes:**

- \$80,000 for Planning Studies Intended for Desalination
- \$660,000 for the ELV pilot exchange project



#### Major initiatives: Water Supply Reliability Concepts

Proposed CIP includes \$116M in FY 2035/36 for a Recycled Water or Alternative Concept(s)

- **Current Concepts being evaluated (ACWD Share Estimates):** 
  - WaterFix : \$120M
  - LVE w/Trans.-Bethany pipeline: \$267M (no water included)
  - Bay Desalination: \$323M \$464M
  - Recycled Water / Indirect Potable Reuse (IPR)
    - 2,500 AF/yr. of non-potable Recycled Water: \$143M
    - 4,500 AF/yr. of potable reuse: \$70.1M (cap only)
    - Recycled Water Fill Station: \$300K-\$2.0M



#### Water System Costs vs. Revenue



Fixed Costs = 19% + 53% = 72% Variable = 28% Fixed Revenues = 29%Fixed + Quasi-Fixed = 29% + 45% = 74%Variable = 18% + 7% = 25%Quasi-fixed = commodity rev for stable indoor consumption only

# Capital Improvement Program (CIP) Review

# **Financial Forecasting**

# Customer Usage Analysis

# Drought Surcharge/Ordinance



#### **Drought Emergency Regulations**

#### **Extended Through January 2017**

**End-User Requirements Remain** 

#### **Conservation Standard Self-Certification**

- Due June 22, 2016
- Assume next 3 years' precipitation are same as 2013-2015
- Assume demand is average of 2013 and 2014
- Conservation standard is shortfall in the 3<sup>rd</sup> year

#### **ACWD's Preliminary Conservation Standard**



#### Water Shortage Emergency Ordinance

Section 1, Declaration of a Water Shortage Emergency

Section 2, Purpose and Authority

Section 3, Effect of Ordinance

Section 4, Water Use Limitations

Section 5, Water Use Guidelines

**Section 6, Application Procedure for Exceptions** 

Section 7, Exemption from CEQA

Section 8, Severability

Section 9, Publication and Posting of Ordinance



#### **Drought Surcharge**

## Conditions for rescinding surcharge:

- Governor rescinds drought state of emergency declaration;
- State Board rescinds statewide drought emergency regulations; and
- Board rescinds water shortage emergency Ordinance.



#### **Next Steps**

### June 9 Board of Directors

- Evaluate Drought Surcharge/Ordinance
- June 30 Budget Workshop
- Adopt FY 2016/17 Midcycle Budget Adjustments
- Adopt 25 Year Capital Improvement Program (CIP)



### **Discussion**



# Capital Improvement Program

MAY 26, 2016

BOARD MEETING



## Outline

# Capital Budget – Mid-cycle Revisions CIP Overview Cost Reduction Scenarios Discussion and Feedback

# **Capital Budget**

#### MID-CYCLE REVISIONS



## Mid-Cycle Yr2 Proposed Budget (\$1000s)

Category	2016 (Adopted)	2017 (Adopted)	2016 (Estimated)	2017 (Proposed)
Capital Jobs	24,769	16,366	19,419	20,586
Extraordinary Expense	1,869	314	814	1,503
2-Yr Total	\$43,	317	\$42	,322
Customer Jobs	2,472	2,513	2,800	4,176
TOTALS	29,110	19,192	23,033	26,265
2-Yr Total	\$48,	302	\$49	,298



### Capital Projects with greatest FY increase

	Increase	Reason
Customer Jobs	\$1,663,000	Higher Development Activity
Main Relocation for SF BDPL 3&4	\$1,535,000	FY Payments/ Outside Agency
Cayenta Software	\$695,000	FY Payments/ Staffing
Iron Horse Lane Main Replacement	\$645,000	Scope & Schedule Adjustment
RD #1 Fish Ladder	\$539,000	Schedule Adjustment
WTP2 PLC Replacement	\$525,000	Acceleration for work efficiency
Washington Blvd Main Replacement	\$429,000	Scope & Schedule Adjustment
Fault Crossings – Hose Procurement	\$380,000	FY Payments/ Staffing
RD1 Fabric Replacement	\$376,000	FY Payments/ Contractor
HQ Office Project	\$342,000	FY Payments/ Staffing
Appian Tank	\$308,000	FY Payments/ Contractor
CIP Software	\$300,000	FY Payments/ Staffing



## **Summary of Changes**

	Impact on Budget Year
New Projects	\$210,000
Accelerated Project	\$525,000
FY Payments/ Outside Agency	\$1,916,000
Scope & Cost Changes	\$1,228,000
Higher Development Activity (Customer Jobs)	\$1,663,000
FY Payments/ Contractor	\$684,000
FY Payments/ Staffing availability (Eng 1.7M; IT 1.4M; Ops 0.4M)	\$3,466,000
Revised Schedule (Fish Passage Program)	\$494,000
Delayed for Grant Funding	\$200,000
Cost savings and reductions	(\$1,378,000)
Defer Project	(\$1,935,000)
TOTAL	\$7,073,000



## Major Projects (highest cost)

Customer Jobs		\$4,176,000
Main Relocation for SF BDPL 3&4	*	\$1,535,000
SL Emergency Replacement Program		\$1,295,000
Membranes for Newark Desalination Facility		\$1,234,000
Washington Blvd Main Replacement	*	\$1,084,000
Avalon Site Slope Stability		\$1,008,300
Blending Facility Radio / Niles Repeater	*	\$974,800
Middlefield Inlet/ Outlet Pipeline Seismic Upgrade	*	\$987,000
WTP2 PLC Replacement	*	\$913,500
Cayenta Software	**	\$744,600
RD1 Fish Ladder	*	\$739,000

\* Bond Funded; \*\* Extraordinary Expense



#### Proposed Yr2 Expenditures by Category



# **CIP Overview**



## Prior Adopted (Revised) CIP A1





## Mid-Cycle Changes to the CIP

Escalation (+3% to future years)

- Cost adjustments ("pencil sharpening")
- Schedule Adjustments
- Adjusted recurring costs (to historical amounts)
- Total CIP Program Reductions:
- 6 years: \$11.9M (GF portion only)
  10 years: \$15.3M (GF portion only)



## Proposed CIP – version P3





### Proposed 10-Year Expenditures by Program



# **CIP Reduction Scenarios**



## **CIP Reduction Scenarios**

Staff developed multiple scenarios to cut and defer additional costs *will show 4 levels* 

Building on reductions already in CIP "P3"

Per FPM, focus on next 5 years (through FY 20/21)

Objectives:

- Minimize impacts on reserves (minimize rate pressure)
- Minimize consequences of cuts/deferrals

Each scenario builds on the prior

Targeting "GF" reductions, total cost reduction is greater (GF+FIF)

Seeking feedback regarding the Board's priorities (and acceptable cuts/deferrals)



## Level 1: ~\$6M GF Capital Reduction (S14)

#### Consequences

Alameda Creek Fish Passage Completion - CY 2022 Continued Deferrals of Facility Decommissioning

Higher Maintenance Costs, Avalon

Level 1 Deferrals	
Alameda Creek Fish Passage, Schedule	-\$3,448,000
Decommissioning of Facilities	-\$1,348,000
Avalon Tank Site Slope Stability	-\$803,000

Net 5Yr GF Reduction -\$5,525



## Level 2: ~\$21M GF Capital Reduction (S15)

**Consequences – Level 2** 

Alameda Creek Fish Passage Completion - CY 2022

Continued Deferrals of Facility Decommissioning

Higher Maintenance Costs, Avalon

Near Term Reduction to Water Main Replacements

Deferred Seismic Improvements to Alameda, Decoto Reservoirs

Level 2 Cuts & Deferrals	
Alameda Creek Fish Passage, Schedule	-\$3,448,000
Decommissioning of Facilities	-\$1,348,000
Avalon Tank Site Slope Stability	-\$803,000
Main Replacement Program (\$6,7,8,10M)	-\$11,387,000
Seismic Upgrade of Reservoir Structures	-\$13,887,000

Net 5Yr GF Reduction -\$21,029

## Level 3: ~\$24M GF Capital Reduction (S17)

**Consequences – Level 3** 

Alameda Creek Fish Passage Completion - CY 2022

Continued Deferrals of Facility Decommissioning

Higher Maintenance Costs, Avalon

Near Term Reduction to Water Main Replacements

Deferred Seismic Improvements to Alameda, Decoto Reservoirs

Deferred AMI, Recharge Diversion & Dist. WQ Improvements

Level 3 Cuts & Deferrals	
Alameda Creek Fish Passage, Schedule	-\$3,448,000
Decommissioning of Facilities	-\$1,348,000
Avalon Tank Site Slope Stability	-\$803,000
Main Replacement Program (\$6,7,8,10M)	-\$11,387,000
Seismic Upgrade of Reservoir Structures	-\$13,887,000
Facilities Improvements/Initiatives	-\$3,033,000

Net 5Yr GF Reduction -\$24,070



## Level 4: ~\$31M GF Capital Reduction (S16)

#### Consequences – Level 4

Alameda Creek Fish Passage Completion - CY 2023

Continued Deferrals of Facility Decommissioning

Higher Maintenance Costs, Avalon

**Greater** Near Term Reductions to Water Main Replacements

Greater Deferrals to Alameda, Decoto Reservoir Seismic

Level 4 Cuts & Deferrals	
Alameda Creek Fisheries, 1 additional year	-\$11,583,000
Decommissioning of Facilities	-\$1,348,000
Major Maintenance Projects	-\$803,000
Main Replacement Program (\$4,6,8,10M)	-\$14,387,000
Seismic Upgrade of Reservoir Structures	-\$14,388,000

Net 5Yr GF Reduction -\$31,037\*



### Proposed 10-Year Expenditures by Program




## **Discussion and Feedback**

Level	Scenario	Reductions	GF 5-Yr Reductions (from P3)
Level 1	S14	Adjusted Fish Program + Defer Facility Decommissioning + Defer Avalon Slope Stability	\$5.5M
Level 2	S15	Level 1 + Delay of Main Repl. (\$6,7,8,10M) + Defer Reservoir Seismic Upgrade (1yr & 6yr)	\$21.0M
Level 3	S17	Level 2 + Defer AMI + Rock Pond, Whitfield WQ	\$24.0M
Level 4	S16	Level 2 + Longer Delay of Main Repl. (\$4,6,8,10M) + Greater Deferral of Reservoir Seismic Upgrades + Deferral of Fish Program 1 <i>additional</i> year	\$31.0M

# END OF PRESENTATION

# Financial Workshop #5 (Customer Usage Analysis)

### BOARD MEETING

MAY 26, 2016









### Agenda

# Review Tiered Rate Discussion Implementation Path Discussion Drought Usage Analysis





## **Potential Tier Definition**

### Rationale for tier definition

	Current DSC Tiers	Potential Tier Widths	Bases
Tier 1	0 – 16 ccf	0 – 12 ccf	2015 Winter Average Usage = 12 ccf
Tier 2	17 – 30 ccf	13 – 20 ccf	2015 Summer Average Usage = 17 ccf 75 <sup>th</sup> – 80 <sup>th</sup> Percentile Usage = 19 – 21 ccf
Tier 3	Above 30 ccf	Above 20 ccf	





### **SFR Bill Frequency**

### CY 2015 Consumption for 3/4 Inch Meters







### **Preliminary SFR Commodity Tiered Rates**

Single Family	Projected Demand (ccf)	Water Supply	Delivery Base	Peaking	Conservation	Revenue Offsets	Potential Tiered Rates	Current w/ DSC
Tier 1	4,650,919	\$0.536	\$2.600	\$0.725	\$0.000	-\$0.519	\$3.342/ccf	\$3.373/ccf
Tier 2	1,242,394	\$0.536	\$2.600	\$0.918	\$0.199	\$0.000	\$4.253/ccf	\$4.853/ccf
Tier 3	850,687	\$2.162	\$2.600	\$1.241	\$0.199	\$0.000	\$6.202/ccf	\$5.373/ccf





## **Potential Implementation Paths**

Path 1: Current w/ DSC  $\rightarrow$  Tiered (Illustrative)









## **Preliminary Rate Comparisons**

#### **Revised SFR Tiered Rates**







## **Preliminary Rate Comparison**



### **Revised SFR Tiered Rates**





### **Preliminary Customer Impact Analysis**

Potential Tiered Rates, Eliminated DSC, Revised Cost of Service Based on 2015 Consumption and Blended SFPUC Marginal WS Costs



#### **Revised SFR Tiered Rates Customer Impact**





### **Preliminary Bill Impact Analysis**

Current Bills with DSC  $\rightarrow$  Bills with Potential Tiered Rates



#### Sample SFR Bills with Potential Tiered Rates <sup>3</sup>/<sub>4</sub> inch Meters





## **Potential Implementation Paths**

Path 2: Current w/ DSC  $\rightarrow$  Uniform No DSC  $\rightarrow$  Tiered (Illustrative)







### **Preliminary Bill Impact Analysis**

Current Bills without DSC  $\rightarrow$  Bills with Potential Tiered Rates



#### Sample SFR Bills with Revised Tiered Rates *¾ inch Meters*





### **Drought Usage Analysis Study Period**

### "Normal" Period:

May-June to Nov-Dec 2013

## **Drought Period**:

May-June to Nov-Dec 2015





## **Bi-Monthly Usage Reduction**

	2013	2015	Reduction	% Reduction
May - Jun	9,298 AF	4,998 AF	-4,300 AF	-46.2%
Jul - Aug	6,098 AF	5,440 AF	-658 AF	-10.8%
Sep - Oct	5,432 AF	5,448 AF	16 AF	0.3%
Nov - Dec	6,359 AF	6,276 AF	-83 AF	-1.3%
Total	27,188 AF	22,163 AF	-5,025 AF	-18.5%





## **Total Usage Reduction**

	2013	2015	Reduction	% Reduction
Single Family	13,405 AF	9,993 AF	-3,411 AF	-25.4%
Multi Family	5,119 AF	4,654 AF	-465 AF	-9.1%
Commercial	4,594 AF	4,480 AF	-114 AF	-2.5%
Landscape	2,953 AF	2,108 AF	-845 AF	-28.6%
Others	1,117 AF	928 AF	-189 AF	-16.9%
Total	27,188 AF	22,163 AF	-5,025 AF	-18.5%





### **Single Family Bi-Monthly Usage Profile**







### **Single Family Bi-Monthly Usage Profile**

	2013	2015
Average	23 ccf	15 ccf
Median	19 ccf	13 ccf
25 <sup>th</sup> Percentile	11 ccf	8 ccf
75 <sup>th</sup> Percentile	29 ccf	19 ccf

Proposed Tier Width Definition: Tier 1 = 0 to 12 Tier 2 = 13 to 20 Tier 3 = 21 +





### **Customer Response and Proposed Tier Definition**

Proposed tier definition is consistent with customer response to the drought

Almost half the bills will be in Tier 1

Over 75 percent of the customers will be in Tiers 1 and 2

Rates developed are based on 2015 water consumption

• Assist with revenue stability in uncertain times





### Discussion



# **EXHIBIT 9**

🔇 United States 🔻

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- Portland Trail Blazers Five-Game Road Trip Begins with Visit to Phoenix
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#### **CITY OF MILLBRAE, CA**

01/30/2017 | News release | Distributed by Public on 01/30/2017 12:27

#### Millbrae Residents Learn About Risks of 60 Year Water System

Last week, the Millbrae City Council, staff from the Public Works Department, and community members joined for the first Millbrae Water Infrastructure Study Session. During the open meeting, Millbrae Public Works Director Ray Chan spoke about the state of the City's water system and challenges the department is facing in trying to maintain it.

'We have a 60-year-old water system. Most water infrastructure has a typical useful life of 50 years,' said Chan. 'We are spending more than 40% of our funds on operations, maintenance and emergency repairs. This kind of emergency response is not sustainable and we need to start planning to gradually replace the system.'

Millbrae's water system was primarily built in the 1950's and 1960's. Deficiencies in the system became apparent in 2013 when seven water mains broke at the same time, causing thousands of Millbrae residents to temporarily go without water until public works crews were able to repair the broken pipes.

'When a water main breaks, we are obligated to fix it within 24 hours. For many of our emergency repairs, they are only temporary fixes. A complete replacement would take weeks. It's unreasonable to ask residents to go without water to their homes for that long,' said Chan in response to a question from a Millbrae resident. 'A planned replacement schedule is more appropriate for the system, as it allows continued water service to be provided.'

Millbrae's 75 miles of pipes provide clean water to 23,000 customers. Because of continual responses to breaks in the system and increased wholesale water costs, the City's budget for long-term capital improvements has shrunk by more than 60% over the past 7 years.

'The major problem we are facing is the San Francisco Public Utilities Commission (SFPUC) has raised our wholesale water rates by 176%. Since we haven't passed those increases on to our customers, we have significantly less funding to do permanent main replacements,' said Chan.

The San Francisco Public Utilities Commission (SFPUC) provides Millbrae with 100% of its water from a variety of regional sources, including Hetch Hetchy. In 2012, in order to address long needed attention to its own infrastructure backlogs and ensure reliable water sourcing, the SFPUC began a \$900 million infrastructure upgrade to the Hetch Hetchy Reservoir.

#### http://www.publicnow.com/view/9CC49AE443AED66936959C0EF03AA66E807B1EC2

#### City of Millbrae, CA (via Public) / Millbrae Residents Learn About Risks of 60 Year Water System

Since then, in order to finance those improvements, the SFPUC has progressively increased its wholesale water rates for Millbrae and other cities in the Bay Area. Instead of passing these rate increases on to residents, Millbrae's water utility is paying for these increases by deferring needed capital improvements.

In 2009, Millbrae used only 30% of its budget to pay for water from the SFPUC, leaving 70% of customer revenues to fund operations, maintenance and capital improvements. Today, it spends more than 50% for water purchases, even taking into account decreases in annual water usage, leaving fewer dollars for proactive capital improvements and system replacements.

'We need to shift from continual emergency repairs to preventative maintenance,' said Chan. 'Public Works recommends replacing 2% of the City's water pipelines each year over a 50-year period. This replacement rate can be increased to 4% or more, but the 2% rate reduces financial stress on the City and would lower the impacts of street construction interruptions on residents and businesses.'

At the City Council's direction, the Public Works Department will host two more study sessions in the near future to review system repair options and funding needs. Times, dates and locations of those will be announced as they become available.

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# **EXHIBIT 10**

### MOODY'S INVESTORS SERVICE

#### Rating Action: Moody's assigns Aa3 to San Francisco Public Utilities Commission (CA) Water Revenue Bonds

#### Global Credit Research - 27 Sep 2016

New York, September 27, 2016 -- Issue: Water Revenue Bonds, 2016 Series AB 2016 Sub-Series A Bonds (Refunding); Rating: Aa3; Rating Type: Underlying LT; Sale Amount: \$728,815,000; Expected Sale Date: 10/06/2016; Rating Description: Revenue: Government Enterprise;

Issue: Water Revenue Bonds, 2016 Series AB 2016 Sub-Series B Bonds (Refunding); Rating: Aa3; Rating Type: Underlying LT; Sale Amount: \$127,875,000; Expected Sale Date: 10/06/2016; Rating Description: Revenue: Government Enterprise;

Issue: Water Revenue Bonds, 2016 Series C (Federally Taxable); Rating: Aa3; Rating Type: Underlying LT; Sale Amount: \$282,465,000; Expected Sale Date: 11/07/2016; Rating Description: Revenue: Government Enterprise;

#### Summary Rating Rationale

Moody's Investors Service has assigned an Aa3 rating to the San Francisco Public Utilities Commission (SFPUC or PUC) Water Revenue Bonds Refunding Bonds, 2016 Series AB, Sub-Series A and B. We have also assigned an Aa3 to the Taxable Water Revenue Bonds, 2016 Series C. The A, B and C Series bond have an expected par value of \$728.8 million, \$127.8 million, and \$282.4 million respectively. The SFPUC's \$4.3 billion debt parity debt is rated Aa3.

The rating reflects the SFPUC's exceptionally large and diverse service area that includes a strong customer base. The SFPUC's credit profile also benefits from a healthy level of stored water supply that helps maintain the reliability of the system's water delivery despite the drought. The rating also incorporates the SFPUC's strong liquidity position, which is included in the solid level of debt service coverage on an indenture basis, though coverage on a current basis is weak. SFPUC also has an unusually high level of debt which is a credit weakness resulting from a large and ambitious capital plan to seismically update facilities.

#### **Rating Outlook**

The stable outlook reflects our expectation that the SFPUC will continue maintain healthy liquidity and solid debt service coverage as per the indenture. Coverage by current year revenues will remain below average but will not present a material credit weakness as the utility will continue to implement rate increases, offsetting the revenue impact of weakened water demand.

Factors that Could Lead to an Upgrade

Stronger sustained coverage on indenture and current basis

Significant reduction of debt load

Stabilized demand and reduction of drought pressures

Factors that Could Lead to a Downgrade

Material weakening of debt service coverage

Significant diminishment of liquidity

Sustained deterioration of stored water supply

Legal Security

The SFPUC has irrevocably pledged the revenues of the water enterprise. These revenues consist of water enterprise revenue net of operations and maintenance expenses.

#### Use of Proceeds

Proceeds from the 2016 A and B bonds will be used to various series of outstanding revenue bonds. Proceeds from the Series C taxable bonds will be used to refund the outstanding taxable commercial paper and finance \$15 million in capital projects.

#### **Obligor Profile**

The SFPUC serves approximately 2.3 million people including residents of the City of San Francisco. Nearly 70% of the SFPUC's customers live outside of the city and receive water from the SFPUC's wholesale contractors. Half of the SFPUC's 27 wholesale customers receive 100% of their water from the SFPUC, which helps to bring an element of stability and predictability to water sales revenue.

#### Methodology

The principal methodology used in this rating was US Municipal Utility Revenue Debt published in December 2014. Please see the Ratings Methodologies page on www.moodys.com for a copy of this methodology.

#### **Regulatory Disclosures**

For ratings issued on a program, series or category/class of debt, this announcement provides certain regulatory disclosures in relation to each rating of a subsequently issued bond or note of the same series or category/class of debt or pursuant to a program for which the ratings are derived exclusively from existing ratings in accordance with Moody's rating practices. For ratings issued on a support provider, this announcement provides certain regulatory disclosures in relation to the credit rating action on the support provider and in relation to each particular credit rating action for securities that derive their credit ratings from the support provider's credit rating. For provisional ratings, this announcement provides certain regulatory disclosures in relation to a definitive rating that may be assigned subsequent to the final issuance of the debt, in each case where the transaction structure and terms have not changed prior to the assignment of the definitive rating in a manner that would have affected the rating. For further information please see the ratings tab on the issuer/entity page for the respective issuer on www.moodys.com.

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# **EXHIBIT 11**



## Reducing Urban Heat Islands: Compendium of Strategies Urban Heat Island Basics

### Acknowledgements

Reducing Urban Heat Islands: Compendium of Strategies describes the causes and impacts of summertime urban heat islands and promotes strategies for lowering temperatures in U.S. communities. This compendium was developed by the Climate Protection Partnership Division in the U.S. Environmental Protection Agency's Office of Atmospheric Programs. Eva Wong managed its overall development. Kathleen Hogan, Julie Rosenberg, and Andrea Denny provided editorial support. Numerous EPA staff in offices throughout the Agency contributed content and provided reviews. Subject area experts from other organizations around the United States and Canada also committed their time to provide technical feedback.

Under contracts 68-W-02-029 and EP-C-06-003, Perrin Quarles Associates, Inc. provided technical and administrative support for the entire compendium, and Eastern Research Group, Inc. provided graphics and production services.

PositvEnergy provided support in preparing the Trees and Vegetation, Cool Roofs, and UHI Activities chapters under contract PO #2W-0361-SATX.

Experts who helped shape this chapter include:

Hashem Akbari, Ryan Bell, Tony Brazel, David Cole, Maury Estes, Gordon Heisler, David Hitchcock, Brenda Johnson, Megan Lewis, Greg McPherson, Tim Oke, Danny Parker, Alan Perrin, Joyce Rosenthal, David Sailor, Jason Samenow, Haider Taha, James Voogt, Darrell Winner, Kathy Wolf, and Barry Zalph.

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### **Urban Heat Island Basics**

s urban areas develop, changes occur in the landscape. Buildings, roads, and other infrastructure replace open land and vegetation. Surfaces that were once permeable and moist generally become impermeable and dry.\* This development leads to the formation of urban heat islands—the phenomenon whereby urban regions experience warmer temperatures than their rural surroundings.

This chapter provides an overview of different types of urban heat islands, methods for identifying them, and factors that contribute to their development. It introduces key concepts that are important to understanding and mitigating this phenomenon, as well as additional sources of information. It discusses:

- General features of urban heat islands
- Surface versus atmospheric heat islands
- Causes of urban heat island formation
- Urban heat island impacts on energy consumption, environmental quality, and human health
- Resources for further information.

#### 1. What Are Urban Heat Islands?

Many urban and suburban areas experience elevated temperatures compared to their outlying rural surroundings; this difference in temperature is what constitutes an urban heat island. The annual mean air temperature of a city with one million or more people can be 1.8 to 5.4°F (1 to 3°C) warmer than its surroundings,<sup>1</sup> and on a clear, calm night, this temperature difference can be as much as 22°F (12°C).<sup>2</sup> Even smaller cities and towns will produce heat islands, though the effect often decreases as city size decreases.<sup>3</sup>

This chapter focuses on *surface* and *atmospheric* urban heat islands. These two heat island types differ in the ways they are formed, the techniques used to identify and measure them, their impacts, and to some degree, the methods available to mitigate them. Table 1 summarizes the basic characteristics of each type of heat island. These features are described in more detail in the following sections of this chapter.

<sup>\*</sup> This change in landscape may differ in regions such as deserts, where moisture may increase in urban areas if development introduces grass lawns and other irrigated vegetation.



Feature	Surface UHI	Atmospheric UHI
Temporal Development	<ul> <li>Present at all times of the day and night</li> <li>Most intense during the day and in the summer</li> </ul>	<ul> <li>May be small or non-existent during the day</li> <li>Most intense at night or predawn and in the winter</li> </ul>
Peak Intensity (Most intense UHI conditions)	<ul> <li>More spatial and temporal variation:</li> <li>Day: 18 to 27°F (10 to 15°C)</li> <li>Night: 9 to 18°F (5 to 10°C)</li> </ul>	<ul> <li>Less variation:</li> <li>Day: -1.8 to 5.4°F (-1 to 3°C)</li> <li>Night: 12.6 to 21.6°F (7 to 12°C)</li> </ul>
Typical Identification Method	<ul> <li>Indirect measurement:</li> <li>Remote sensing</li> </ul>	<ul> <li>Direct measurement:</li> <li>Fixed weather stations</li> <li>Mobile traverses</li> </ul>
Typical Depiction	Thermal image	<ul><li>Isotherm map</li><li>Temperature graph</li></ul>

#### Table 1: Basic Characteristics of Surface and Atmospheric Urban Heat Islands (UHIs)<sup>4</sup>

#### 1.1 Surface Urban Heat Islands

On a hot, sunny summer day, the sun can heat dry, exposed urban surfaces, like roofs and pavement, to temperatures 50 to 90°F (27 to 50°C) hotter than the air,<sup>5</sup> while shaded or moist surfaces—often in more rural surroundings—remain close to air temperatures. Surface urban heat islands are typically present day and night, but tend to be strongest during the day when the sun is shining.

On average, the difference in daytime surface temperatures between developed and rural areas is 18 to  $27^{\circ}$ F (10 to  $15^{\circ}$ C); the difference in nighttime surface temperatures is typically smaller, at 9 to  $18^{\circ}$ F (5 to  $10^{\circ}$ C).<sup>6</sup>

The magnitude of surface urban heat islands varies with seasons, due to changes in the sun's intensity as well as ground cover and weather. As a result of such variation, surface urban heat islands are typically largest in the summer.<sup>7</sup>

#### How Weather Influences Urban Heat Islands

Summertime urban heat islands are most intense when the sky is clear and winds are calm. Heavy cloud cover blocks solar radiation, reducing daytime warming in cities. Strong winds increase atmospheric mixing, lowering the urban-rural temperature difference. This document, *Reducing Urban Heat Islands: Compendium of Strategies,* focuses on mitigating summertime heat islands through strategies that have maximum impact under clear, calm conditions.

To identify urban heat islands, scientists use direct and indirect methods, numerical modeling, and estimates based on empirical models. Researchers often use remote sensing, an indirect measurement technique, to estimate surface temperatures. They use the data collected to produce thermal images, such as that shown in Figure 1.
## Figure 1: Thermal Image Depicting a Surface Urban Heat Island



This image, taken from an aircraft, depicts a midday surface urban heat island in Salt Lake City, Utah, on July 13, 1998. White areas are around  $160^{\circ}F$  ( $70^{\circ}C$ ), while dark blue areas are near  $85^{\circ}F$  ( $30^{\circ}C$ ). Note the warmer urban surface temperatures (left side of image) and cooler surfaces in the neighboring foothills (on the right).

## 1.2 Atmospheric Urban Heat Islands

Warmer air in urban areas compared to cooler air in nearby rural surroundings defines atmospheric urban heat islands. Experts often divide these heat islands into two different types:

- **Canopy layer urban heat islands** exist in the layer of air where people live, from the ground to below the tops of trees and roofs.
- Boundary layer urban heat islands start from the rooftop and treetop level and extend up to the point where urban landscapes no longer influence the atmosphere. This region typically extends no more than one mile (1.5 km) from the surface.<sup>8</sup>

Canopy layer urban heat islands are the most commonly observed of the two types and are often the ones referred to in discussions of urban heat islands. For this reason, this chapter and compendium use the more general term *atmospheric urban heat islands* to refer to canopy layer urban heat islands.

Atmospheric urban heat islands are often weak during the late morning and throughout the day and become more pronounced after sunset due to the slow release of heat from urban infrastructure. The timing of this peak, however, depends on the properties of urban and rural surfaces, the season, and prevailing weather conditions.

#### Surface and Air Temperatures: How Are They Related?

Surface temperatures have an indirect, but significant, influence on air temperatures, especially in the canopy layer, which is closest to the surface. For example, parks and vegetated areas, which typically have cooler surface temperatures, contribute to cooler air temperatures. Dense, built-up areas, on the other hand, typically lead to warmer air temperatures. Because air mixes within the atmosphere, though, the relationship between surface and air temperatures is not constant, and air temperatures typically vary less than surface temperatures across an area (see Figure 2).



Figure 2: Variations of Surface and Atmospheric Temperatures

Surface and atmospheric temperatures vary over different land use areas. Surface temperatures vary more than air temperatures during the day, but they both are fairly similar at night. The dip and spike in surface temperatures over the pond show how water maintains a fairly constant temperature day and night, due to its high heat capacity.

\* Note: The temperatures displayed above do not represent absolute temperature values or any one particular measured heat island. Temperatures will fluctuate based on factors such as seasons, weather conditions, sun intensity, and ground cover. Atmospheric heat islands vary much less in intensity than surface heat islands. On an annual mean basis, air temperatures in large cities might be 1.8 to 5.4°F (1 to 3°C) warmer than those of their rural surroundings.<sup>9</sup>

Researchers typically measure air temperatures through a dense network of sampling points from fixed stations or mobile traverses, which are both direct measurement methods. Figure 3 illustrates a conceptual isotherm map that depicts an atmospheric urban heat island. The center of the figure, which is the hottest area, is the urban core. A simple graph of temperature differences, as shown in Figure 4, is another way to show the results.



Figure 3: Isotherm Map Depicting an Atmospheric Nighttime Urban Heat Island

This conceptual map with overlaid isotherms (lines of equal air temperature) exhibits a fully developed nighttime atmospheric urban heat island. The dotted red line indicates a traverse along which measurements are taken.

## Figure 4: Conceptual Drawing of the Diurnal Evolution of the Urban Heat Island during Calm and Clear Conditions

Modified from Oke, 1982, and Runnalls and Oke, 2000



Atmospheric urban heat islands primarily result from different cooling rates between urban areas and their surrounding rural or non-urban surroundings (section (a) of Figure 5). The differential cooling rates are most pronounced on clear and calm nights and days when rural areas can cool more quickly than urban areas. The heat island intensity (section (b)) typically grows from mid- to late afternoon to a maximum a few hours after sunset. In some cases, a heat island might not reach peak intensity until after sunrise.

#### **Urban Heat Islands, Climate Change, and Global Warming**

Urban heat islands refer to the elevated temperatures in developed areas compared to more rural surroundings. Urban heat islands are caused by development and the changes in radiative and thermal properties of urban infrastructure as well as the impacts buildings can have on the local micro-climate—for example tall buildings can slow the rate at which cities cool off at night. Heat islands are influenced by a city's geographic location and by local weather patterns, and their intensity changes on a daily and seasonal basis.

The warming that results from urban heat islands over small areas such as cities is an example of local climate change. Local climate changes resulting from urban heat islands fundamentally differ from global climate changes in that their effects are limited to the local scale and decrease with distance from their source. Global climate changes, such as those caused by increases in the sun's intensity or greenhouse gas concentrations, are not locally or regionally confined.

Climate change, broadly speaking, refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from:

- Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun
- Natural processes within the climate system (e.g. changes in ocean circulation)
- Human activities that change the atmosphere's composition (e.g. burning fossil fuels) and the land surface (e.g. deforestation, reforestation, or urbanization).

The term climate change is often used interchangeably with the term global warming, but according to the National Academy of Sciences, "the phrase 'climate change' is growing in preferred use to 'global warming' because it helps convey that there are [other] changes in addition to rising temperatures."

Global warming is an average increase in the temperature of the atmosphere near the Earth's surface and in the lowest layer of the atmosphere, which can contribute to changes in global climate patterns. Global warming can occur from a variety of causes, both natural and human induced. In common usage, "global warming" often refers to the warming that can occur as a result of increased emissions of greenhouse gases from human activities. Global warming can be considered part of global climate change along with changes in precipitation, sea level, etc.

The impacts from urban heat islands and global climate change (or global warming) are often similar. For example, some communities may experience longer growing seasons due to either or both phenomena. Urban heat islands and global climate change can both also increase energy demand, particularly summertime air conditioning demand, and associated air pollution and greenhouse gas emissions, depending on the electric system power fuel mix.

Strategies to reduce urban heat islands—the focus of this document, *Reducing Urban Heat Islands: Compendium of Strategies* produce multiple benefits including lowering surface and air temperatures, energy demand, air pollution and greenhouse gas emissions. Thus, advancing measures to mitigate urban heat islands also helps to address global climate change.

For more information on global warming see EPA's Climate Change website, <www.epa. gov/climatechange>.

#### 2. How Do Urban Heat Islands Form?

While many factors contribute to urban heat island formation (see Table 2), this chapter focuses on vegetative cover and surface properties because communities can directly address these factors with available technologies. See the "Trees and Vegetation," "Green Roofs," "Cool Roofs," and "Cool Pavement" chapters for detailed information on these strategies.

#### 2.1 Reduced Vegetation in Urban Areas

In rural areas, vegetation and open land typically dominate the landscape. Trees and vegetation provide shade, which helps lower surface temperatures. They also help reduce air temperatures through a process called evapotranspiration, in which plants release water to the surrounding air, dissipating ambient heat. In contrast, urban areas are characterized by dry, impervious surfaces, such as conventional roofs, sidewalks, roads, and parking lots. As cities develop, more vegetation is lost, and more surfaces are paved or covered with buildings. The change in ground cover results in less shade and moisture to keep urban areas cool. Built up areas evaporate less water (see Figure 5), which contributes to elevated surface and air temperatures.



Highly developed urban areas (right), which are characterized by 75%-100% impervious surfaces, have less surface moisture available for evapotranspiration than natural ground cover, which has less than 10% impervious cover (left). This characteristic contributes to higher surface and air temperatures in urban areas.

#### 2.2 Properties of Urban Materials

Properties of urban materials, in particular solar reflectance, thermal emissivity, and heat capacity, also influence urban heat island development, as they determine how the sun's energy is reflected, emitted, and absorbed.

Figure 6 shows the typical solar energy that reaches the Earth's surface on a clear summer day. Solar energy is composed of ultraviolet (UV) rays, visible light, and infrared energy, each reaching the Earth in different percentages: five percent of solar energy is in the UV spectrum, including the type of rays responsible for sunburn; 43 percent of solar energy is visible light, in colors ranging from violet to red; and the remaining 52 percent of solar energy is infrared, felt as heat. Energy in all of these wavelengths contributes to urban heat island formation.

Solar reflectance, or albedo, is the percentage of solar energy reflected by a surface. Much of the sun's energy is found in the visible wavelengths (see Figure 6); thus, solar reflectance is correlated with a material's color. Darker surfaces tend to have lower solar reflectance values than lighter surfaces. Researchers are studying and developing cool colored materials, though, that use specially engineered pigments that reflect well in the infrared wavelengths. These products can be dark in color but have a solar reflectance close to that of a white or light-colored material. (See the "Cool Roofs" chapter for further discussion of cool colored roof products.)



Figure 6: Solar Energy versus Wavelength Reaching Earth's Surface

Solar energy intensity varies over wavelengths from about 250 to 2500 nanometers.

Urban areas typically have surface materials, such as roofing and paving, which have a lower albedo than those in rural settings. As a result, built up communities generally reflect less and absorb more of the sun's energy. This absorbed heat increases surface temperatures and contributes to the formation of surface and atmospheric urban heat islands.

Although solar reflectance is the main determinant of a material's surface temperature, thermal emittance, or emissivity, also plays a role. Thermal emittance is a measure of a surface's ability to shed heat, or emit long-wave (infrared) radiation. All things equal, surfaces with high emittance values will stay cooler, because they will release heat more readily. Most construction materials, with the exception of metal, have high thermal emittance values. Thus, this property is mainly of interest to those installing cool roofs, which can be metallic. See the "Cool Roofs" chapter of the compendium for more information.

Another important property that influences heat island development is a material's heat capacity, which refers to its ability to store heat. Many building materials, such as steel and stone, have higher heat capacities than rural materials, such as dry soil and sand. As a result, cities are typically more effective at storing the sun's energy as heat within their infrastructure. Downtown metropolitan areas can absorb and store twice the amount of heat compared to their rural surroundings during the daytime.<sup>10</sup>

#### Radiative and Thermal Properties—Cool Roofs and Cool Pavements

Albedo and emissivity are considered "radiative properties." Heat capacity, on the other hand, is one of several "thermal properties" a material can possess. For thin materials like roofing, which is typically placed over insulation, reflectance and emittance are the main properties to consider, as the heat capacity of a well insulated roof is low. For pavements, which are thicker than roofing products and are placed on top of the ground, which has its own set of thermal characteristics, designers and researchers need to consider a more complex set of factors that include radiative and thermal properties such as heat capacity, thermal conductivity, and density.

#### 2.3 Urban Geometry

An additional factor that influences urban heat island development, particularly at night, is urban geometry, which refers to the dimensions and spacing of buildings within a city. Urban geometry influences wind flow, energy absorption, and a given surface's ability to emit long-wave radiation back to space. In developed areas, surfaces and structures are often at least partially obstructed by objects, such as neighboring buildings, and become large thermal masses that cannot release their heat very readily because of these obstructions. Especially at night, the air above urban centers is typically warmer than air over rural areas. Nighttime atmospheric heat islands can have serious health implications for urban residents during heat waves (see textbox in Section 3.3, "Factors in Heat-Related Illnesses and Death.")

Researchers often focus on an aspect of urban geometry called urban canyons, which can be illustrated by a relatively narrow street lined by tall buildings. During the day, urban canyons can have competing effects. On the one hand, tall buildings can create shade, reducing surface and air temperatures. On the other, when sunlight reaches surfaces in the canyon, the sun's energy is reflected and absorbed by building walls, which further lowers the city's overall albedo-the net reflectance from surface albedo plus urban geometryand can increase temperatures.<sup>11</sup> At night, urban canyons generally impede cooling, as buildings and structures can obstruct the heat that is being released from urban infrastructure.

#### Table 2: Factors that Create Urban Heat Islands

#### Factors Communities are Focusing On

- Reduced vegetation in urban regions: Reduces the natural cooling effect from shade and evapotranspiration.
- Properties of urban materials: Contribute to absorption of solar energy, causing surfaces, and the air above them, to be warmer in urban areas than those in rural surroundings.

#### Future Factors to Consider

- Urban geometry: The height and spacing of buildings affects the amount of radiation received and emitted by urban infrastructure.
- Anthropogenic heat emissions: Contribute additional warmth to the air.\*

#### **Additional Factors**

- Weather: Certain conditions, such as clear skies and calm winds, can foster urban heat island formation.
- Geographic location: Proximity to large water bodies and mountainous terrain can influence local wind patterns and urban heat island formation.

<sup>\*</sup> Although communities currently can lower anthropogenic heat emissions through energy efficiency technologies in the building and vehicle sectors, this compendium focuses on modifying vegetative cover and surface properties of urban materials, as they have long been regarded as urban heat island reduction strategies. An emerging body of literature on the role waste heat plays in urban heat island formation, though, may lead communities to focus on anthropogenic heat in the near future.

#### **The Urban Surface Energy Budget**

An energy budget provides an equation that quantifies the balance of incoming and outgoing energy flows, or fluxes (see Figure 7). The surface energy budgets of urban areas and their more rural surroundings will differ because of differences in land cover, surface characteristics, and level of human activity. Such differences can affect the generation and transfer of heat, which can lead to different surface and air temperatures in urban versus rural areas. Various elements of the budget include:

- Short-wave radiation is ultraviolet, visible light, and near-infrared radiation from the sun that reaches the Earth (see Figure 6). This energy is a key driver of urban heat islands. Urban surfaces, compared to vegetation and other natural ground cover, reflect less radiation back to the atmosphere. They instead absorb and store more of it, which raises the area's temperature.
- Thermal storage increases in cities in part due to the lower solar reflectance of urban surfaces, but it is also influenced by the thermal properties of construction materials and urban geometry. Urban geometry can cause some short-wave radiation—particularly within an urban canyon—to be reflected on nearby surfaces, such as building walls, where it is absorbed rather than escaping into the atmosphere.



#### Figure 7: Urban Surface Energy Budget

#### The Urban Surface Energy Budget (continued)

- Similarly, urban geometry can impede the release of **long-wave**, or infrared, radiation into the atmosphere. When buildings or other objects absorb incoming short-wave radiation, they can re-radiate that energy as long-wave energy, or heat. However, at night, due to the dense infrastructure in some developed areas that have low sky view factors (see section 2.3), urban areas cannot easily release long-wave radiation to the cooler, open sky, and this trapped heat contributes to the urban heat island.
- Evapotranspiration describes the transfer of **latent heat**, what we feel as humidity, from the Earth's surface to the air via evaporating water. Urban areas tend to have less evapotranspiration relative to natural landscapes, because cities retain little moisture. This reduced moisture in built up areas leads to dry, impervious urban infrastructure reaching very high surface temperatures, which contribute to higher air temperatures.\*
- Convection describes the transfer of **sensible heat**, what we feel as temperature, between the surface and air when there is a difference in temperature between them. High urban surface temperatures warm the air above, which then circulates upwards via convection.
- Anthropogenic heat refers to the heat generated by cars, air conditioners, industrial facilities, and a variety of other manmade sources, which contributes to the urban energy budget, particularly in the winter.

\* This change in landscape may differ in regions such as deserts, where moisture may increase in urban areas if development introduces grass lawns and other irrigated vegetation.

The effects of urban geometry on urban heat islands are often described through the "sky view factor" (SVF), which is the visible area of the sky from a given point on a surface. For example, an open parking lot or field that has few obstructions would have a large SVF value (closer to 1). Conversely, an urban canyon in a downtown area that is surrounded by closely spaced, tall buildings, would have a low SVF value (closer to zero), as there would only be a small visible area of the sky.

#### 2.4 Anthropogenic Heat

Anthropogenic heat contributes to atmospheric heat islands and refers to heat produced by human activities. It can come from a variety of sources and is estimated by totaling all the energy used for heating and cooling, running appliances, transportation, and industrial processes. Anthropogenic heat varies by urban activity and infrastructure, with more energy-intensive buildings and transportation producing more heat.<sup>12</sup> Anthropogenic heat typically is not a concern in rural areas and during the summer. In the winter, though, and year round in dense, urban areas, anthropogenic heat can significantly contribute to heat island formation.

#### 2.5 Additional Factors

Weather and location strongly influence urban heat island formation. While communities have little control over these factors, residents can benefit from understanding the role they play.

- Weather. Two primary weather characteristics affect urban heat island development: wind and cloud cover. In general, urban heat islands form during periods of calm winds and clear skies, because these conditions maximize the amount of solar energy reaching urban surfaces and minimize the amount of heat that can be convected away. Conversely, strong winds and cloud cover suppress urban heat islands.
- Geographic location. Climate and topography, which are in part determined by a city's geographic location, influence urban heat island formation. For example, large bodies of water moderate temperatures and can generate winds that convect heat away from cities. Nearby mountain ranges can either block wind from reaching a city, or create wind patterns that pass through a city. Local terrain has a greater significance for heat island formation when larger-scale effects, such as prevailing wind patterns, are relatively weak.

# 3. Why Do We Care about Urban Heat Islands?

Elevated temperatures from urban heat islands, particularly during the summer, can affect a community's environment and quality of life. While some heat island impacts seem positive, such as lengthening the plant-growing season, most impacts are negative and include:

- Increased energy consumption
- Elevated emissions of air pollutants and greenhouse gases
- Compromised human health and comfort
- Impaired water quality.

#### Wintertime Benefits of Urban Heat Islands

Communities may benefit from the wintertime warming effect of urban heat islands. Warmer temperatures can reduce heating energy needs and help to melt snow and ice on roads. Fortunately, urban heat island mitigation strategies—for example, trees and vegetation and green roofs—generally provide year-round benefits, or their winter penalty, such as that from cool roofs, is much smaller than their summertime benefits.

#### 3.1 Energy Consumption

Elevated summertime temperatures in cities increase energy demand for cooling and add pressure to the electricity grid during peak periods of demand, which generally occur on hot, summer weekday afternoons, when offices and homes are running cooling systems, lights, and appliances (see Figure 8). This peak urban electric demand increases 1.5 to 2 percent for every 1°F (0.6°C) increase in summertime temperature. Steadily increasing downtown temperatures over the last several decades mean that 5 to 10 percent of community-wide demand for electricity is used to compensate for the heat island effect.<sup>13</sup> During extreme heat events, which are exacerbated by urban heat islands, the resulting demand for cooling can overload systems and require a utility to institute controlled, rolling brownouts or blackouts to avoid power outages.



Figure 8: Increasing Power Loads with Temperature Increases<sup>14</sup>

As shown in this example from New Orleans, electrical load can increase steadily once temperatures begin to exceed about 68 to 77°F (20 to 25°C). Other areas of the country show similar demand curves as temperature increases.

#### 3.2 Air Quality and Greenhouse Gases

As discussed in Section 3.1, higher temperatures can increases energy demand, which generally causes higher levels of air pollution and greenhouse gas emissions. Currently, most electricity in the United States is produced from combusting fossil fuel. Thus, pollutants from most power plants include sulfur dioxide  $(SO_2)$ , nitrogen oxides  $(NO_x)$ , particulate matter (PM), carbon monoxide (CO), and mercury (Hg). These pollutants are harmful to human health and contribute to complex air quality problems such as acid rain. Further, fossil-fuel-powered plants emit greenhouse gases, particularly carbon dioxide  $(CO_2)$ , which contribute to global climate change.

In addition to increases in air emissions, elevated air temperatures increase the rate of ground-level ozone formation, which is produced when  $NO_x$  and volatile organic compounds (VOCs) react in the presence of sunlight. If all other variables

are equal—such as the level of precursor emissions or wind speed and direction ground-level ozone emissions will be higher in sunnier and hotter weather.

#### 3.3 Human Health and Comfort

Increased daytime surface temperatures, reduced nighttime cooling, and higher air pollution levels associated with urban heat islands can affect human health by contributing to general discomfort, respiratory difficulties, heat cramps and exhaustion, non-fatal heat stroke, and heat-related mortality.

Urban heat islands can also exacerbate the impact of heat waves, which are periods of abnormally hot, and often humid, weather. Sensitive populations, such as children, older adults, and those with existing health conditions, are at particular risk from these events. For example, in 1995, a mid-July heat wave in the Midwest caused more than 1,000 deaths.<sup>15</sup> While it is rare for a

#### **Factors in Heat-Related Illnesses and Death**

Low income elderly people who live in row homes are at a particular risk for heatrelated health incidents. Living on the upper floor of a typical row home, with a dark roof, brick construction, and windows on only two sides, could contribute to the risk of heat-related illness or death during heat waves, as temperatures in these homes can be extreme.<sup>16</sup> These homes often lack air conditioning, especially in areas unaccustomed to high temperatures. Further, even when air conditioning is available, residents may not use it for fear of high utility bills.

Social isolation and physical health also contribute to one's vulnerability. Elderly people, especially, may not have family or friends nearby, may not report to work regularly, and may lack neighbors who can check on them, leaving them stranded during extreme heat events. The elderly may also fail to hear news or other warnings of impending heat waves and recommendations on how to cope. Finally, their bodies may be less able to handle heat stress.

The lack of nighttime relief in air temperatures is strongly correlated with increased mortality during heat waves. Some studies suggest that these oppressive nighttime temperatures may be more significant than high maximum daytime temperatures.<sup>17</sup>

For more information on heat-related health incidents and ways to respond, see the EPA Excessive Heat Events Guidebook <www.epa.gov/hiri/about/pdf/EHEguide\_final.pdf>

heat wave to be so destructive, heat-related mortality is not uncommon. The Centers for Disease Control estimates that from 1979 to 1999, excessive heat exposure contributed to more than 8,000 premature deaths in the United States.<sup>18</sup> This figure exceeds the number of mortalities resulting from hurricanes, lightning, tornadoes, floods, and earthquakes combined.

#### 3.4 Water Quality

Surface urban heat islands degrade water quality, mainly by thermal pollution. Pavement and rooftop surfaces that reach temperatures 50 to 90°F (27 to 50°C) higher than air temperatures transfer this excess heat to stormwater. Field measurements from one study showed that runoff from urban areas was about 20-30°F (11-17°C) hotter than runoff from a nearby rural area on summer days when pavement temperatures at midday were 20-35°F (11-19°C) above air temperature. When the rain came before the pavement had a chance to heat up, runoff temperatures from the rural and urban areas differed by less than 4°F (2°C).<sup>19</sup> This heated stormwater generally drains into storm sewers (see Figure 5) and raises water temperatures as it is released into streams, rivers, ponds, and lakes. A study in Arlington, Virginia, recorded temperature increases in surface waters as high as 8°F (4°C) in 40 minutes after heavy summer rains.<sup>20</sup>

Water temperature affects all aspects of aquatic life, especially the metabolism and reproduction of many aquatic species. Rapid temperature changes in aquatic ecosystems resulting from warm stormwater runoff can be particularly stressful. Brook trout, for example, experience thermal stress and shock when the water temperature changes more than 2 to 4°F (1-2°C) in 24 hours.<sup>21</sup>

#### 4. Strategies to Reduce Urban Heat Islands

Although urban climatologists have been studying urban heat islands for decades, community interest and concern regarding them has been more recent. This increased attention to heat-related environment and health issues has helped to advance the development of heat island reduction strategies, mainly trees and vegetation, green roofs, and cool roofs. Interest in cool pavements has been growing, and an emerging body of research and pilot projects are helping scientists, engineers, and practitioners to better understand the interactions between pavements and the urban climate.

This compendium *Reducing Urban Heat Islands: Compendium of Strategies* provides details about how these strategies work, their benefits and costs, factors to consider when selecting them, and additional resources for communities to further explore. It presents the multiple benefits—beyond temperature reduction that a community can accrue from advancing heat island reduction strategies. It also gives examples of how communities have implemented these strategies through voluntary and policy efforts in the "Heat Island Reduction Activities" chapter. Communities can use this compendium as a foundation and starting point for understanding the nuts and bolts of existing urban heat island reduction strategies that communities are currently advancing.

Future policy efforts may focus on encouraging strategies to modify urban geometry and anthropogenic heat in communities to reduce urban heat islands. Research in this area is on-going, and there is a growing awareness of the importance of these factors.

#### 5. Additional Resources

The table on the next page provides additional resources on urban heat island formation, measurement, and impacts.

#### Table 3: Urban Heat Island Resources

Name	Description	Web Link
General Information		
EPA's Heat Island Website	Through this website, EPA provides background in- formation, publications, reports, access to national webcasts, a database of urban heat island activities, and links to other resources to help communities reduce urban heat islands.	<www.epa.gov heatislands=""></www.epa.gov>
International Association for Urban Climate (IAUC)	This international website is the main forum in which urban climatologists communicate. Urban climate resources, including a bimonthly newsletter, and in- formation on upcoming meetings can be found here.	<www.urban-climate.org></www.urban-climate.org>
Lawrence Berkeley National Laboratory (LBNL) Heat Island Group	LBNL provides background information on urban heat islands and their impacts through this website. It also presents some of the impacts heat island re- duction strategies can have on temperature, energy consumption, and air quality.	<http: <br="" eetd.lbl.gov="">HeatIsIand&gt;</http:>
National Center of Excellence - SMART Innovations for Urban Climate and Energy	Arizona State University's National Center of Excellence collaborates with industry and government to research and develop technologies to reduce urban heat islands, especially in desert climates. Its website provides back- ground information on urban heat islands.	<www.asusmart.com <br="">urbanclimate.php&gt;</www.asusmart.com>
Urban Heat Islands: Hotter Cities	This article explains urban heat islands and presents solutions to mitigate them.	<www.actionbioscience.org <br="">environment/voogt.html&gt;</www.actionbioscience.org>
Measuring Heat Islands and Their Impacts		
National Aeronautics and Space Administration (NASA) and the U.S. Geological Survey Landsat Program	The Landsat program is a series of Earth-observing satellites used to acquire images of the Earth's land surface and surrounding coastal regions. These images provide information from which research- ers can derive surface temperatures and evaluate urban heat islands.	<http: landsat.gsfc.nasa.gov=""></http:>
National Weather Service	The National Weather Service is a source for air temperature measurements, climate and weather models, and past and future climate predictions. The site also has links to excessive heat outlooks, fatality statistics, historic data on major heat waves, drought information, and advice on how to mini- mize the health risks of heat waves.	<www.nws.noaa.gov></www.nws.noaa.gov>
EPA's Excessive Heat Events Guidebook	This document is designed to help community officials, emergency managers, meteorologists, and others plan for and respond to excessive heat events by highlight- ing best practices that have been employed to save lives during excessive heat events in different urban areas. It provides a menu of options that officials can use to respond to these events in their communities.	<www.epa.gov <br="" about="" hiri="">heatguidebook.html&gt;</www.epa.gov>

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## **Green Infrastructure**

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# What is Green Infrastructure?

What is Green Infrastructure?

Overcoming Barriers to Green Infrastructure

Green infrastructure is a cost-effective, resilient approach to managing wet weather impacts that provides many community benefits. While single-purpose gray stormwater infrastructure—conventional piped drainage and water treatment systems—is designed to move urban stormwater away from the built environment, green infrastructure reduces and treats stormwater at its source while delivering environmental, social, and economic benefits.

Stormwater runoff is a major cause of water pollution in urban areas. When rain falls on our roofs, streets, and parking lots in cities and their suburbs, the water cannot soak into the ground as it should. Stormwater drains through gutters, storm sewers, and other engineered collection systems and is discharged into nearby water bodies. The stormwater runoff carries trash, bacteria, heavy metals, and other pollutants from the urban landscape. Higher flows resulting from heavy rains also can cause erosion and flooding in urban streams, damaging habitat, property, and infrastructure.

When rain falls in natural, undeveloped areas, the water is absorbed and filtered by soil and plants. Stormwater runoff is cleaner and less of a problem. Green infrastructure uses vegetation, soils, and other elements and practices to restore some of the natural processes required to manage water and create healthier urban environments. At the city or county scale, green infrastructure is a patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. At the neighborhood or site scale, stormwater management systems that mimic nature soak up and store water.

Learn more about green infrastructure elements that can be woven into a community, from small-scale elements integrated into sites to larger scale elements spanning entire watersheds.

On this page:

Downspout Disconnection

- Rainwater Harvesting
- Rain Gardens
- Planter Boxes
- Bioswales
- Permeable Pavements
- Green Streets and Alleys
- Green Parking
- Green Roofs
- Urban Tree Canopy
- Land Conservation

## **Downspout Disconnection**



Water from the roof flows from this disconnected downspout into the ground through a filter of pebbles.

This simple practice reroutes rooftop drainage pipes from draining rainwater into the storm sewer to draining it into rain barrels, cisterns, or permeable areas. You can use it to store stormwater and/or allow stormwater to infiltrate into the soil. Downspout disconnection could be especially beneficial to cities with combined sewer systems.

## Examples

- Los Angeles Downspout Disconnection Program EXIT
- Milwaukee Downspout Disconnection EXIT
- Portland, OR, Downspout Disconnection Program

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## **Rainwater Harvesting**



This rainwater harvesting system is adapted to the architecture of the building and its surroundings.

Rainwater harvesting systems collect and store rainfall for later use. When designed appropriately, they slow and reduce runoff and provide a source of water. This practice could be particularly valuable in arid regions, where it could reduce demands on increasingly limited water supplies.

#### Examples

- Technicians for Sustainability: Water Harvesting EXIT
- New York City Rain Barrel Giveaway Program

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## **Rain Gardens**



A rain garden can be beautiful as well as functional.

Rain gardens are versatile features that can be installed in almost any unpaved space. Also known as bioretention, or bioinfiltration, cells, they are shallow, vegetated basins that collect and absorb runoff from rooftops, sidewalks, and streets. This practice mimics natural hydrology by infiltrating, and evaporating and transpiring—or "evapotranspiring"—stormwater runoff.

#### Examples

https://www.epa.gov/green-infrastructure/what-green-infrastructure

- Burnsville, MN, Stormwater Retrofit Study (PDF) (18 pp, 2.7 MB, About PDF) EXIT
- 12,000 Rain Gardens in Puget Sound EXIT

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## **Planter Boxes**



Planter boxes are an attractive tool for filtering stormwater as well as reducing the runoff that goes into a sewer system.

Planter boxes are urban rain gardens with vertical walls and either open or closed bottoms. They collect and absorb runoff from sidewalks, parking lots, and streets and are ideal for space-limited sites in dense urban areas and as a streetscaping element.

#### Examples

- Michigan Avenue Streetscape EXIT
- Philadelphia Water Department EXIT

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## **Bioswales**



Bioswales are essentially rain gardens placed in long narrow spaces such as the space between the sidewalk and the curb.

Bioswales are vegetated, mulched, or xeriscaped channels that provide treatment and retention as they move stormwater from one place to another. Vegetated swales slow, infiltrate, and filter stormwater flows. As linear features, they are particularly well suited to being placed along streets and parking lots.

#### **Examples**

• Wisconsin Department of Natural Resources Technical Standard

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## **Permeable Pavements**

Permeable pavement is a good example of a practice that catches water where it falls.

Permeable pavements infiltrate, treat, and/or store rainwater where it falls. They can be made of pervious concrete, porous asphalt, or permeable interlocking pavers. This practice could be particularly cost effective where land values are high and flooding or icing is a problem.

#### Examples

- Use of Pervious Concrete Eliminates over \$260,000 in Construction Costs in Sultan, WA EXIT
- Designing Impervious: A Minnesota city eschews storm drains for pervious streets EXIT

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Green streets combine more than one feature to capture and treat stormwater.

https://www.epa.gov/green-infrastructure/what-green-infrastructure

## **Green Streets and Alleys**





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Green streets and alleys are created by integrating green infrastructure elements into their design to store, infiltrate, and evapotranspire stormwater. Permeable pavement, bioswales, planter boxes, and trees are among the elements that can be woven into street or alley design.

#### Examples

- EPA Region 3 Green Streets, Green Jobs, Green Towns (G3) Program
- Seattle Public Utilities GSI Projects
- Syracuse Green Street: Concord Place (PDF) (2 pp, 220 K, About PDF) EXIT
- Los Angeles Green Street: Elmer Ave EXIT
- The Chicago Green Alley Handbook (PDF) (24 pp, 3.7 MB, About PDF) EXIT

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## **Green Parking**



Parking lots are a good place to install green infrastructure that can capture stormwater that would usually flow into the sewer system.

Many green infrastructure elements can be seamlessly integrated into parking lot designs. Permeable pavements can be installed in sections of a lot and rain gardens and bioswales can be included in medians and along the parking lot perimeter. Benefits include mitigating the urban heat island and a more walkable built environment.

#### Examples

- Ipswich River Watershed Demonstration Project in Wilmington, MA
- Toronto Design Guidelines for "Greening" Surface Parking Lots (PDF) (40 pp, 9.6 MB, About PDF) EXIT

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## **Green Roofs**



A green roof system atop a building helps manage stormwater and reduce energy costs for cooling.

Green roofs are covered with growing media and vegetation that enable rainfall infiltration and evapotranspiration of stored water. They are particularly cost-effective in dense urban areas where land values are high and on large industrial or office buildings where stormwater management costs are likely to be high.

#### Examples

- King County, WA, Green Roof Case Study Report (PDF) (31 pp, 1 MB, About PDF)
- Green Roof and Wall Projects Database EXIT

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## **Urban Tree Canopy**



City trees, or tree canopy, soak up stormwater, provide cooling shade and help to slow traffic.

Trees reduce and slow stormwater by intercepting precipitation in their leaves and branches. Many cities have set tree canopy goals to restore some of the benefits of trees that were lost when the areas were developed. Homeowners, businesses, and community groups can participate in planting and maintaining trees throughout the urban environment.

#### Examples

- Chicago Trees Initiative EXIT
- Philadelphia Water Department: Stormwater Tree Trench EXIT

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## Land Conservation



Land conservation is another good tool for communities to use for reducing the risks of stormwater runoff and sewer overflows.

The water quality and flooding impacts of urban stormwater also can be addressed by protecting open spaces and sensitive natural areas within and adjacent to a city while providing recreational opportunities for city residents. Natural areas that should be a focus of this effort include riparian areas, wetlands, and steep hillsides.

#### Examples

- Green Seams: Flood Management in Milwaukee EXIT
- Alachua County, FL, Green Infrastructure Investment Program (PDF) (8 pp, 233 K, About PDF) EXIT

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#### **Basics: What is Green Infrastructure?**

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# **EXHIBIT 13**

# AT RISK: THE BAY AREA GREENBELT



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# FOREWORD BARBARA BOXER



When I first moved from Brooklyn to the San Francisco Bay Area more than 50 years ago, I fell in love with its wonder and beauty. Anyone who has seen the majestic Bay with its wetlands and wildlife, the coastal ridge mountains hugged by fog, the towering redwoods, and historic agricultural lands knows these landscapes take your breath away. It is our responsibility to protect them for current and future generations to enjoy.

That's why one of my very first priorities as a Marin County Supervisor was to address local land-use planning, and I worked successfully to prevent West Marin from being over-developed and to protect our coast from offshore drilling. And it's why I worked for years in the House and Senate to protect more than a million acres of California land as wilderness, convert the Presidio into a national park, and expand our national monuments.

The efforts to protect these magnificent places is often driven by the people who are closest to them, and that's why the work Greenbelt Alliance has done for the past 59 years is so important. It's impossible to imagine what the Bay Area would be like without those who started this movement to save our farmland and our hills, and all the members and volunteers who continue to do their part. This report continues that legacy by taking a closer look at every threat to this region's magnificent landscapes and providing the kind of information decision-makers need to shape smart policy.

While I will not be in the Senate, I will never stop fighting for these issues, and I hope you will join me in working to protect our pristine lands for generations to come.

# EXECUTIVE SUMMARY 293,100 ACRES AT RISK OF DEVELOPMENT

To appreciate the values of the San Francisco Bay Area's greenbelt, a good first stop might be a farmers market.

But that's just a taste of what the greenbelt provides.

#### VALUES WE DEPEND ON

In addition to spectacular scenery, the region's natural and agricultural lands provide us with benefits that are less visible: Wetlands protect us from floods and sea-level rise, watersheds provide clean drinking water, and forests store carbon to help stabilize our climate.

#### A LEGACY OF CONSERVATION

The Bay Area's greenbelt is no accident. Generations of Bay Area residents have worked hard to protect it. Today, of the roughly 4.4 million total acres of the region's nine counties, almost 1.2 million acres are permanently protected from development.

Bay Area communities and their leaders have also voted to restrict development on an additional 2.2 million acres of land with policies such as growth boundaries, hillside ordinances, and agricultural zoning.

#### THE RISK ADDS UP

But the threat persists. While the Bay Area's sizzling economy is the envy of many other parts of the country, it also brings challenges. Skyrocketing housing costs have led to development proposals on open space and farmland all over the region. There's no question that the Bay Area needs more homes we can all afford, but the evidence shows that sprawl is not the solution.

Today, across the Bay Area, 293,100 acres of natural and agricultural lands are at risk of sprawl development over the next 30 years. The most acute threat exists on 63,500



acres, which are likely to be developed in the next 10 years.

The total land at risk is about 458 square miles, nearly 10 times the size of San Francisco.

#### HOLDING THE LINE

Despite the increasing pressure in today's economy, there is less total land at risk today than when Greenbelt Alliance released our last *At Risk* analysis in 2012—by 29,700 acres. Some of that land has been acquired for permanent protection; some has been lost to development.

But on much of this land, the risk has dropped thanks to new policy protections. Since our last report in 2012, Bay Area land at a strong or moderate level of policy protection has increased by over 66,000 acres.

This progress is promising, but much more action is needed to protect the remaining greenbelt land at risk. Once it's lost, it's gone forever.

# **REGION-WIDE RESULTS**

The San Francisco Bay Area attracts people from across the world, in part for its spectacular landscapes: golden hills and ridgelines, orchards and green valleys, all cradling the iconic Bay.

These lands that make up the greenbelt frame our cities, draw us out on adventures, and provide a rich abundance of fresh local food in all seasons. The benefits add up: New economic studies estimate that services provided by greenbelt lands—such as catching and filtering drinking water—are worth billions of dollars.

Despite its beauty and its value, the Bay Area's greenbelt is threatened. A comprehensive survey of city and county plans and proposals reveals that large areas of land are at risk of development.

The risks vary. In some areas, specific development proposals may already be adopted or are being considered such as luxury housing on a Napa hilltop. Some lands may be zoned for development—for example, grazing land that is zoned for rural residential development. Other areas are designated for development in city or county plans, or are included in proposed boundary expansions, like farmland outside of Brentwood. Some lands may be vulnerable to development based on qualities of being flat, or being close to roads and to existing development. Some have a long history of development proposals that so far have failed. For this report, these risks are scored relative to one another—an approved project, for example, puts an area at higher risk of development than zoning or historic threats. The land's risk score is then adjusted based on whether that given area is protected by policies to prevent development.

The resulting At Risk Map brings to light—out of the depths of city and county planning documents—what the region's future could hold.

#### HARD NUMBERS

Today, 293,100 acres of the region's farmland and natural areas are threatened with development within the next 30 years. This is an area of 458 square miles, almost 10 times the size of San Francisco, that could be paved over in a generation.

Of that land, 63,500 acres are at high risk, meaning they face development within the next 10 years. These areas are under extreme market pressure; the bright red areas on the At Risk Map reflect dozens of proposals that threaten the Bay Area's ranchland, farms, wildlife habitat, and wetlands.


Across the eight Bay Area counties addressed in this report, Contra Costa County has the most total land at risk; about one out of every five acres of threatened land in the region is in Contra Costa. Contra Costa also has the most land at high risk, land that could be developed in the near term. The next two counties with the most land at high risk are Santa Clara and Solano counties. There, developers have put forward many proposals to build on farmland and in valleys, and cities seek to expand out into the greenbelt.

### POLICIES PROTECT THE GREENBELT

Since Greenbelt Alliance's last *At Risk* report was released in 2012, the amount of total land at risk in the Bay Area land that could be developed in the next 30 years—has dropped, from 322,800 to 293,100 acres. Some of that land has been acquired for permanent protection: Those areas have either been purchased by land trusts or park agencies, or the right to develop them has been sold as part of an agreement called a conservation easement. Other lands have been lost to development.

### HOW BIG IS AN ACRE?

AN ACRE CAN BE HARD TO PICTURE. ONE ACRE IS:

ROUGHLY 200 X 200 FEET.

ABOUT HALF OF A SOCCER PITCH, OR MOST OF A FOOTBALL FIELD. But much of the land no longer at risk is now protected by policies. Greenbelt Alliance's focus for over 50 years has been policy protection: working with residents to pass city and county laws—such as urban growth boundaries, hillside protections, or agricultural zoning—to encourage development in central urban areas, rather than on remote natural lands.

Greenbelt Alliance has been tracking policy protections around the region since 2012. Many different policies can preserve land and the natural values of the greenbelt. We categorize lands by their level of protection-that is, how effectively the policies on that land are likely to prevent its development. A strong level of protection comes from policies such as voter-approved growth boundaries, requiring a vote of the people to overturn. A moderate level of protection is afforded by boundaries that are not voter-approved, or other ordinances addressing hillside or riparian lands, though these ordinances must still have strong language that clearly limits development. A weak level of protection applies to land with only vaguely worded ordinances or zoning, or no protection at all. If several policies apply to a given landscape, they may add up to give that land a stronger level of protection from development.

Different approaches to land protection work in concert. For some landscapes, permanent protection is the goal, but policy protection must come first. Policies can hold the line against development, often for many years, until funds can be found to preserve lands in perpetuity. In other cases, purchasing land is not needed or not possible. Policies can protect far more acres, far more cost-effectively.

### **STRONGER PROTECTIONS SINCE 2012**

The Bay Area has made significant strides since 2012: The total amount of land under strong- or moderate-level policy protections in the Bay Area has increased by over 66,000 acres, and now totals 2,172,900 acres. This total is almost evenly split between strong and moderate levels of protection: 1,067,000 acres enjoy strong protection and 1,106,000 acres have moderate protection. In addition, 1,192,900 acres of the greenbelt are permanently protected. Just over a quarter-million acres-265,100 acresare today left with little or no protection from sprawl development.

Several new policies stand out as examples of how the region has protected more land. Santa Clara County's 2013 Habitat Conservation Plan is helping fund conservation while deterring development on natural areas. In 2014, the East Bay city of Dublin adopted an urban limit line protecting the rolling hills of Doolan Canyon. In 2016, Gilroy adopted an urban growth boundary, protecting South Bay farmland. Also in 2016, Sonoma County designated 36,000 acres of land as new "community separators," and voters renewed protection of the entire system of

community separators, now totaling over 53,000 acres of greenbelt lands between towns.

These policies are good models. Cities and counties around the region can adopt more like them to protect the lands on the Policy Protection map that are colored bright orange: the quarter-million acres of the Bay Area's greenbelt still left vulnerable.

### **BUT THE PRESSURE IS GROWING**

Recent policy protections are especially impressive-and especially necessary—given the rebounding economy and housing market. As the nation has recovered from the recession, the housing market has surged—especially here in the Bay Area, as the booming, high-paying tech economy has attracted thousands of new workers. The rise



Urban

in housing prices has not only made life tougher for many Bay Area families, it has also increased incentives to build on greenbelt land around the region.

The speculative pressure is acute, with 63,500 acres of Bay Area land at high risk of development within the next 10 years. On the At Risk Map, most of this high-risk land is just outside cities. The bright red shapes include dozens of current proposals cropping up to cash in on the latest real estate boom. The rise in housing prices has caused a crisis for Bay Area residents and workers struggling to find a place to live. The region desperately needs more homes people can afford: homes close to jobs, in existing cities and towns. Sprawling onto the greenbelt won't help. Not long ago, the crash of the housing market resulted in foreclosures that hit hardest in areas with the most sprawl. The Bay Area can avoid making that mistake again; protecting land will protect people as well.

### HOW DO WE DEFINE RISK AND PROTECTION?

### HIGH RISK

Greenbelt lands that are likely to be developed in the next 10 years.

### MEDIUM RISK

Greenbelt lands that are likely to be developed in the next 30 years.

### LOW RISK

Greenbelt lands that are not likely to be developed in the next 30 years.

### STRONG PROTECTION

Greenbelt lands that are protected by one or more policy measures that prohibit most development on that land.

### MODERATE PROTECTION

Greenbelt lands that are protected by one or more policy measures where development is intended to be limited but is still possible with a special permit.

### WEAK PROTECTION

Greenbelt lands that do not fall under any protective policy measures or that are protected by only vaguely worded ordinances or zoning.

### GLOSSARY

### **TYPES OF POLICY PROTECTION**

The level of protection of policies below generally goes from stronger to weaker. However, any given policy may vary in its efficacy; for example, one hillside policy may forbid development and another may just limit it.

### **Permanent Protection**

The purchase of land or development rights to permanently prevent development, as on most public lands, land trust properties, and conservation easements.

### **Growth Boundary**

A line drawn between urban and rural lands defining where growth can and cannot occur. Depending on the details of the policy, changes to the boundary can be approved by either elected officials or voters. These include urban service areas, urban growth boundaries, urban limit lines, and city limits.

### Williamson Act Properties

A contract with local governments restricting land use to agricultural or related uses. Land owners receive reduced property-tax assessments from local governments, who receive the difference in property-tax revenues from the state.

### **Agricultural Policies**

A measure that prohibits conversion of agricultural lands to other uses or requires a buffer to maintain a distance between urban development and farmland or grazing land.

### Watershed Policies

A policy that minimizes or restricts new construction on lands that drain to sources of irrigation and drinking water.

### **Riparian Policies**

A policy that limits or forbids new construction within a certain distance of rivers and streams to avoid the adverse impacts of urban development, such as pollution runoff, erosion, and habitat degradation.

### Hillside Policies

A policy that reduces or prohibits development on a city's or county's hills based on the slope or distance from a ridgeline. Intended to preserve the scenic value of an area and/or reduce the threat of landslides.

### **Coastal Zone Policy**

Measures taken under the California Coastal Act to protect important coastal resources for public enjoyment, safeguarding natural land-scapes, and reducing impact on existing urban development.

### **Baylands Policy**

Measures taken under the Bay Plan by the San Francisco Bay Conservation and Development Commission to protect the open water, wetlands, marshes, and mudflats of the greater San Francisco Bay, and areas 100 feet inland from the high-tide line.

### **General Conservation Policies**

A local jurisdiction's designation of land for agricultural use or wildlife habitat that still leaves the land susceptible to future development.

### County Zoning for Agriculture or Open Space

Land designated by the county for farmland, grazing land, watershed lands, or natural resource management.

### Habitat Conservation Policies

A plan prepared for an area under the Federal Endangered Species Act to protect endangered species' habitat while still allowing some development to occur.

### **Critical Habitat Policy**

The designation of land, under the Federal Endangered Species Act, as essential for the conservation of a threatened or endangered species, potentially requiring special management and protection.

### Flood Hazard Zone

A designation by the Federal Emergency Management Agency based on the severity or type of flooding in an area.

### **TYPES OF DEVELOPMENT PRESSURES**

The severity of threat of the development pressure factors below generally goes from higher threat to lower threat.

### Market Activity

Projects or plans proposed on or approved for a given parcel of land.

### Speculative Value

Land subject to speculation based on past proposed projects and future upcoming development opportunities (such as expiring protections or urban reserves), and Regional Housing Needs Assessment housing sites.

### **Rural Subdivision**

Plans allowing large lot properties to subdivide into smaller parcels.

### **County Zoning for Development**

The designation by the county of land for development at varying levels of density. "Urban" density is greater than 1.5 to 2.5 acres per unit, "rural ranchette" is up to 20 acres per unit, and "rural estate" is more than 20 acres per unit.

### Long-term Planning Boundaries

City boundaries that establish where urban growth will occur in the future, including Spheres of Influence and Planning Areas.

#### Locational Attributes

Geographical characteristics that encourage urban-scale development, including proximity to recent and existing development, major roads, or low-slope lands.

#### **Regional Projections**

Forecasts by regional and state agencies of areas for long-term growth including Plan Bay Area and California's urban growth scenario.

In Alameda County, 29,500 acres or 46 square miles of rangeland, farmland, and natural areas are at risk of development in the next 30 years. This total has not changed significantly since our last report in 2012, but the threat is less imminent: Today, land at high risk—facing development in the next 10 years—now totals 6,300 acres, a drop of a third since 2012.

This drop in threat came in part from Dublin's 2014 adoption of an urban limit line, a campaign in which Greenbelt Alliance played a significant role. The urban limit line halted proposals to develop Doolan Canyon, a remote and beautiful area to the city's northeast. Part of the land is now permanently protected, and the area's policy protection is strong: Changes require a vote of the people.

With the economic recovery, large areas of land to the city's north and east have become hot spots for speculative development proposals. As of August 2016, there were 7,459 housing units slated to be built as part of the city's various specific plans. These proposed projects are within the urban limit line, but several are on undeveloped land on the city's edges—which is intended to be a reserve over decades, not immediately be filled with subdivisions.

The hills southeast of Pleasanton are also being battered by development proposals. For example, in 2016 voters allowed Lund Ranch to break through the hillside protection ordinance and build roads and luxury houses up to the ridgeline.

Alameda County's countywide growth boundary, adopted in 2000 with Measure D, remains a regional model for land protection, covering nearly 90 percent of the county's grazing land. However, important watershed and habitat lands are still at risk if cities and towns don't choose to build well and use land wisely.



#### ALAMEDA COUNTY

## IN ALAMEDA COUNTY 46 SQUARE MILES ARE AT RISK

The city of Newark is "clinging tooth and nail," says Carin High, to a development proposal that sounds like something out of the 1960's: a 500-unit luxury development with a golf course—on rare undeveloped wetlands along the Bay. Despite regular draining, the so-called "Area 4" is habitat for endangered salt marsh harvest mice, water and song birds, and even burrowing owls.

Carin has been trying to protect these wetlands for over 20 years, along with Florence La Riviere, a soft-spoken but iron-willed wetlands advocate and mentor. In 2014, their group, the Citizens Committee to Complete the Refuge, won a lawsuit against the city over its environmental review of the proposed development.

Though the lawsuit dealt a blow to the plan, the ill-conceived project lives on. Its multimillion-dollar homes would sit on lands vulnerable to liquefaction in earthquakes, cut off by railroad tracks from the rest of the city, surrounded by pungent-smelling landfills and salt ponds. They would sit on land that already has to be drained every year, and that sea level rise will put deeper underwater. "It's just crazy," says Carin, "but we're going to have to keep fighting to save these lands."

Today, new advocates are joining the fight, including Ricardo Corte, a recent Berkeley graduate who hopes one day to become a lawyer. "It's folly to destroy these lands," says Ricardo. "With climate change and sea level rise, now we need our wetlands to save us."

## CONTRA COSTA COUNTY HAS 20,000 ACRES AT HIGH RISK: THE MOST IN THE BAY AREA

Out of all Bay Area counties, Contra Costa County has the most land at risk, with 62,000 total acres at risk, including the most land at high risk: 20,000 acres. That means that in just the next 10 years, development the size of Concord, the county's largest city, could pave over the county's golden hills, farmland, and habitat for wildlife. Since 2012, the county's amount of land at risk has increased by almost a third.

The overheated housing market has again driven up pressure to build anywhere and everywhere.

Despite opportunities to build more central, walkable communities, Pittsburg, Antioch, Oakley, and Brentwood all continue to sprawl outward. Pittsburg and Antioch both passed developer-backed growth boundaries in 2005 that allow building on hillsides, ranches, and critical habitat. Antioch is considering several projects to its south, including 1,667 housing units on 550 acres of grasslands. Brentwood is rapidly consuming



### CONTRA COSTA COUNTY

farms and ranches in every direction. Despite two successive "no" votes from local residents, Brentwood is still seeking to annex a large area southwest of the city.

In a longer-term risk that is a kind of "death by a thousand cuts," Contra Costa County's urban limit line is vulnerable to expansions of less than 30 acres next to the line. Developers are already using this vulnerability to propose carving up Tassajara Valley. While these 30-acre expansions might seem small, the land affected totals 9,300 acres. Over time, these expansions could unravel the limit line around the county and threaten the local farm economy.

Threats have grown since our last report in 2012, but Greenbelt Alliance and partners have also won major conservation victories. The long western face of the ridgeline between Concord and Pittsburg should soon be permanently protected as part of the Concord Naval Weapons Station reuse plan. If this goes through, it will be transformed into the new Concord Hills Regional Park.

The county's Habitat Conservation Plan, in effect since 2008, helped make it possible to purchase thousands of acres of important lands. Today, however, Contra Costa County still has 41 percent of the Bay Area's at-risk Critical Habitat lands. The future of many of the region's remaining burrowing owls, kit foxes, and other rare species depends on the county's growth decisions.

"Every Saturday morning I'd be at Willy's Bagels—that's how it all started. We made flyers. We walked neighborhoods. Spoke at City Council meetings. We did everything we possibly could." In 2010, local mom Kathy Griffin helped turn the tide on sprawl in Brentwood—one of the fastest-growing cities in California.

She'd had some practice: In 2005 and 2006, Kathy fought for voter approval of a tight urban limit line, halting the city's relentless sprawl. Then, in 2010, developers tried to break through the boundary to allow enormous expansion on the city's western edge. Kathy and her cadre of concerned Brentwoodians sprang into action. Developers spent \$300,000 trying to pass their measure, but to no avail: Kathy's small group convinced voters to hold the line.

Now, Brentwood is again trying to burst through the limits its voters have set. Though the city's leaders have expressed concern about the city's imbalanced growth all housing, few jobs—they are planning more low-density residential development outside the urban limit line. More than 2,000 acres of rich agricultural land and valleys are at risk.

These plans, says Kathy, are "still terrible, bad ideas. Where is the promised economic and job-sustaining growth we need—inside our city boundaries?"

"For the time being, we've won the common-sense battle. But it's always a fight." Kathy laughs. "I retire next year. I'll have a lot of time on my hands." She's ready. Marin County has long been a national model of land conservation with 58 percent of the county's natural and agricultural lands permanently protected—more than any other Bay Area county. The county also has less land at risk of development than most other counties—11,600 total acres. Of that, 2,400 acres are at high risk, where development is likely in the next 10 years.

The largest area at risk of development is the Silveira-St.Vincent's property, where a boys' school sits next to ranchland on a rolling grassy expanse of 1,200 acres along San Pablo Bay. For decades, this has been a contested landscape. The land separates Novato and San Rafael, and Marin's Countywide Plan allows for 221 homes on the site. While earlier proposals planned to cluster homes and prioritize open space, new discussions include spreading homes out over the site, consuming more natural lands. Though Marin very much needs affordable homes, they would be more appropriate in alreadydeveloped areas where residents can be close to services, schools, and jobs.

Marin County's greatest environmental challenge is building homes for workers who cannot afford to live there. The lack of affordable homes close to jobs puts sprawl pressure on outlying areas, and as of 2014, 68,000 people or 62 percent of the workforce, drove in every day.<sup>1</sup> These long car commutes

"It gives me great joy to see families walking here. It's so easy to get here by ferry. The vista draws people, and once they get here, they're out in real nature." Jerry Riessen looks out at the vista stretching from Mount Tamalpais to the Golden Gate Bridge, and beyond the San Francisco skyline. The views from Tiburon's hilltops are spectacular, and thanks to Jerry and the Tiburon Open Space Committee, they're free to visit and enjoy. The group spent years organizing the public purchase of two of three pieces of hilltop land—and now they hope to preserve the last.

On the 110 acres of remaining unprotected land along the ridge, irises flutter between outcroppings of serpentine rock. A rare population of threatened Marin dwarf flax opens delicate white flowers. The proposed Easton Point development by the Martha Company would put 43 large houses on this fragile hillside, much of which is prone to mudslides, and crown it all with a massive water tank.

Jerry has been watching legal battles over this land for 40 years. Today, his group sees a chance to preserve this last key piece in a system of lands stretching from Angel Island across to the historic coast and up to these ridgelines, and someday to join these lands to the Golden Gate National Recreation Area. Their goals are laid out at tiburonopenspace.org. create more than 284,000 tons of carbon dioxide pollution per year.<sup>2</sup> More affordable homes are needed close to jobs and transportation, such as Golden Gate Transit and the new SMART train.

Since the last *At Risk* report in 2012, Marin increased its protected land and, thanks in large part to the Marin Agricultural Land Trust, 47 percent of the county's farmland is now safeguarded. The leadership Marin County has shown in protecting land is needed now to help its communities grow in a way that is truly sustainable. MARIN COUNTY, A LEADER IN CONSERVATION, STILL HAS OVER 10,000 ACRES AT RISK

	Acres
High Risk	2,400
Medium Risk	9,200
Low Risk	87,600
Permanent Protection	191,300
🔲 Urban	42,300

Napa County has led the region on protecting agricultural land, especially for its famous grapes; however, the success of the wine industry itself may now be putting land at risk. Today, 10,100 acres of land in Napa County are at risk of development, with only 750 at high risk. Napa County has the region's least at-risk land, in part because it requires a two-thirds popular vote to take land out of agricultural use. But since 2012, the county's total land at risk has increased by 55 percent.

In recent years, one longstanding threat in particular has grown acute: the construction of large-scale event centers and resorts on farmland, especially vineyards. The agricultural connection may allow these to sidestep the review required for large-scale development—even as they pave land with new buildings and roads, and put new demands on scarce groundwater. The county is debating the issue with no resolution in sight.

Napa County's fastest-growing city, American Canyon, has a very loosely drawn urban growth boundary, encouraging development outward rather than containing it. A giant "new town center" called Watson Ranch proposes 1,250 housing units, a luxury hotel, a school, and commercial development, paving over farmland north of the city.<sup>3,4</sup>



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The county's most alarming threat is to a park south of the city of Napa, where land now considered permanently protected could be sold for development. Skyline Wilderness Park's 850 acres of land is leased to the county by the state, and the state has resisted selling the land to the county. In fact, the state has attempted to remove the land's designation as a park, to allow its sale at a higher price for development—possibly even for gravel mining.<sup>5, 6</sup> The precedent this would set is deeply disturbing.

In Napa, both land and water can be protected together. A full 90 percent of Napa's land at risk is in groundwater basins, vital for collecting the rainwater that fills underground aquifers.

## 90% OF NAPA COUNTY'S AT RISK LAND IS IN GROUNDWATER BASINS

"I felt like the Lone Ranger out there. We were the ones keeping the city from coming over the hill." Jo Ann Truchard and her family have been growing wine grapes for 40 years, in a long love affair with Napa, and with farming. For almost as long, they've been leading the fight against development on the hill, just north of their vineyard, that separates the city of Napa from the surrounding countryside.

Neighbors have joined Jo Ann and her family against the latest threat. The developers of the "Napa Oaks II" project—which would cut down 570 oak trees—seek to change the zoning to allow 53 homes on the hillside. The current "resource area" zoning is supposed to protect the land's views, natural springs, and wildlife, and also protect people: The 6.1 earthquake that shook Napa in 2014 ran along a fault just below the hill, making it a dangerous place to build.

"You need to be vigilant about your community," says Jo Ann's daughter-in-law Suzanne Truchard, who has also joined the fight. A land use attorney, Suzanne scrutinized all the proposal documents. "What was really disconcerting was their tone," she says, "Like it's all a done deal."

But it's not, thanks to the Truchards and their neighbors. As one neighbor said, "They're speculators. They want to cash in. They made a bet—and they're going to lose."

Photo: Dani Padgett

SAN MATEO COUNTY'S LAND AT RISK HAS INCREASED BY ALMOST A THIRD SINCE 2012 San Mateo County is the smallest county in the Bay Area. Despite its small size, the county has a considerable amount of land at risk: 22,700 acres total, about 8 percent of its land area. Of this, 4,700 acres are at high risk, likely to be developed within the next 10 years. Since our last report, the county's amount of land at risk has increased by almost a third.

Some of the most important land at risk in San Mateo County is farmland along the county's western coast. Half Moon Bay, the county's largest coastal city, is updating its Local Coastal Program; this plan is required by the state to guide development and protect unique coastal resources. But the city's draft plan would significantly weaken protections for sensitive habitat, agricultural lands, and scenic landscapes.



Further inland, many hillside lands are newly at risk because the county has planned for housing in remote areas on the eastern slope of the Santa Cruz Mountains. These areas are often steep and forested, with little infrastructure, and largely inappropriate for development. Many do not believe the county intends to develop in these areas—but this calls into question whether the county has done its required housing planning in good faith. Either way, these plans raise serious concerns.

On the Bay, northeast of Redwood City, a major waterfront development is being considered for 1,500 acres of salt ponds owned by Cargill. With up to 12,000 homes, this would be the largest Bay development in 50 years.<sup>7</sup> In 2003, 16,500 acres

of these salt ponds were sold for wetland restoration. The fate of the rest remains an open question.

Despite these threats, an impressive amount of San Mateo County's land has been protected, almost 40 percent of its farms, ranches, and natural areas.

The county's forests store carbon, keeping tons of greenhouse gases out of the atmosphere. Development would destroy these benefits, and though San Mateo is the region's smallest county, it has the second most above-ground stored carbon at risk: 257,700 metric tons. Protecting land in San Mateo County can benefit the climate—and everyone who depends on it.

"I've been a surfer since I was a little kid," says Edmundo Larenas. "Surfers are always looking for public access; but for many of us, environmental protection comes first." As the chair of the local chapter of the Surfrider Foundation as well as a biochemist, Edmundo is a strong advocate for clean water. But clean water and the undeveloped land it depends on—San Mateo County's whole scenic coast—are threatened by a new plan in Half Moon Bay.

> "Cities always want to do more development, and the city of Half Moon Bay has a long history of doing crazy stuff." The city's decisions can affect the county's entire coastline—especially now that the city is updating its Local Coastal Program, a state-required plan to guide coastal development. The new draft of the plan would dramatically weaken wildlife and farming protections.

"We're not anti-development, we just want it in the right places," says Edmundo. But this plan would allow long slices of suburban development to cut through green cropland, from the shoreline to the hills. Coastal wetlands could also be at risk.

The wild beauty of San Mateo County's coast, says Edmundo, "is not an accident. People purposely defended it from development over the years." Unfortunately, the defense cannot rest. Santa Clara County, the Bay Area's second-largest county, was once famous for fruit orchards; today, over half of its last remaining farmland is at risk. The county has a total of 54,100 acres of land at risk of development, with 13,000 acres of land at high risk. However, its land at risk has dropped since 2012, thanks in part a sweeping Habitat Conservation Plan.

South of San Jose, about half of the 7,000-acre Coyote Valley is at risk of development. The land in the valley's north is rare and valuable for its agriculture, wildlife corridors, groundwater recharge, and recreation—but this land is at high risk. San Jose has zoned northern Coyote Valley for industrial development, and it faces multiple proposals, including a 517,000-square-foot warehouse distribution center for e-commerce deliveries—a growing development threat throughout the state.

At the southern tip of the county, farmland around Gilroy is being pelted with development threats. A reprieve came when voters passed an urban growth boundary in November 2016, protecting over 2,000 acres east of the city. But multiple proposals still threaten agricultural land to the city's east, and if a remote site is chosen for the new high-speed rail station, that could spur sprawl. To the city's north, over 700 acres of farmland were at risk until 2016, when the Local Agency Formation Commission, or LAFCo, actually sued the city, bringing the plan to a halt—at least for now.

For years, Morgan Hill has sought to develop the last farmland between it and San Martin, a 1,300-acre region called the "Southeast Quadrant." The city proposed to annex and develop more than half of the valley's farmland; but in 2016 the county's LAFCo refused the annexation. An attempt by San Martin met a similar fate. The county is lucky to have a vigilant LAFCo agency.

Since our 2012 report, Santa Clara County achieved a major conservation milestone by adopting a 50-year Habitat Conservation Plan championed by Greenbelt Alliance. This plan levies a fee on development to mitigate impacts on wildlife and natural resources. With higher fees on key habitat lands, the plan also discourages development of the most important natural areas.

Farmland in Santa Clara County desperately needs conservation. With an astounding 56 percent of the county's farmland at risk of development, this fertile and irreplaceable resource is very close to being lost forever.



## HALF OF SANTA CLARA COUNTY'S 7,000 ACRE COYOTE VALLEY IS AT RISK

"It's been called Coyote for thousands of years." The long green valley east of the Santa Cruz Mountains was once part of a vast and thriving Native American region, and at its heart was a village site called Matalan—or Coyote. An important cultural site, Coyote Valley is a critical corridor for wildlife—not just coyotes, but bobcats, foxes, and, in the future, potentially even tule elk. But the city of San Jose has long threatened to sprawl southward into the valley with industrial development.

Advocates like Valentin Lopez have a different vision. Lopez is chair of the Amah Mutsun tribal band, which, together with the Muwekma Ohlone tribe, shares Coyote Valley as ancestral lands. Elsewhere, the Amah Mutsun have made innovative agreements with federal and state agencies to act as indigenous land stewards. They seek to help steward Coyote Valley by restoring it for wildlife, growing and gathering native plants, and teaching people the values and the stories of this unique place.

"Coyote Valley is a place to restore habitat and restore the knowledge of our ancestors. Very few places remain that allow us to do that: to have that intimate relationship with Mother Earth, and fulfill our responsibility to take care of all living things."

## NEARLY 10% OF SOLANO COUNTY'S LAND IS AT RISK

The valleys and oak-dotted hillsides of Solano County have long been threatened by growth sprawling out from I-80. Today, feverish speculation has turned up the heat. A total of 44,600 acres of Solano's land is at risk of development over the next 30 years, and in just the next 10 years, 12,300 acres could be developed. The amount of land at risk has increased by almost half since 2012. Now, nearly one out of ten acres of the county's land is at risk. Only Contra Costa County has a higher percentage of all land at risk.

Vacaville is a hotspot, surrounded by farmland and ranchlands at high risk from an onslaught of new development proposals. Despite central areas available for development, the city is planning to develop out on rural land to its south and east. Large areas of land to the city's northeast and southeast are

"When people come visit, they always say, 'It's so quiet here!" says Esther Pryor, owner of four goats, nine cats, and a small bike shop on Suisun Valley Road.

Here at the gateway to the fertile Suisun Valley, the quiet is made possible in part by Esther and her neighbor Carol Herzig's efforts to keep this place rural. On a small plot of land below Rockville Hills Regional Park, horses and cattle graze, and Swainson's hawks catch prey in golden grass. But the "Woodcreek 66" developer is trying to change the area's zoning to allow 66 homes, and the City of Fairfield is supporting the proposal, hoping to annex the land.

Esther's group and others are suing—not for the first time—to stop this. It's a dangerous precedent, a direct attack on the county's voter-approved Orderly Growth Initiative. "These developers are trying to wrangle water and sewer into land outside the city, so the city can swallow us up," says Esther. If allowed, this would pave the way for a much larger proposal for 400 homes in nearby Green Valley, and Fairfield's continued sprawl out into rural land. at risk as well. The county has proposed to meet its regional housing requirements with development scattered across grazing land. Though some say this is unlikely, the county has mapped projected development here, so either the county's housing plans are not in good faith or this land is at risk—both alternatives raise concerns.

Fairfield, like Vacaville, is threatening to annex rural areas in Suisun Valley and Green Valley. Fairfield is also building a new train station on its northeastern edge, likely to induce development on surrounding open space and farmland.

Fairfield and Vacaville's annexations, both past and proposed, highlight a key vulnerability. Though the county's Orderly Growth Initiative currently protects agricultural land, if a city annexes the land, that protection disappears. Vigilance is needed on the part of residents and elected leaders, as well as Solano's Local Area Formation Commission, which is responsible for arbitrating boundaries and stopping sprawl.

Solano County is home to more wetlands and vernal pools than any other Bay Area county. In a conservation victory, after decades of debate, in 2014 federal agencies signed a plan to protect almost half of the 116,000-acre Suisun Marsh. But Solano is still the only county in the Bay Area without a public open space district, and has the least permanently protected land. With 27 percent of all the region's at-risk wetlands, Solano County must act to protect a rare resource.

Acres High Risk 12,300 Medium Risk 32,300 Low Risk 348,600 Permanent 72,100 Protection 60,700 Sonoma County, the Bay Area's largest county, has made the region's largest recent strides in land protection. Today, the county has 58,400 acres of total land at risk of development over the next 30 years—more than any county but Contra Costa—but this number has been cut in half in just five years, thanks to new greenbelt protections. Land at high risk—threatened in the next 10 years—has dropped by 70 percent since 2012 to 4,100 acres.

Several areas remaining at high risk are around Rohnert Park; the city has adopted multiple plans for greenfield lands, building out toward its growth boundary. Rohnert Park would be better served by focusing new development in downtown and near the train station, rather than quickly using up its remaining open lands.

Like its neighbor Napa, Sonoma County is also grappling with large event centers on rural lands, putting additional pressure on land and groundwater. These projects remain controversial and continue to be negotiated.

Another insidious threat to Sonoma's greenbelt is parcelization, or the division of undeveloped land into small lots. This division is largely invisible until development occurs, fragmenting landscapes. Parcelization can occur far from cities and towns, slicing up valuable habitat or farmland and rendering it vulnerable to development.

Though threats persist, Sonoma has made impressive strides on conservation. The historic 2013 purchase of the 20,000-acre redwood forests of Preservation Ranch will preserve wildlife habitat and store carbon for climate protection.

And, in 2016, Sonoma County voters dramatically expanded protections for rural lands between cities and towns. Greenbelt Alliance led the effort to more than triple the area of open space and farmland designated as community separators to 53,600 acres. Voters then renewed these protections for another 20 years, blocking any housing tracts, shopping malls, or resort hotels without a vote of the people.

A growing challenge for Sonoma County is that more than half of its water—both for drinking and irrigation—comes from groundwater.<sup>8</sup> The lands that collect this water are at risk—in fact, 28 percent of all the region's at-risk groundwater basins are in Sonoma County. Protecting this land is essential, for water and for the people who depend on it.



## 58,400 ACRES OF SONOMA COUNTY'S LAND IS AT RISK

"It's a resource for wildlife, and for people who really need it. Developing the land will destroy a resource that can't be replaced." Studies show that being in nature is good for our mental health; for Kathleen Miller, it has been a lifesaver. Kathleen's son Danny (pictured left) has lived for many years at the Sonoma Developmental Center, which cares for people with developmental disabilities and mental illness. The center sits amid an idyllic 900-acre expanse of redwood forests, grasslands, and oak woodlands along Sonoma Creek. Most of this land is left alone, which has allowed wildlife—from bobcats to threatened steelhead trout—to thrive. But the state is planning to close the 120-year-old facility, and the land is at risk.

To preserve this rare resource, the families of patients have joined with the Sonoma Land Trust, the Sonoma Ecology Center and the community of Sonoma Valley in a coalition called Transform SDC. Together, they're seeking to keep safety-net services for the most disabled, while protecting the land for wildlife habitat and recreation. It's an unusual alliance to save a unique place.

"Nothing like this place could be created now," says Kathleen. "All we can do is save it."

## THE VALUES OF NATURAL LANDS



The Bay Area's economy, and its prosperity, could not exist without its natural landscapes. Some of the benefits these lands provide are obvious, like the scenic views and outdoor opportunities that draw people here from across the world to visit, work, and live. But nature does far more for us than we often acknowledge: It provides clean air, clean reliable water, safety from storms and floods, healthy food, and more.

### **ECONOMIC VALUES**

Though most people would probably say they value nature, as a society we have often failed to assign it any economic value. When we make important decisions, the services and benefits our landscapes provide are often left out of the equation. As we confront global climate change, drought, and more, we are learning that this has been a costly omission.

New studies are changing this, assessing and assigning economic value to these natural goods and services.

In Santa Clara County, a recent comprehensive study added up the economic value provided by the county's natural landscapes.<sup>9</sup> It found that the benefits people obtain from ecosystems—filtering water, growing food, providing recreation opportunities, and more—are worth up to \$3.9 billion per year. The county's natural capital—the infrastructure that provides these benefits—is worth up to \$386 billion.

An example from New York shows how this information can be used: New York City's water utility began investing millions of dollars in conservation after seeing that the Catskill/Delaware River watershed filters water naturally for a far lower cost than a new water treatment facility, which would cost \$6-10 billion to build and \$300 million per year to maintain.

Another study found that just the benefit provided by rangeland for pollinators—habitat for wild bees—is likely to be worth \$2.4 billion statewide.<sup>10</sup> Almost all crops other than grains rely on pollinators, and most now depend on just one species of bee. Honeybee populations have been declining steeply, driving up prices and uncertainty for farmers who must rent them. Farmers who have access to wild bees benefit from a source of pollinators that is less costly and more resilient.

These estimates are conservative. As the Santa Clara report points out, though it is based on many studies, more are needed; for example, no peer-reviewed estimate was available for lands that recharge groundwater—obviously a critical service in drought-stricken California. The true value of these lands is likely to be higher than these initial studies report.

Protecting natural and working lands is one of the smartest investments we can make. The Santa Clara study found that the return on investment (ROI) of the 352-acre Coyote Valley Open Space Preserve, based on its costs and the ecosystem benefits it provides, was \$3 for every \$1 invested. These come from grazing leases, recreation value, and the services provided by the various types of ecosystems there.

### NATURAL VALUES

Greenbelt Alliance gathered data on the natural values of all Bay Area lands, including those that are protected and those still at risk. The Bay Area has a total of 2.3 million acres of agricultural land, 1.8 million acres of lands that provide water resources—watersheds and wetlands—and 2.5 million acres of lands that are important for wildlife—habitat, corridors, and areas rich in biodiversity. Planned trails around the region total an impressive 1,600 miles, including those that will someday connect all 9 counties, such as the Bay Trail and the Ridge Trail. And together, the region's lands store an enormous 111 million tons of carbon, helping to regulate and protect our climate. These values often overlap, as one landscape provides many benefits. For example, a forested watershed helps provide clean water, wildlife habitat, and carbon storage, and if it is open to the public, it provides recreation as well, with trails and scenic views.

### NATURAL BENEFITS ADD UP

Our local and regional economies and the health of our communities rely on the benefits natural landscapes provide:

- Clean, plentiful drinking water
- Protection from floods and storms
- Food production and food security
- Basic materials for building and for medicine
- Carbon storage for climate regulation and resiliency
- Recreation and tourism opportunities
- Health benefits from clean air and recreational opportunities

These values help show what is at risk from development. For example:

- Clean drinking water is at risk:
  - Undeveloped Bay Area lands catch and filter rain, replenishing groundwater supplies. But this service is threatened by development; if lands are paved over, they cannot collect water. This is a critical issue in California's long drought, especially in counties like Sonoma, where groundwater is what people drink. If the region's at-risk landscapes are lost to sprawl development, 46 billion gallons of water-a year's worth of water for 677,000 households—is at stake.11
- The climate is at risk:

Bay Area ecosystems, especially forests and wetlands, are very efficient at storing carbon, whose release is a primary driver of climate change. Together, the region's at-risk landscapes store more than 6 million metric tons of carbon. If these lands are developed, the carbon that would be released is equivalent to putting 1.3 million cars on the road every year.<sup>12</sup>

As we begin to understand the benefits of our natural areas and working lands to our economy, our health, and our communities, we better grasp how their loss would affect us. We start to see we cannot afford to lose them. and when they are at risk, so are we.

Agriculture: 58.1%

This graphic represents the 3.6 million acres of the Bay Area's greenbelt. The sections represent wildlife, watershed, and agricultural lands, and where they overlap.



Wildlife Water

Agriculture

# THE HOUSING CRISIS

### SPRAWL DEVELOPMENT VS. REAL SOLUTIONS



The Bay Area is in an affordable housing crisis. More and more people are burdened by housing costs that are more than 30 percent—the national standard—or even half of their income. Home prices in some parts of the region have doubled since 2004—the national average increase is 13 percent—and some have even doubled since 2010.<sup>13, 14</sup> While this might allow some people to "cash out" though they must leave the Bay Area to do it—it is hard on everyone else, especially those with low incomes.

The impacts also go beyond those directly affected.

If affordable homes are not available close to jobs, people "drive 'til they qualify" to find a less expensive home farther away, and commute long distances—mostly in cars. The resulting costs affect all the region's residents: worse traffic, polluted air, more carbon changing our climate, and a lower quality of life.

### SPRAWL IS NOT THE ANSWER

Some people suggest that the solution to the housing crisis is to build more homes on farmland and natural areas. But sprawl won't actually help reduce household costs.

Most of the region's farmlands and natural areas that are threatened by sprawl are in communities at the edges of the region, such as southern Santa Clara County, eastern Contra Costa County, and Solano County. Sprawling developments are car-dependent; their residents must not only make long commutes to work, but drive more to meet every need in daily life.<sup>15</sup>

So while housing prices may be lower in sprawl developments in outlying areas, other expenses go up, especially for transportation.<sup>16</sup> These costs are often hidden and include not just the price of gas, but the purchase of a second car and the insurance and maintenance it requires, and the cost of additional child care to cover the extra hours spent commuting. The costs are not all financial: More time spent in traffic takes away opportunities to be with family and friends. Ultimately, living in sprawling development is rarely cheaper; the costs simply hit in different ways.

In addition, greenfield development—building on farmland and natural areas—is expensive for taxpayers, who foot the bill for providing services to far-flung neighborhoods. These communities pay more for infrastructure and services including water, roads, sewers, libraries, parks and recreation, governance, and more. Annual per-household costs for roads can cost 4,000 percent more in sprawling areas than in dense communities.<sup>17</sup> Services cost more and serve fewer, too: A fire station in a lowdensity neighborhood serves just one-quarter of households at four times the cost of one in a more compact neighborhood.<sup>18</sup>

### REAL SOLUTIONS: THE RIGHT DEVELOPMENT IN THE RIGHT PLACES

Increasing the region's housing supply is one key tool to reduce home prices, but supply is not just about land. Zoning for large lots or only single-family homes has reduced the housing supply for many years. Communities can use land more efficiently and rebuild on existing urbanized land, such as aging strip malls and unused parking lots. They can also encourage the creation of a variety of types of homes: townhomes, apartments, and in-law units, as well as single-family homes. People need more options. Demand is high and growing among single people—now more than half the nation's population and more than a quarter of households—as well as couples without children, empty nesters, and families seeking smaller, more affordable homes.<sup>19</sup>

The solution to the housing crisis is not to build on farmland and natural areas around the edges of the region. A better choice is to add new homes as "infill" in existing cities and towns. Plan Bay Area, the region's shared blueprint for land use and transportation through 2040, shows that the Bay Area can accommodate all its projected growth within existing urban growth boundaries.<sup>20</sup>

But doing so will not be easy. Infill development faces many challenges. To truly address the housing crisis, every community must do its part:

• Pass policies that make it easier to build more homes in existing cities and towns.

Greenbelt Alliance's *Fixing the Foundation* report outlines local policy solutions to promote infill housing.<sup>21</sup> For example, reducing parking requirements can make building infill more cost-effective. Allowing more height and more homes in a given building, in exchange for community benefits, can create more new homes while also bringing amenities for existing residents. And encouraging, rather than prohibiting, the creation and rental of in-law apartments can provide more homes and also benefit the local homeowners who create them.

• Ensure that new homes are affordable to households at all income levels, and fund the creation of affordable homes.

Inclusionary housing policies can help, by requiring every new development to include a certain percentage of affordable homes. Impact fees, too, can ensure that new commercial or residential development contributes to providing affordable homes. These fees recognize that the lower-income workers who will be needed to support that development (for example, the gardeners needed to maintain the grounds of a new office building) will need an affordable place to live. Greenbelt Alliance has helped win inclusionary housing and impact fee policies in cities across the region.

• Say "Yes" to good development in the right places. Plans, policies, and funding streams are a good start. But at the end of the day, new homes only get built when communities approve specific, individual development projects. Endorsement programs run by Greenbelt Alliance and others speak up for good projects.

## A CALL TO ACTION



The Bay Area is a leader in protecting its iconic landscapes: rolling hills, fields and forests, and windswept coastlines. But too much land—almost 300,000 acres—is still at risk, and the stakes are high.

The fate of the greenbelt depends on decisions that are being made every day in cities and counties around the region. A vote in Sonoma County could decide the future of groundwater supplies for thousands of people. Decisions in Solano or Alameda County to build on wetlands could release tons of carbon to change our climate. Votes in Contra Costa and Santa Clara County could impact the availability of fresh, local food.

### THESE DECISIONS MATTER.

Bay Area communities can act now to:

- Adopt policies—like Sonoma's community separators, Santa Clara's Habitat Conservation Plan, and Dublin's urban limit line—that protect the most valuable natural and agricultural lands.
- Take the natural values of land into account when making development decisions. The data from this report is available on Greenbelt Alliance's website at greenbelt.org/at-risk-2017.
- Support the right development in the right places. Creating more new homes within our existing cities and towns relieves pressure to sprawl onto natural areas, farms, and grazing land.

We are lucky to have the greenbelt and all the bounty it provides, from clean drinking water, to spectacular scenery, to juicy peaches. We are lucky to have the power to preserve it—because when we consider the greenbelt's future, we decide our own.

### METHODOLOGY

To create this report, Greenbelt Alliance does a detailed mapping analysis using Geographic Information Systems (GIS) software. The report covers eight Bay Area counties (San Francisco is not included, as all its land is generally either developed or permanently protected). This analysis addresses three topics: development pressure, policy protection, and natural values.

### DEVELOPMENT PRESSURE AND POLICY PROTECTION: HOW WE FIND WHAT'S AT RISK

To assess development pressure and policy protection, we review all city and county general plans and zoning, as well as other local ordinances. We also review city and county websites and local news for development proposals, talk with local advocates, and use our staff's local knowledge to get as comprehensive a picture as possible of all proposals and plans, both past and present. (Multiple past proposals for an area can be an indication of future risk.)

Growth projections from the state and the region's Plan Bay Area also feed into our analysis. And this year, for the first time, new maps became available showing where each city and county is planning to accommodate needed new homes through 2022.

We gather information on boundaries—city limits, growth boundaries, service areas, spheres of influence, and longer-term planning areas—largely from city and county general plans and from Local Area Formation Commission (LAFCo) agencies, which oversee these boundaries. We also factor in natural boundaries and the geography of the landscape, such as proximity to roads or existing development, as well as slope—flat land is generally at greater risk.

For policy protections, we look at city and county plans to find hillside, riparian, and agricultural policies, as well as habitat conservation plans and more. We use a statewide protected lands database from GreenInfo Network, and include coastal and bayland data from regional and state agencies to map shoreline protections.

Finally, we assign scores to both development pressures and policy protections. These scores are relative. For example, land with an actual project being considered for approval would get a high development-pressure score, whereas farmland zoned "rural residential," where nothing is yet proposed, would get a lower development-pressure score. Similarly, agricultural land under voter protections would get a greater protection score than land subject to a city council-adopted hillside ordinance, since voteradopted protections are harder to change. We combine the development pressure and policy protection scores to determine the overall likelihood that the land will be developed.

The timing then establishes whether land is at high or medium risk, with development likely within 10 years, or 30 years respectively. For example, if a site has a current development proposal, that land would be at high risk. If land is at risk of development for more general reasons, such as being within a growth boundary and near roads, it is at medium risk.

### NATURAL VALUES: HOW WE FIND WHAT'S AT STAKE

To assess the natural values of the land, both for agriculture and for ecosystems, we gather many types of information, largely from public agencies. We compile farm and rangeland maps, as well as data on watersheds, groundwater basins, and wetlands, from state agencies. We include maps of critical habitat and flood zones from federal agencies. The Bay Area Open Space Council provides maps of biodiversity conservation lands, and we compile trails data from several sources.

A fascinating new addition to this year's report is the natural value of carbon storage for protection from climate change. Biomass and carbon data come from recent research by federal agencies and universities. A more detailed methodology can be found at greenbelt.org/ at-risk-2017.

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ACROSS THE BAY AREA, 293,100 ACRES OF FARMS, RANCHES, AND NATURAL LAND ARE AT RISK OF DEVELOPMENT IN THE NEXT 30 YEARS.

312 Sutter Street, Suite 510 San Francisco, CA 94108 (Ph) 415.543.6771 greenbelt.org

# **EXHIBIT 14**

Daily Democrat (http://www.dailydemocrat.com)

### State Water Board Issues Moratorium on New Water Connections

### By

By Adrian Baumann

abaumann@willitsnews.com">abaumann@willitsnews.com

Wednesday, November 5, 2014



The State Water Resources Control Board Division of Drinking Water has placed a moratorium on all new water connections and upgrades for both the Willits, Brooktrails and Pine Mountain water systems.

The order was received October 17, and both governments have been working to have the building ban modified or at least partially rescinded, but it is now clear that there will be at least some temporary impacts.

Willits, for its part, was given 30 days and will know by November 17 if they have succeeded in getting a variance by meeting the requirements of the water board. At least three homes under construction in the Willits

Haehl Creek Subdivision will be affected by the moratorium, and it is possible that some of the campus buildings at the new hospital will also be affected.

Willits, Brooktrails and Pine Mountain were the only Mendocino County water agencies among the 22 districts state wide slapped with a moratorium. According to the Division of Drinking Water these "community public water systems (were ordered) to find a reliable, alternative source of water to replace that curtailed earlier this summer due to the drought. Within the affected water systems, the orders prohibit new water service connections to residences and businesses in the service area, require metering for all customers, and establish a schedule to develop a reliable alternate source of supply. This prohibition is in effect until a new source of water is identified and established for regular water service to existing customers."

As Willits City Manager Adrienne Moore explained at the last Willits City Council meeting, "There are a lot of implications for this order, what it's seeming to state is that we have an immediate moratorium on new connections, upgrades, expansions, and will-serves, which are connections that there's been a deposit or payment for, and a promise to put those in, but the building permit has not been issued yet."

The Willits legal counsel, Jim Lance, continues to look into exactly what restrictions will end up applying. Lance in turn has been in contact with the city's water attorney in Sacramento, Alan Lilly, who is working with the city to press the state water board for clarifications and exemptions if possible.

Moore elaborated at the council meeting the city was essentially trying to get the order revoked, adding, "I would imagine every recipient of that order is trying to find a way to at least get it modified if not revoked, because it has widespread ramifications. Certainly in the city of Willits there are number projects underway it impacts." The Mendo Mill expansion will not be affected, as their water connection will not change, but other building plans which require new or upgraded water connections will be impacted.

State Water Board Issues Moratorium on New Water Connections

Since, at this point, it appears that the order will not be revoked, instead the city is seeking a modification, which might include partially lifting some of the restrictions, but how everything shakes out remains to be seen. The process of making a decision on the moratorium is an internal review process within the water board.

This process is similar to what Brooktrails went through following the 2003 building moratorium imposed by the state due to the lack of a sufficient water supply.

Willits has known following its 2006 water study that it did not have enough water storage to supply current customers during a multi-year drought. The city held many meetings, some quite emotionally charged, but the council has not been able to reach a consensus on moving forward with developing either new water sources or a conservation strategy since 2007.

Only empty reservoirs and no rain through January 2014 helped the city move forward on an emergency water supply in the teeth of a major drought. When citizens cut water use, let landscaping die and the reservoirs drained more slowly than normal, the priority to complete the emergency water supply project slipped. It remains incomplete nearly a year after it began. This is, in part because, the city failed to garner significant funding for the project through grants from state and federal agencies.

But as Willits Building Official John Sherman explained in an interview, "We're basically hoping that we've got some significant rain on the way and if we fill up our reservoir I don't see how they wouldn't change their position."

As of Monday, Moore said of the city's efforts to modify the moratorium, "We're working on it, but there's nothing new to report."

If the moratorium does continue without exemptions it could effectively mean no new construction in the Willits area until the drought ends, or longer.

Alternatively it might mean that any new construction project would require an exemption of some sort, meaning that local construction decisions would have to be decided at the state level.

The moratorium is the next step in the curtailment orders that were issued to several Northern California municipalities in June. In California any water rights established after 1914 are referred to as "junior rights." "Senior right" holders, those property owners or entities that claimed their water before 1914, are entitled to their full share of water before any can go to junior rights holders, though there are exemptions for public safety.

Even though Willits does not pull any water directly from the Eel River, the two reservoirs, Morris and Centennial, collect water from sections of the watershed that would otherwise run into the Eel River, meaning less water gets into the Eel River as a result. Most of the time this is not a problem, but with the severe drought it has become an issue. Councilman Bruce Burton said at the meeting he thought that the amount of water that Willits collects that would otherwise wind up in the Eel is actually miniscule, calling it, "One tenth, of one fifth, of one quarter, of one percent of the watershed."

Though the authority behind the moratorium stems from the Water Resources Control Board in Sacramento, the order has actually been sent to Willits and Brooktrails from the division of drinking water, within the water board. Confusingly, the Drinking Water Program was until recently part of the California Department of Public Health, and has been subsequently reorganized into the water board system.

The moratorium could also potentially impact both the proposed inter-tie between Willits and Brooktrails, and as a result Willits has tabled a decision on this issue until further clarification arrives from the state. The inter-tie, a connection that would allow Brooktrails to pump water up from the Willits system, was requested by the District at the behest of the state water board. The proposed inter-tie would be about 10,000 ft. of eight inch line, running parallel to the sewage line that currently goes down the fire trail, on its way to the Brooktrails treatment plant.

As for the upgraded water connection to the REACH site at the Willits Airport, Brooktrails says that is has found an effective work around and that they will be able to provide the upgrade.

URL: http://www.dailydemocrat.com/general-news/20141105/state-water-board-issues-moratorium-on-new-water-connections

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# **EXHIBIT 15**



### CITY OF EAST PALO ALTO

OFFICE OF THE CITY MANAGER 2415 University Avenue East Palo Alto, CA 94303

### **City Council Agenda Report**

Date:	July 19, 2016	
To:	Honorable Mayor and Members of the City Council	
Via:	Carlos Martínez, City Manager	
From:	Sean Charpentier, Assistant City Manager	
Subject:	Approving an Ordinance Prohibiting New or Expanded Water Connections to the City of East Palo Alto Water System	

### **Recommendation**

Adopt an Uncodified Ordinance temporarily prohibiting new or expanded water service connection within the Service Territory of the City of East Palo Alto's Water System.

### Alignment with City Council Strategic Plan

This recommendation is primarily aligned with:

- Priority #1: Enhance Public Safety and Emergency Preparedness
- Priority #2: Enhance Economic Vitality
- Priority #4: Improve Public Facilities and Infrastructure
- Priority #6: Create a Healthy and Safe Community

### Background

All the water in the City of East Palo Alto's water system is supplied by the San Francisco Public Utilities Commission (SFPUC) water system. The City has an Interim Supply Guarantee (ISG) of 1.963 million gallons a day (mgd) or approximately 2,199 acre feet a year (AFY.) There are two small water mutual companies that provide water for about 1,000 residential connections in East Palo Alto.

The City has been using in average approximately 95%, or practically all of its ISG for the last 14 years, and in some years (2006, 2007, 2012) exceeded its ISG. Table 1 below displays the percentage of the Normal Year ISG that has been purchased by East Palo Alto between 2001 and 2015.



The City's Urban Water Management Plans (UWMP) of 2005, 2010, the updated 2013 UWMP; the 2012 Water Supply Assessment for the Ravenswood Specific Plan; and the 2016 Water Supply Assessment for the General Plan Update have documented the need for additional water supply to meet the City's current and future needs.

### East Palo Alto Water Allocation and Usage

Water planning looks at normal year water supply conditions and dry year (or drought conditions). The City of East Palo Alto has an Individual Water Supply Guarantee of 2,199 acre feet per year (AFY) from the SFPUC under normal year conditions. This amount is equivalent to 1.96 million gallons per day. During dry years, as determined by the SFPUC, the City's guarantee will decrease in accordance with adopted plans and the specific hydrologic conditions. The SFPUC has not instituted dry year reductions nor declared a drought. However, the State of California has imposed drought reductions on all water users in California. All BAWSCA members have been meeting their state mandated drought reductions. In June 2015, the State imposed mandatory drought water restrictions on all water suppliers. East Palo Alto's target was to achieve an 8% reduction between June 2015 and February 2016. East Palo Alto achieved a 19% water reduction during that period. See: http://projects.scpr.org/applications/monthly-water-use/city-of-east-palo-alto/

The last three years have experienced significant volatility in water usage that staff attribute to drought reductions and SFPUC water price increases. In addition, these numbers do not include the water usage for the four major entitled, but not constructed, projects with 166 new residential units and 265,000 square feet of commercial development (Edenbridge Homes, Sobrato Office project, DKB Industrial project, and 4 Corners mixed-use project). There is a fifth entitled project, the MidPen/EPACando senior affordable housing project. However, it utilized a water demand offset for its water supply and accordingly is not anticipated to result in a net increase in water usage. As a result, the City's updated Urban Water Management Plan shows that the City used in 2015; 1,574,600 mgd, or 80.22% of its water allocation. See Table 2 below.
Table 2.

	MGD	% of ISG	Available
ISG from SFPUC	1,963,000		
ISG Actual Use (2015 UWMP)	1,574,680	80.22%	19.78%

The reduction in water use is mainly driven by a couple of factors, mandatory drought reductions and SFPUC water commodity price increases, that have gone up from 2.45 Centum (100 hundred) cubic feet (Ccf,) to 4.1 Ccf from 2013 to 2016, a 40% increase. Thus, the approximately 80% actual water use reflected in the City's 2015 Urban Water Management Plan, which suggests that the City is not using about 20% of its ISG, practically mirrors the 19% water reduction achieved due to both SFPUC water price increases and mandatory drought reduction measures.



Source: SFPUC

Another complicating factor is that Equity Residential, the former owner of 1,800 rent stabilized units, created a 36% vacancy rate between 2012 and 2015 that reduced demand for city water.

However, for long range water planning purposes, the City needs to take into account the demand of entitled projects that are under construction, or not yet built, and for potential SFPUC dry year mandatory cutbacks. Taking into account the entitled projects in Table 3 below, the available water is approximately 13%. In case that the SFPUC does declare Mandatory dry year water reductions, the SFPUC can reduce the City's water supply by 6% (2015 UWMP Table 6-1), leaving only 7%, or 0.12 mgd available in the Water system.

Entitled Projects Estin	nated Dema	and			
Projects	gpcd/unit	sq.ft./People	Demand		
Sobrato	0.16	200,000	32,000		
Edenbridge	120	220	26,400		
Four Corners	75	460	34,500		
DKB Industrial	235	160	37,600		
Unaccounted Demand			130,500	6.65%	
Net use with Entitled Projects			1,705,180	86.87%	13.13%

This very small amount leaves no room for error, especially given the fact that the City of East Palo Alto uses the least amount of water among the BAWSCA members on a per capita basis. The BAWSCA members' average gross per capita per day usage is 124.3 gallons.



Source: BAWSCA Annual Report, Table 7B.

At 56.9 gallons (FY 2013-14) per day per capita, East Palo Alto has the lowest daily per capita usage. Hillsborough has one of the highest uses at 301.9 gallons per capita per day. See Attachment 2, Figure 7b for more detailed information. At such a low per capita consumption level, there is practically no room for residents of East Palo Alto to increase the aggregate water supply available with additional conservation measures. For many municipalities, another alternative to expanding supply is increasing the use of recycled water. This would have very limited use to East Palo Alto because the City doesn't have large parks, industrial users, or a golf course where recycled water could make a difference.

As a result, the City Council has directed staff to pursue a couple of strategies that would increase our existing water supply: 1) initiating the design and environmental work to develop a new groundwater well (Pad D), and a water treatment system for an existing well (Gloria Way Well); and, 2) exploring potential water allocation transfers from other municipal entities such as the SFPUC or other BAWSCA agencies that may be interested in transferring their excess water supply to meet future water demands.

# East Palo Alto Existing and Future Water Demand

The City of East Palo Alto adopted and certified its Ravenswood 4 Corners Transit Oriented Development Specific Plan and Program EIR in September 2012. The EIR Mitigation for the lack of water supply included the following Specific Plan Policy.

Policy UTIL-2.2: Before individual development projects are approved in the Plan Area, require the developer to demonstrate verifiable, enforceable proof that either they have secured new water supplies to serve the new development or that the proposed development will create no net increase in total water demand in East Palo Alto. Ensure that environmental review is carried out for augmentations to the supply from additional groundwater pumping in the Specific Plan area and within a quarter mile radius.

The City is updating its General Plan, which includes the Ravenswood Specific Plan.

	Net New	Net Retail	Net Office	Net Industrial
	Units	Sq. Ft.	Sq. Ft	Sq. Ft.
Ravenswood/4 Corners Area	835	112,400	1,235,853	267,987
Westside	900	45,000		
2nd Units on single-family parcels	119			
All other Areas Citywide	665	176,006	704,000	
Total	2,519	333,406	1,939,853	267,987

## Table 2: General Plan Growth Projections

The City conducted a Water Supply Assessment for the General Plan Update. The Water Supply Assessment indicated a need, during a Normal Water Year, for approximately 1,662 additional AFY, or approximately up to 1.5 mgd by 2040. The 2015 UWMP identifies a projected total demand of 3,417 Acre Feet a Year (AFY), or 3.05 mgd by the year 2040. This is 1,218 AFY, or 1.08 mgd over our 2,199 AFY, or 1.963 mgd allocation from the SFPUC.

The General Plan Draft EIR includes Mitigation Measure UTIL-1.

**Mitigation Measure UTL-1:** The General Plan Update shall be amended to include the following policy under Infrastructure, Services, and Facilities Goal ISF-2:Require new or intensified development to demonstrate that adequate water is available before project approval. Before new or intensified development projects are approved, the development proponent must provide the City with enforceable, verifiable proof that adequate water supply exists to supply the new or intensified development. The enforceable proof can take three forms:1) Depending on the location of the development, a will-serve letter, or similar instrument from the City of East Palo Alto, the Palo Alto Park Mutual Water Company, or the O'Connor Tract Co-Operative Water Company.2) A verifiable recordable water demand offset project or program that ensures that there is no net increase in new water demand.3)

Verifiable and enforceable proof that the developer has secured new water supplies necessary to serve the project.

The City is pursuing groundwater supplies and anticipates that between 700 and 1,200 AFY of groundwater will be available by 2020. The UWMP conservatively assumed that an additional 700 AFY, or a total of 2,899 AFY will be available over the forecast (2040) timeframe.

## <u>Analysis</u>

Under these conditions, the City cannot entitle additional projects, and there is a de facto moratorium in place for any new construction in the City that creates a demand for additional water supply. The City currently requires all applicants to sign a disclosure form that indicates that there is insufficient water supply. See Attachment 4.

Staff believe that there is sufficient supply, given current use patterns, to meet the needs of the exempt projects, including vested projects that are anticipated to be build during the moratorium period.

# PROPOSED WATER MORATORIUM

Therefore, staff is recommending that the City clearly articulates the implicit Water Moratorium conditions that are in place by officially adopting an Ordinance to temporarily prohibit new or expanded water service connections within the service territory of the City of East Palo Alto's water system.

The Water Moratorium period would allow staff sufficient time to study the water shortage issue, to develop new water supply and water demand offset policies for the City Council to consider for adoption.

A water demand offset policy defines how the City will treat projects that reduce water use elsewhere. The Mid Peninsula/EPACando Affordable Senior Housing project used a water demand offset. Key policy questions include the ratio of offset, how to calculate existing water use, and exemptions. Upon adoption of a Water Demand Offset Policy, staff will request that the City Council update the exemptions in the Moratorium ordinance to include projects that use the adopted water demand offset policy.

Staff will also prepare a water allocation strategy which will identify key priorities for water allocation. It is important that if there is limited water supply available, it is allocated based on the priorities of the community and City Council rather than which project applied first. Depending on the City's ability to secure new water supply, the Water Allocation strategy might have a triggering threshold.

This is critical if there is limited water, however, if the future new water supply equals 1mgd or more, there might be sufficient water supply so that a water allocation strategy would not be necessary.

These policies, once adopted, will provide clear guidance regarding how land use applications for existing buildings or new uses in existing buildings will be treated, will define the specifics of a water offset policy, will clarify the conditions necessary to lift the Moratorium, will define how to treat the limited capacity that exist in the water system, and how to use and allocate the additional amount of water secured by the City when the wells are in production in a post Moratorium environment.

### PROPOSED ORDINANCE

This ordinance is necessary for the immediate preservation of the public peace, health or safety, for the reasons stated in this section and based on the facts stated in Resolution No. 4723, the City Manager's report to the City Council dated April 19, 2016 in support of Resolution No. 4723, the City Manager's report to the City Council dated July 19, 2016 in support of this ordinance, the City Manager's report to the City Council dated June 21, 2016 relating to the City's Urban Water Management Plan update, the documents referenced those reports, and further, on the testimony of the meeting at which Resolution No.4723 and the public hearings at the meeting at which this ordinance and the Urban Water Management Plan were considered.

The proposed ordinance only affects new or expanded meters. If a rehabilitation project does not require a new or expanded meter, it should not be impacted. There are multiple exemptions, including projects with vested rights, meters required for fire safety systems, temporary closures, and others. This proposed action applies only to the area within the City water service area and does not apply to areas served by the two water mutual companies.

If this Ordinance is adopted by the City Council it will go into effect immediately and will last for two years.

During that time, staff will not process new development applications that do not fall into the exemptions unless prior to the expiration of the Ordinance in two years, the City Council determines that the City has obtained sufficient water supplies either through the activation of new groundwater wells or by securing a water transfer, meeting the intent of Resolution 4723, here included as Attachment 3. The City Council may extend the term of this ordinance for additional two year periods upon adoption of a resolution finding that water supply shortage conditions continue to exist.

# **Existing major entitled projects**

There are 5 major entitled projects with a vested right to development including approximately 207 new residential units, and 265,000 square feet of commercial development.

- 1. Senior Housing: EPACando and Mid Peninsula Housing Development, 41 affordable senior units along University Avenue. This project is under construction. It utilized a water demand offset program for its water supply.
- 2. DKB/Edenbridge Montage Homes: 51 townhomes at Bay Rd and Pulgas. Almost completely constructed and occupied.
- 3. Sobrato Office Project, corner of University Ave. and Donohoe: 200,000 sqft of office development, under construction.
- 4. Pulgas Industrial Condos, Bay Rd. and Pulgas: Approximately 50,000 sqft of industrial/flex space. New owner Mural Arts has submitted an application for an arts community center.
- 5. 4 Corners: 115 Condos over 15,000 square feet of retail at intersection of University Ave. and Bay Road. Developer seeking investors.

#	SITE ADDRESS	Project Type	Unite/Saft	Application Type
100		rioject type	4 lot	
1	809 Donohoe Street	Residential	subdivision	Application
			6 lot	· · · · · · · · · · · · · · · · · · ·
2	717 Donohoe Street	Residential	subdivision	Application
	<ul> <li>Proprietary system investments of the installation particular system.</li> <li>Provident system investments of the installation particular system.</li> </ul>		4 lot	
3	961 Beech Street	Residential	subdivision	Application
4	2123 Clarke Avenue	Residential	Lot Split	Application
			3 lot	
5	800 Weeks Street	Residential	subdivision	Application
			16	
6	2331 University Avenue	Residential	townhomes	Application
	undens Ster Mittalitiere Rasian understelle Provinsi wits sons de - ers			Administrative Use
7	1255 Weeks	Industrial/Flex	120,000	Permit for interim use
			25,000 sq.ft.	n an
8	1950 Bay Road	Art Center	building	Application
			500	
9	1200 Weeks Street	School	Students	Application
10	2020 Bay Road	Office	1,400,000	Pre Application
				Reimbursement
11	2115 University	Office	200,000	Agreement

There are approximately 11 projects in the pipeline. All have been impacted by the water shortage.

(1) Application does not mean that the application is complete.

Projects #1-#6 are generally smaller residential projects that could proceed to the Planning Commission quickly if there were water supply. Staff are recommending that no further processing of these applications shall occur until there is additional water supply. Upon securing additional water supply, staff will continue processing these applications.

Project #7 is an application for an interim use of outdoor storage for an existing former agricultural/greenhouse building and paved area at 2555 Pulgas. The application was recently submitted, and the applicant also indicated in the application that they would want to submit an application for a 120,000 sqft industrial/flex building in the future. To continue with the interim application, the applicant would have to provide verification of meeting one of the exceptions in the ordinance. Continuing to process the application means that the applicant will have to meet all planning, building, and Fire Department requirements for the proposed interim use.

Project #8 is a new application for a site that has entitlements for approximately 50,000 sqft of industrial/flex space. The application is for an arts/performing center. Staff will return to the City Council with a determination of whether the use is sufficiently consistent with the original entitlements and should be a vested right.

Projects #9, #10, and #11 included in the reimbursement agreement for funding a groundwater engineer and other services associated with securing new water supplies. If the Water Reimbursement is adopted, staff will continue processing these applications. If the Water Reimbursement is not adopted, staff will not continue processing these applications.

The goal of the reimbursement agreement is to accelerate a solution for the City's water shortfall by leveraging contributions from developers.

These three projects covered by the reimbursement agreement will not be approved until there is water either from the completion of the groundwater wells or from a water transfer. Participating with the Reimbursement does not constitute a project approval.

## **Notification**

The public was provided notice of this agenda item by posting the City Council agenda on the City's official bulletin board outside City Hall and making the agenda and report available at the City's website and at the San Mateo County Library located at 2415 University Avenue. Letters were mailed and emailed to all applications noticed on July 13, 2016. A notice was published on Friday, July 8, 2016, in the San Mateo Times. See attachment 5 for a copy of the notice.

## **Environmental**

Approval of this Resolution and Ordinance is exempt from the requirements of the California Environmental Quality Act ("CEQA") because: it is not a project as it has no potential to result in direct or reasonably foreseeable indirect physical change to the environment (14 Cal. Code Regs. §15378(a); there is no possibility that the ordinance or its implementation would have a significant effect on the environment (14 Cal. Code Regs. §15061(b)(3); or because it is an action taken by a regulatory agency for the maintenance or protection of the environment (14 Cal. Code Regs. §15308).

### Attachments

- 1. Uncodified Ordinance
- 2. East Palo Alto Gross Per Capita Water Consumption
- 3. Resolution 4723
- 4. East Palo Alto Water Disclosure
- 5. Published Notice

## ORDINANCE NO.

## AN UNCODIFIED ORDINANCE OF THE CITY OF EAST PALO ALTO TEMPORARILY PROHIBITING NEW OR EXPANDED WATER SERVICE CONNECTIONS WITHIN THE SERVICE TERRITORY OF THE CITY'S WATER SYSTEM

The City Council of the City of East Palo Alto does ordain as follows:

### Section 1. Purpose

(a) The City Council has determined the current ordinary demands and requirements of water consumers within the service territory of the City's Water System meet or exceed the amount of the water supply available to the City. Demands created by new, additional, or expanded water service connections cannot be satisfied without adversely affecting the health, safety, and welfare of current water uses. Therefore, it is necessary to set aside and allocate all of the City's currently available water supply to meet the demands of current water users and to establish a temporary prohibition of new or expanded water service connections within the Service Area of the City's Water System.

(b) The City is experiencing a City-wide water supply shortage and has been working diligently to implement identified solutions, including the design and installation of new wells and water treatment systems, often referred to as the Gloria Way Well and the Pad D Well, to take advantage of potential groundwater resources. However, the completion date and water supply yield of these projects are currently uncertain.

(c) On April 19, 2016, the City Council adopted Resolution No.4723 titled, *A Resolution of the City Council of the City of East Palo Alto advocating for an additional water supply of up to 1.5mgd and authorizing the city manager to work with the City's partners at the BAWSCA and the SFPUC to secure up to an additional 1.5mgd in water supply*. Resolution No. 4723 is intended to assure sufficient water to implement the City's General Plan, Urban Water Management Plan, and other official plans and policies of the City through a program to obtain additional water supplies. Likewise, this ordinance is intended to implement these same policies by assuring precluding new demands on the City's Water System until additional water supplies are obtained.

(d) This ordinance is necessary for the immediate preservation of the public peace, health or safety, for the reasons stated in this section and based on the facts stated in Resolution No. 4723, the City Manager's report to the City Council dated April 19, 2016 in support of Resolution No. 4723, the City Manager's report to the City Council dated July 19, 2016 in support of this ordinance, the City Manager's report to the City Council dated July 19, 2016 in support of this ordinance, the City Manager's report to the City Council dated July 19, 2016 relating to the City's Urban Water Management Plan update, the documents referenced those reports, and further, on the testimony of the meeting at which Resolution

No.4723 and the public hearings at the meeting at which this ordinance and the Urban Water Management Plan were considered.

Section 2. Prohibition of new, additional, or expanded water service connections

(a) It is unlawful to install or make, or cause to be installed or made a new or expanded water service connection to the City's Water System, except as provided in subdivision (b).

(b) The following connections are exempt from the prohibition established by subdivision (a):

- 1. Sub-meters receiving water through an existing connection provided there is no increase in the size of the existing connection;
- 2. New connections through a water meter used to measure water provided solely to a fire suppression system and equipment approved by the Fire Marshal;
- 3. Expansion of an existing connection when the expansion is required by the Fire Marshal in order to provide additional capacity expressly for the purpose of supplying water for a fire suppression system and equipment.;
- 4. Reinstallation or unlocking of a water meter for parcel connected to the Water System before the effective date of this ordinance where the reinstallation or unlocking is required to restore service following a temporary disconnection or disruption of service;
- 5. Installation of a meter on an existing unmetered connection or the replacement of existing meter provided there is no increase in the capacity of the connection;
- 6. A connection for a development project for which a vested right to build existed on the effective date of this ordinance and all land use and building permits are valid as of the date of connection;
- 7. A connection for a development project for which the applicant has obtained and dedicated to the City a new long-term water supply that the City Council has determined is in an amount and duration sufficient to meet the needs of the development project.
- 8. Installation of a new or increase in size of an existing meter to provide service to an previously unpermitted secondary residential unit on property zoned for single-family residential use provided that the unit is brought into compliance with all applicable Planning and Building regulations.

(c) "Water System" and "Service Area" have the same meanings as in the *Agreement for Lease of Real Property (Water System)* entered into as of May 22, 2001 between the City of East Palo Alto and American Water Services, Inc., as amended or extended (the "Water System Lease"). "Expanded" or "expansion" means an increase in the size or water supplying capacity of a water service connection existing on the date of this ordinance.

(d) No application for approval of a development project or a permit to build that is submitted after July 1, 2016, or has not been deemed complete or otherwise authorized for processing before July 1, 2016, will be deemed complete unless at the time of the application there is substantial evidence that water service is authorized in compliance with Section 2 of this ordinance. The applicant shall provide the evidence in a form acceptable to the City Manager at the time of submission of the application. Any application that is submitted without acceptable evidence of compliance is incomplete and may be returned without further processing. This section does not apply to a development project for which the city council has approved and the city has executed an agreement for reimbursement of water supply development costs with the project applicant or applicants.

### Section 3. Enforcement

Violations of this ordinance are punishable pursuant to the provisions of Chapters 1.12 and 1.14 of the East Palo Alto Municipal Code. In addition, this ordinance constitutes a Legal Requirement as defined in the Water System Lease. As an additional, cumulative, and non-exclusive remedy, the City Manager is authorized to disconnect or cause to be disconnected any connection made or maintained in violation of this ordinance.

#### Section 4. Administration

The City Manager is authorized to administer and enforce this ordinance and may adopt and enforce supplemental administrative policies and procedures consistent with the restrictions imposed by this ordinance.

### Section 5. Effective Date

(a) This ordinance is adopted as an urgency measure and is effective immediately upon adoption.

(b) This ordinance will remain in effect for a period of two years from the effective date unless prior to the expiration of two years the City Council determines that the City has obtained water supplies sufficient to meet the intent of Resolution No. 4723. The City Council may extend the term of this ordinance for additional two year periods upon adoption of a resolution finding that water supply shortage conditions continue to exist.

## Section 6. California Environmental Quality Act Exemption

The adoption of this ordinance is exempt from the requirements of the California Environmental Quality Act ("CEQA") because: it is not a project as it has no potential to result in direct or reasonably foreseeable indirect physical change to the environment (14 Cal. Code Regs. §15378(a); there is no possibility that the ordinance or its implementation would have a significant effect on the environment (14 Cal. Code Regs. §15061(b)(3); or because it is an action taken by a regulatory agency for the maintenance or protection of the environment (14 Cal. Code Regs. §15308). The Director of Community Development is directed to cause a notice of exemption to be filed as authorize by CEQA and the CEQA Guidelines.

### Section 7. Publication

The City Clerk is directed to cause publication of this ordinance as required by law.

**INTRODUCED** and **ADOPTED** at a regular City Council meeting held on July <u>19</u>, 2016, by the following four-fifths vote:

AYES: NOES: ABSENT: ABSTAIN:

#### SIGNED:

Donna Rutherford, Mayor

ATTEST:

**APPROVED AS TO FORM:** 

Terrie Gillen, Deputy City Clerk

Marc G. Hynes, Interim City Attorney





Source: BAWSCA Annual Survey, Figure 7b

### **RESOLUTION NO. 4723**

## A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF EAST PALO ALTO ADVOCATING FOR AN ADDITIONAL WATER SUPPLY OF UP TO 1.5MGD AND AUTHORIZING THE CITY MANAGER TO WORK WITH THE CITY'S PARTNERS AT THE BAWSCA AND THE SFPUC TO SECURE UP TO AN ADDITIONAL 1.5MGD IN WATER SUPPLY.

WHEREAS, the City of East Palo Alto is the youngest, smallest, most densely populated City in San Mateo County; and

WHEREAS, the City of East Palo Alto, when controlled for size, provides more affordable housing than any city in Silicon Valley; and

WHEREAS, approximately 40% of the total housing stock in the City of East Palo Alto is affordable housing (income restricted rental, rent stabilization units, or below market rate ownership units); and

WHEREAS, 6.2% of East Palo Alto's housing is income restricted affordable developed with Low Income Housing Tax Credits, compared to 1.1% for San Mateo County as a whole; and

WHEREAS, with 0.2 jobs per employed resident, the City of East Palo Alto has one of the lowest jobs per employed resident ratio in Silicon Valley; and

WHEREAS, the amount of housing and the affordability of housing in the City of East Palo Alto support commercial land uses that generate jobs and revenue in other Cities throughout Silicon Valley; and

WHEREAS, the per capita property tax, sales tax, and transient occupancy tax in the City of East Palo Alto is approximately 50% to 60% that of other Cities in Silicon Valley; and

WHEREAS, the City of East Palo Alto relies solely on the San Francisco Public Utilities Commission, (SFPUC) for water supply and does not have access to other major sources of water supplies or water suppliers; and

WHEREAS, the adopted Ravenswood Business District Specific Plan and the draft General Plan update represent a vision of a more balanced land use pattern with an improved jobs per employed resident ratio and improved financial stability; and WHEREAS, the City of East Palo Alto is a permanent member of the Bay Area Water Supply and Conservation Agency (BAWSCA) and has signed the 2009 Water Supply Agreement between the SFPUC and its wholesale customers (the BAWSCA members); and

WHEREAS, the City of East Palo Alto has a normal year Individual Supply guarantee of 1.963 mgd; and

WHEREAS, the City of East Palo Alto has one of the lowest gross per capita usage in BAWSCA and one of the lowest in the State of California; and

WHEREAS, the SFPUC Wholesale Customers used approximately 80% of their collective Individual Supply Guarantee of 184 mgd of water supply permanently allocated to them in 2014; and

WHEREAS, the 2009 Water Supply Agreement contains provisions for the transfer of Individual Water Supply Guarantees among SFPUC wholesale customers, however it has not been utilized to date; and

WHEREAS, the City of East Palo Alto has exceeded its normal year Individual Supply Guarantee four (4) years between 2001 and 2014 and on average used 95% of the normal year Individual Supply Guarantee; and

WHEREAS, a water shortfall has been identified in the 2005, 2010, and the updated 2013 Urban Water Management Plans; the Water Supply Assessment for the Ravenswood Business District 4 Corners Transit Oriented Development Specific Plan; and the General Plan Update Water Supply Assessment; and

WHEREAS, the certified EIR for the RBD 4 Corners Transit Oriented Development Specific Plan included the mitigating Specific Plan policy UTIL-2.2, which specified that prior to project approval, there must be proof of sufficient water supply or no net increase in water demand; and

WHEREAS, the Water Supply Assessment for the General Plan Update identified the need for up to an additional 1,666 AFY or 1.5 mgd to support the balanced growth envisioned in the adopted Ravenswood/4 Corners Specific Plan and Draft General Plan update; and

WHEREAS, the lack of water supply has immediate negative impacts on the City's ability to develop affordable housing and achieve its economic development goals; and

WHEREAS, the lack of water supply has required the city to delay an affordable housing project with up to 120 units on the City owned land at 965 Weeks Street; and

WHEREAS, developers have started the pre application process for a private school that could provide up to 500 students with comprehensive wrap around social and health services; a 200,000 square foot office project; and 1.4 million square feet of office development that would remediate one of the most contaminated parcels in the City; and

WHEREAS, the lack of water means that these projects cannot be brought to the Planning Commission or City Council for a vote until a source of water has been identified; and

WHEREAS, City of East Palo Alto has invested significant resources in diversifying its supply, including the Gloria Way Feasibility Study; designing, entitling, and securing State approval for the rehabilitation of Gloria Way Well; drilling a test well at Pad D and initiating the design and environmental review; adopting a Groundwater Management Plan in 2015; adopting a \$6.75 water capital surcharge for water supply and emergency storage investments and a \$6.24 rate charge for replacing inefficient meters; securing and allocating to groundwater well projects more than \$3 million in outside funding, including State and Tribal Assistance Grant, Community Development Block Grant, and Integrated Resources Water Management Plan funds; and

WHEREAS, the City of East Palo Alto would seek to add up to 1.5 mgd to its Individual Supply Guarantee; and

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF EAST PALO ALTO THAT the City Council advocates for an increased water allocation of up to 1.5 mgd from the SFPUC and authorizes the City Manager to work with the City's partners at BAWSCA and the SFPUC to secure up to an additional 1.5 mgd.

**BE IT FURTHER RESOLVED** that the City Council requests that the SFPUC include "How will the SFPUC ensure that East Palo Alto has an additional 1.5mgd of water supply for future growth?" as a fourth question in the SFPUC's 2035 Water Management Action Plan.

**BE IT FURTHER RESOLVED** that the City Council requests that the SFPUC and BAWSCA create mechanisms that would empower and incentivize the BAWSCA members that are not using their full water supply allocation to transfer a portion to other City's like East Palo Alto that have significant demand for new water supply.

### [SIGNATURES ON FOLLOWING PAGE]