

BOARD OF DIRECTORS SAN LORENZO VALLEY WATER DISTRICT AGENDA February 7, 2019

MISSION STATEMENT: Our Mission is to provide our customers and future generations with reliable, safe and high quality water at an equitable price; to create and maintain outstanding service and community relations; to manage and protect the environmental health of the aquifers and watersheds; and to ensure the fiscal vitality of the San Lorenzo Valley Water District.

Notice is hereby given that a meeting of the Board of Directors of the San Lorenzo Valley Water District will be held on <u>Thursday, February 7, 2019 at 5:30 p.m.</u>, SLVWD, 13057 Highway 9, Boulder Creek, CA 95006.

In compliance with the requirements of Title II of the American Disabilities Act of 1990, the San Lorenzo Valley Water District requests that any person in need of any type of special equipment, assistance or accommodation(s) in order to communicate at the District's Public Meeting can contact the District Secretary's Office at (831) 430-4636 a minimum of 72 hours prior to the scheduled meeting.

Agenda documents, including materials related to an item on this agenda submitted to the Board of Directors after distribution of the agenda packet, are available for public inspection and may be reviewed at the office of the District Secretary, 13060 Highway 9, Boulder Creek, CA 95006 during normal business hours. Such documents are also available on the District website at <u>www.slvwd.com</u> subject to staff's ability to post the documents before the meeting.

- 1. Convene Meeting/Roll Call
- 2. Additions and Deletions to Closed Session Agenda:

Additions to the Agenda, if any, may only be made in accordance with California Government Code Section 54954.2 (Ralph M. Brown Act) which includes, but is not limited to, additions for which the need to take action is declared to have arisen after the agenda was posted, as determined by a two-thirds vote of the Board of Directors (or if less than two-thirds of the members are present, a unanimous vote of those members present).

3. Oral Communications Regarding Items in Closed Session:

This portion of the agenda is reserved for Oral Communications by the public for items which are on the Closed Session portion of the Agenda. Any person may address the Board of Directors at this time, on Closed Session items. Normally, presentations must not exceed five (5) minutes in length, and individuals may only speak once during Oral Communications. No actions may be taken by the Board of Directors on any Oral Communications presented; however, the Board of Directors may request that the matter be placed on a future agenda. Please state your name and town/city of residence at the beginning of your statement for the record.

4. Adjournment to Closed Session

At any time during the regular session, the Board may adjourn to Closed Session in compliance with, and as authorized by, California Government Code Section 54956.9 and Brown Act, Government Code Section 54950. Members of the public will be given the opportunity to address any scheduled item prior to adjourning to closed session.

- a. CONFERENCE WITH LEGAL COUNSEL- EXISTING LITIGATION Government Code Section 54956.9(d)(1) Vierra v. San Lorenzo Valley Water District, et al. (Santa Cruz Superior Court Case No. 18CV00890)
- b. CONFERENCE WITH LEGAL COUNSEL- EXISTING LITIGATION Government Code Section 54956.9(d)(1) Holloway v. Showcase Realty Agents, Inc. et al. (Santa Cruz Superior Court Case No. CV180394; 6th District Court of Appeal Case Nos. H043704, H043492).

Closed Session Note:

The Brown Act prohibits the disclosure of confidential information acquired in a closed session by any person present and offers various remedies to address willful breaches of confidentiality. These include injunctive relief, disciplinary action against an employee, and referral of a member of the legislative body to the grand jury. It is incumbent upon all those attending lawful closed sessions to protect the confidentiality of those discussions. Only the legislative body acting as a body may agree to divulge confidential closed session information; regarding attorney/client privileged communications, the entire body is the holder of the privilege and only a majority vote of the entire body can authorize the waive of the privilege.

- 5. Convene to Open Session at 6:30 p.m.
- 6. Report of Actions Taken in Closed Session
- 7. Additions and Deletions to Open Session Agenda:

Additions to the Agenda, if any, may only be made in accordance with California Government Code Section 54954.2 (Ralph M. Brown Act) which includes, but is not limited to, additions for which the need to take action is declared to have arisen after the agenda was posted, as determined by a two-thirds vote of the Board of Directors (or if less than two-thirds of the members are present, a unanimous vote of those members present).

8. Oral Communications:

This portion of the agenda is reserved for Oral Communications by the public for items which are not on the agenda. Please understand that California law (The Brown Act) limits what the Board can do regarding issues raised during Oral Communication. No action or discussion may occur on issues outside of those already listed on today's agenda. Any person may address the Board of Directors at this time, on any subject that lies within the jurisdiction of the District. Normally, communication must not exceed five (5) minutes in length, and individuals may only speak once during Oral Communications.

9. Unfinished Business:

Members of the public will be given the opportunity to address each scheduled item prior to Board deliberations. The President of the Board may establish a time limit for members of the public to address the Board on agendum.

- SLVWD COMMITTEE MEETINGS
 Discussion and possible action by the Board regarding SLVWD Committee meetings days and times.
- BOARD POLICY MANUAL UPDATE Discussion and possible action by the Board regarding updates to the Board Policy Manual.
- 10. New Business:

Members of the public will be given the opportunity to address each scheduled item prior to Board deliberations. The Chairperson of the Board may establish a time limit for members of the public to address the Board on agenda items.

- a. SLVWD-SVWD JOINT BOARDS RETREAT Discussion and possible action by the Board regarding a retreat hosted by the Boards of SLVWD and SVWD and to include SMGWA Board.
- SLVWD WATER SUPPLY OUTLOOK AND ENVIRONMENTAL DEPARTMENT WORKSHOP
 Presentation by J. Michelsen, Environmental Programs Manager on the Environmental Action plan for the District. Discussion by Board, staff and public at the end of the presentation.
- c. WATER AVAILABILTY ASSESSMENT FOR SAN LORENZO RIVER WATERSHED CONJUNCTIVE USE PLAN Discussion and possible action by the Board regarding the Water Availability Assessment for San Lorenzo River Watershed Conjunctive Use Plan.
- 11. Consent Agenda:

The Consent Agenda contains items which are considered to be routine in nature and will be adopted by one (1) motion without discussion. Any item on the consent agenda will be moved to the regular agenda upon request from individual Directors or a member of the public.

a. MINUTES FROM BOARD OF DIRECTORS MEETING JANUARY 17, 2019
 Consideration and possible action by the Board to approve minutes from the January 17, 2019 BoD meeting.

- 12. Written Communication:
 - Email from B. Holloway
 - Email from M. Lee-Lake Nacimeinto
 - o Email from M. Lee-Santa Clara Water
 - o Letter from D. Cox
- 13. Informational Material:
 - Letter from CSDA with Board Member Handbook & SDLA Conference

14. Adjournment

Certification of Posting

I hereby certify that on February 1, 2019 I posted a copy of the foregoing agenda in the outside display case at the District Office, 13060 Highway 9, Boulder Creek, California, said time being at least 72 hours in advance of the meeting of the Board of Directors of the San Lorenzo Valley Water District (Government Code Section 54954.2).

Executed at Boulder Creek, California on February 1, 2019.

Holly Hossack, District Secretary San Lorenzo Valley Water District

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MEMO

To: Board of Directors

From: District Manager

SUBJECT: Committees

DATE: February 7, 2019

RECOMMENDATION

It is recommended that the Board of Directors review this memorandum regarding Committee meetings times, provide direction, and change to the Board Policy Manual Committee Minutes as requested.

BACKGROUND

The District has five standing Committee's as follows: Administrative, Budget & Finance, Engineering, Environmental and Lompico Assessment District Oversight. The Committees are encouraged to meet at least monthly. Committees have historically met Monday through Friday between the hours 9:00 AM to 4:00 PM working with the Operations Department to provide as little disruption as possible to the functions of the District.

In scheduling 2019 Committee Meetings there has been a request for afterhours Committee meetings. Staff has resisted adding additional afterhours meetings to the many meetings already scheduled. Staff is requesting direction.

Item 13 Minutes. Board Policy Manual reads;

In addition, the District Secretary shall record the minutes for Board of Directors meetings and committee meetings which shall also be posted on the District's website.

Staff is recommending a change in the Board Policy Manual Item 14 Committees which currently reads; the committee Chairperson shall record summary minutes of each committee meeting. Should be changed to read the same as Item 13 the District Secretary will record the minutes...

It is recommended that the Board of Directors review this memorandum regarding the Committee meetings times, provide direction, and change to the Board Policy Manual Committee Minutes as requested.

- 6. Be responsible for the orderly conduct of all Board of Directors meetings.
- 7. Act as spokesperson for the Board of Directors.
- 8. Coordinate and prepare the Board of Directors annual evaluation of the General Manager and Legal Counsel.
- 9. Other duties as authorized by the Board of Directors.

12. <u>VICE-PRESIDENT</u>

When the President resigns or is absent or disabled, the Vice President shall perform the President's duties. When the President disqualifies himself/herself from participating in an agenda item, the Vice-President shall perform the duties of the presiding officer.

13. <u>MINUTES</u>

All Board of Directors meetings and committee meetings will be audio recorded and made available through the District's website. Said audio record shall be subject to inspection in accordance with State Laws, including the California Public Records Act.

In addition, the District Secretary shall record the minutes for Board of Directors meetings and committee meetings which shall also be posted on the District's website.

The minutes shall be of the form of summary minutes and will include the following information: the time the meeting was called to order, the names of the Directors (or, as appropriate, the committee members) attending the meeting, the vote (roll call or voice) on each matter considered at the meeting, the time the Board of Directors began and ended any closed session, the names of the Directors and the names, and titles where applicable, of any other persons attending any closed session, a list of those members of the public who spoke on each matter if the speakers identified themselves, whether such speakers supported or opposed the matter, a brief summary of each Board member's and public members statement during the public comment period for each agenda item (if they identified themselves), and the time the meeting was adjourned. Any person speaking during a public comment period may supply written comments which shall be included in the minutes.

The draft minutes of each meeting shall be available for inspection and copying upon request no later than ten working days after the meeting, unless circumstances prevent meeting that goal in which case the minutes shall be available as soon as possible. The officially adopted minutes shall be available for inspection and copying upon request no later than ten working days after the meeting at which the minutes are adopted, unless circumstances prevent meeting that goal in which case the minutes shall be available as soon as possible.

Changes to this section shall take effect at the next Board of Directors meeting.

14. <u>COMMITTEES</u>

The Board shall organize committees that are advisory to the Board with regard to matters within their respective areas of responsibility.

The five District standing committees are as follows: Administrative, Budget & Finance, Engineering, Environmental and Lompico Oversight. Each standing committee shall have no power or authority to commit the District or to take any action on behalf of the Board of Directors. Standing Committees shall hold meetings at such times, frequency and locations as deemed necessary by consensus of the committee members. Committees are encouraged to meet at least monthly.

Committee meetings shall be held in accordance with the provisions of the Ralph M. Brown Act. In order to promote attendance by Directors at Committee meetings without inadvertently creating a violation of the Ralph M. Brown Act, Directors that are not members of a committee are discouraged from attending but may attend as observers, and, if attending, shall not participate at the Committee's meeting.

Committee appointments will be reviewed by the full Board at a Board of Director's meeting in December of each Calendar Year, or as soon thereafter as practical. Applications to serve as a Public Member will be available at the District's Office or online at the District's website (<u>www.slvwd.com</u>). Public Member Applications will be reviewed by the full Board. Each committee member shall be appointed by a simple majority vote of the Board.

Regardless of the start date, the terms of public member(s) of the Administrative, Budget & Finance, Engineering and Environmental Committees shall end on December 31st of each year.

Members of the public shall serve on no more than one standing committee at a time.

Administrative, Budget & Finance, Engineering, Environmental Committees may have no more than two Board Members and at least one Public Member. If more than one public member applies to serve on an individual committee, the full Board shall vote to determine which public member shall be seated on that committee for the year or may choose to appoint more than one public member to a committee by adjusting the size of the committee appropriately. At any time, the Board may also choose to appoint additional public members to any standing committee.

The Lompico Oversight Committee may have no more than five Public Members. Public members serving on the Lompico Oversight Committee shall have a residential mailing address within Assessment District 2016-1.

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Members of the committees serve at the pleasure of the Board. Each committee shall designate their own chairperson. For the Administrative, Budget & Finance, Engineering and Environmental Committees the chairperson shall be a member of the Board. Each committee may elect a vice- chairperson. Members of committees, including the chairperson and vice-chairperson shall serve until their successors are appointed. The chairperson of a committee is its presiding officer and shall be responsible for communicating the recommendation of the committee to the Board. In the absence of the chairperson, the vice-chairperson shall perform the duties of the chairperson. The chairperson are not deprived of any of the rights and privileges of a committee member by reason of being the presiding officer.

A majority of the members of each committee shall constitute a quorum for the transaction of business. Only members of the committee are entitled to make, second or vote on any motion or other action of the committee. Each committee member shall be entitled to one vote on all matters considered by the committee. A simple majority vote of the members of the Committee shall designate approval of a motion.

During the first regular meeting after January 1st of each year, each Committee shall review the District's current Strategic Plan and identify Strategic Plan Elements pertaining to said Committee. The Committee's findings regarding such Strategic Plan review shall be reported back to the Board at the next available regular Board Meeting for discussion and to allow the Board to provide direction back to the committees regarding completion of identified Strategic Plan Elements.

During the first regular meeting after January 1st of each year, each Committee shall prepare a multi-month forward looking calendar of items to be discussed by said Committee. Said calendar shall be no less than a three month look-ahead. Each Committee chairperson s h a I I maintain said look-ahead calendar and submit same to the Board on a monthly basis.

The committee Chairperson shall record summary minutes of each committee meeting. The minutes of each committee meeting and any recommendation of a committee shall include a summary of the information presented.

All committee member absences will be considered by the majority of the committee members to determine whether or not the absence is without cause. Sickness, jury duty, vacation and/or bereavement will be considered excused absences. When three meetings in a row or a total of six meetings in one calendar year are missed the remaining committee members will consider the removal of the individual from the committee. The removal must be voted upon and approved by the majority of the committee members with the exception of the committee member in question.

Vacancies shall be reported to the full Board as soon as practically possible. Vacancies shall be filled by simple majority vote of the Board.

Committee Members shall comply with the obligations and responsibilities of office including the obligation to comply with the disclosure requirements of the Political Reform Act (Form 700). The reporting categories made applicable to the Directors by San

MEMO

To: Board of Directors

From: District Manager

Subject: Board Policy Manual

Date: February 7, 2019

Recommendation

It is recommended that the Board of Directors review this memo and continue the review of several edits of the Board of Directors Policy Manual and if appropriate adopt the attached Resolution approving the Board Policy Manual.

Background

On January 17, 2019 the Board reviewed edits to the policy and made several changes. The policy review was not completed and may require additional review. It is anticipated that the review will be completed at this meeting for adoption by the Board.

The current policy manual requires that the policy manual be reviewed annually by District Counsel and ratified by Resolution of the Board of Directors at the Board of Directors meeting in December of each calendar year or as soon thereafter as reasonable.

SAN LORENZO VALLEY WATER DISTRICT RESOLUTION NO. 27 (18-19)

SUBJECT: BOARD POLICY MANUAL 2019

WHEREAS, on December 13, 2018, the Board of Directors of the San Lorenzo Valley Water District adopted Resolution No. 22 (18-19) Board of Directors Policy Manual 2019; and

WHEREAS, on January 3 and 17, 2019 the Board of Directors reviewed the Policy Manual and agreed to revisions, adopting Resolution No. 26 (18-19); and

WHEREAS, the proper functioning of the District Board and Board Meetings is critical to proper functioning of the District; and

WHEREAS, an adopted set of rules and procedures assist in the proper functioning of the Board; and

WHEREAS, the Board of directors as a whole, agrees with the Policy Manual and agrees to follow said Policy Manual;

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the San Lorenzo Valley Water District that the Board adopts and approves the revised 2019 San Lorenzo Valley Water District Board of Directors Policy Manual.

PASSED AND ADOPTED by the Board of Directors of the San Lorenzo Valley Water District, County of Santa Cruz, State of California, on the 7th day of February 2019, by the following vote of the members thereof:

AYES: NOES: ABSTAIN: ABSENT:

> Holly B. Hossack District Secretary

SAN LORENZO VALLEY WATER DISTRICT



BOARD OF DIRECTORS POLICY MANUAL 2019

ADOPTED

January 17, 2019

RESOLUTION NO. 26 (18-19)

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MODIFICATIONS TO POLICY MANUAL SINCE LAST FULL BOARD APPROVAL

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1. MISSION STATEMENT

<u>"Our mission is to provide our customers and all future generations with reliable, safe and high quality water at an equitable price; to create and maintain outstanding customer service; to manage and protect the environmental health of the aquifers and watersheds; and to ensure the fiscal vitality of the San Lorenzo Valley Water District".</u>

Adopted by the Board of Directors of the San Lorenzo Valley Water District on June 2, 2000.

The mission of the San Lorenzo Valley Water District will be accomplished through the implementation of the following objectives:

OBJECTIVE I; STAFFING

Provide an efficient and adequate staff of employees and consultants, dedicated to the District mission and responsive to the Board. Provide staff and consultants with proper resources.

OBJECTIVE II; COMMUNICATIONS

Establish and maintain an environment that encourages the open exchange of ideas and information between Board members, staff and the public that is positive, honest, concise, understandable, responsive and cost-efficient.

OBJECTIVE III; EDUCATION

Develop and maintain comprehension and competence regarding issues that come before the Board of Directors and Staff. Ensure the District's customers are informed regarding the benefits of safe operations, proper claims procedures, District operations and conservation.

2. <u>AUTHORITY OF BOARD</u>

A) The Board of Directors shall act only at regular, regularly adjourned, or special meetings, as provided by State Law.

- B) Individual Directors shall have no power to act for the San Lorenzo Valley Water District, or the Board of Directors, or to direct District staff, except as authorized by the Board of Directors.
- C) Until a quorum is present there can be no meeting of the Board of Directors. The presence of a minimum of 3 Board members is required to constitute a quorum of the Board of Directors.

3. <u>CODE OF ETHICS AND CONDUCT</u>

The Board of Directors of the San Lorenzo Valley Water District is committed to providing excellence in legislative leadership that results in providing the highest quality services to its constituents. The Board of Directors is expected to maintain the highest ethical standards, to follow District policies and regulation, and to abide by all applicable local, state and federal laws. Board of Directors conduct should enhance the integrity and goals of the District. In order to assist in the governing of behavior between and among members of the Board of Directors, the following rules shall be observed:

- A) The dignity, style, values and opinions of each Director shall be respected.
- B) Responsiveness and attentive listening in communications is encouraged.
- C) The needs of the District's constituents shall be the priority of the Board of Directors.
- D) The primary responsibility of the Board of Directors is the formulation and evaluation of policy. Routine matters concerning the operational aspects of the District are to be delegated to staff members of the District.
- E) Directors should commit themselves to emphasizing the positive.
- F) Directors should commit themselves to focusing on issues and not personalities. The presentation of the opinions of others should be encouraged.
- G) Differing viewpoints are healthy in the decision-making process. Individual Directors have the right to disagree with ideas and opinions, but without being disagreeable. Once the Board of Directors takes action, Directors should commit to supporting said action and not to creating barriers to the implementation of said action.
- H) Directors should practice the following procedures:
 - 1. In seeking clarification on informational items, Directors may directly approach the District Manager to obtain information needed to supplement, upgrade, or enhance their knowledge to improve legislative decision-making.

- 2. In handling complaints or inquiries from residents and property owners of the District, said complaints should be referred to the District Manager and may be followed up by the Board of Directors.
- 3. In handling items related to safety concerns, hazards should be reported to the District Manager. Emergency situations should be dealt with immediately by seeking appropriate assistance.
- 4. In seeking clarification for policy-related concerns, especially those involving personnel, legal action, land acquisition, sale or development, finance, and programming, said concerns should be referred directly to the District Manager.
- I) When approached by District personnel concerning specific District policy, Directors should direct inquiries to the District Manager.
- J) The work of the District is a team effort. All individuals should work together in the collaborative process, assisting each other in conducting the affairs of the District.
- K) When responding to constituent requests and concerns at board meetings, the Board President's discretion determines the amount of time for comments. Specific questions or concerns will be directed to the District Manager for future action by the Board or staff. Directors should be courteous, responding to individuals in a positive manner and routing their questions through appropriate channels and to responsible management personnel.
- L) Directors should develop a working relationship with the District Manager wherein current issues, concerns and District projects can be discussed comfortably and openly.
- M) Directors should function as a part of the whole. Issues should be brought to the attention of the Board of Directors as a whole, rather than to individual members selectively.
- (N) Members' interaction with public, press or other entities must recognize the limitation of any Board member to speak for the Board except to repeat explicitly stated Board decisions, while respecting the right of Board members to express individual opinions.
- O) Directors are responsible for monitoring the District's progress in attaining its goals and objectives, while pursuing its mission.
- P) The Board will further inform itself, individually and collectively, through ongoing outreach to determine community wishes and through continuing education on issues relevant to the District.
- Q) Continual Board development will include orientation of new Board members in the Board's governance process and periodic Board discussion of process improvement.

4. <u>ETHICS TRAINING</u>

Pursuant to California Government Code section 53234 et seq. or as amended, all Directors shall receive two (2) hours of training in general ethics principles and ethics laws relevant to public service within one (1) year of election or appointment to the Board of Directors, and at least once every two (2) years thereafter. All ethics training shall be provided by entities whose curriculum has been approved by the California Attorney General and the Fair Political Practices Commission. The District Manager and any other employee(s) of the District designated by the Board of Directors shall also receive the ethics training specified herein. The District shall maintain records indicating the name of the entity that provided the training and the dates ethics training was completed. Records shall be maintained for a period of at least five (5) years after the date on which the training was received. These records are public records subject to disclosure under the California Public Records Act.

5. <u>GOVERNING LAWS</u>

The Board of Directors shall comply with and shall be guided by applicable provisions of Federal laws; State laws, including the Water Code, Government Code, Section 1090 of the Government Code, Elections Code and Public Resources Code; this Policy Manual, and the rules and regulations of the District as established by the motions, resolutions and ordinances enacted by the Board of Directors. Motions, resolutions and ordinances may be enacted by the Board in accordance with Water Code section 30523 or as amended.

6. <u>ELECTION OF OFFICERS</u>

There shall be two (2) officers: a president and a vice president, who shall be members of the District Board of Directors. Election of officers shall be held at a Board of Directors meeting in December of each calendar year. Officers will serve for a one (1) year term. Elections will conform to the applicable provisions of this Policy Manual.

7. ROLE OF THE BOARD POWERS, DUTIES AND FUNCTIONS

A) POWERS

The Board of Directors is responsible for the establishment of policy and general control of the District. This broad authority shall be exercised in accordance with all applicable federal, state and local laws and regulations. The Board of Directors may execute any powers delegated by law to the District, and shall discharge any duty imposed by law upon the District.

The enabling codes established by the California State Legislature empowers the Board of Directors to have broad authority and flexibility in carrying out financial programs and activities which meet its individual needs, provided these programs or activities are not in conflict with, inconsistent with, or preempted by law.

B) DUTIES

The primary duties of the Board of Directors are as follows:

- 1. Take action at legal meetings.
- 2. Establish and periodically review written policies for District operation a n d administration.
- 3. Be responsible for all District finances.
 - a. Approve fiscal budget.
 - b. Monitor the budget spending.
- 4. Set rates, fees and charges for District services.
- 5. Personnel
 - a. Hire and discharge General Manager and Legal Counsel.
 - b. Annually evaluate the General Manager and Legal Counsel.
- 6. Establish written policy on how Board of Director's meetings a r e conducted.
- 7. Review and revise the Master Plan for the District.
- 8. Ratify committee appointments made by the President.
- 9. Establish Director compensation limits.

C) FUNCTIONS

The powers and duties of the Board of Directors include governance, executive and quasi-judicial functions. These relate to the Board's own operations as a governing body and to all functions of the District.

1. GOVERNANCE FUNCTIONS

To fulfill its responsibility, the Board is committed to establishing policies to govern District activities. The Board of Directors shall consider and approve or disapprove matters submitted to it by a Director, Staff or the public. The Board of Directors shall prescribe rules for its own governance which are consistent with its "enabling code" or by Federal or State Laws and regulations.

2. EXECUTIVE FUNCTIONS

The Board of Directors is authorized to delegate any of its powers and duties to an officer or employee of the District. The Board of Directors; however, retains ultimate responsibility over the performance of those powers or duties so delegated.

3. QUASI-JUDICIAL FUNCTIONS

The Board of Directors desires that public complaints be resolved at the lowest possible administrative level. The method of resolving public complaints shall be as follows:

- a. The individual with a complaint shall first discuss the matter with the District Manager. If this individual registering the complaint is not satisfied with the disposition of the complaint by the District Manager, said complaint may be filed with the Board of Directors.
- b. The Board of Directors may consider the matter at a subsequent regular meeting or call a special meeting. The Board of Directors will expeditiously resolve the matter.
- c. This policy in no way prohibits or intends to deter a member of the public from appearing before the Board of Directors to present a verbal complaint or statement in regards to actions of the Board of Directors, District programs or services, or impending considerations of the Board of Directors.

8. ROLE OF INDIVIDUAL DIRECTORS

The Board of Directors is the unit of authority for the District. Apart from their normal function as a part of this unit, individual Directors may not commit the District to any policy, act or expenditure unless duly authorized by the Board of Directors. Nor may an individual Director direct staff to perform specific duties unless duly authorized by the Board of Directors. Directors do not represent any factional segment of the constituency, but are, rather, a part of the body which represents and acts for the constituency as a whole.

- A) Each Director has the right to place items on a subsequent Board of Directors Meeting, subject to scheduling by the Board president. The deadline for submittal of an agenda item by a Director shall be the preceding Wednesday at 5:00 p.m. before the scheduled Board of Directors meeting date at the office of the District Secretary. Agenda item requests received after the submittal deadline for a specific agenda will be added to the next following regularly scheduled agenda, subject to scheduling by the Board president.
- B) Directors will make every effort to attend assigned Board of Directors and Committee meetings:

- 1. To prepare adequately for each such meeting;
- 2. To observe the rules of decorum as set forth herein; and
- 3. Whenever any individual Directors will be absent or late for a Board of Directors or Committee meeting said Director shall notify the District Secretary or Board President at the earliest opportunity.
- C) When requesting information from staff, Directors shall contact the District Manager. When responding to constituent requests and concerns, Directors should reroute such inquiries to the District Manager.
- D) Each Director shall decide individually on what contact information will be released by District staff to the general public. In order to accomplish this in an orderly and consistent manner, each Director shall provide the District Secretary with a completed and signed Director Contact Authorization Form. Directors shall be responsible for any and all updates and amendments to said Director Contact Authorization Form.

9. BOARD OF DIRECTORS MEETINGS

A) REGULAR TIME AND PLACE OF MEETINGS

Regularly scheduled meetings of the Board of Directors shall be held, on the first (1st) and third (3rd) Thursday of each month at 5:30 pm for Closed Session and 6:30 pm time certain for Open Session; at the District Operations Building, 13057 Highway 9, Boulder Creek, CA, unless otherwise specified by action of the Board of Directors. Special meetings of the Board of Directors, as that term or its successor terms are defined within the meaning of the Ralph M. Brown Act (California Government Code section 54950 et seq.), may be duly authorized and held as deemed necessary by the President or a majority of the Board of Directors. Notice and location of special meetings shall be as prescribed by law. Emergency meetings of the Ralph M. Brown Act, may be duly authorized and held as deemed necessary only by a majority of the Board of Directors. Notice and location of special meetings of the Board of Directors. Notice and held as deemed necessary only by a majority of the Board of Directors. Notice and held as deemed necessary only by a majority of the Board of Directors. Notice and held as deemed necessary only by a majority of the Board of Directors. Notice and held as deemed necessary only by a majority of the Board of Directors. Notice and held as deemed necessary only by a majority of the Board of Directors. Notice and held as deemed necessary only by a majority of the Board of Directors. Notice and location of special meetings shall be as prescribed by law.

B) PUBLIC NATURE OF MEETINGS

All meetings of the Board of Directors shall be open to the public, except when the Board is convened in Closed Session as authorized under provisions of the Ralph M. Brown Act (California Government Code section 54950 et seq.).

C) QUORUM AND VOTING REQUIREMENTS

The presence of three (3) or more Directors shall constitute a quorum for the transaction of District business. No ordinance, resolution or motion shall be passed by the Board of Directors without a majority vote of the Board, unless otherwise required or prescribed by State law. (See for example, Government Code section 54954.2, Board Policy Manual subparagraph K, below.)

D) BOARD ACTION

The Board of Directors shall act only by ordinance, resolution, or motion, Except where action is taken by the unanimous vote of all Directors present and voting, the ayes and noes shall be taken upon the passage of all ordinances, resolutions or motions and shall be entered in the minutes. An ordinance does not require two readings at separate meetings unless otherwise prescribed by law. Unless otherwise provided by its own terms, all ordinances, resolutions and motions shall become effective upon adoption. Any member of the Board of Directors, including the President, can make a motion. Motions require seconds. The President may vote on all motions unless disgualified or abstaining. The President shall not call for a vote on any motion until sufficient time has been allowed to permit any and all members of the Board of Directors to speak. Complex motions should generally be prepared in writing and read aloud to the members of the Board of Directors at the time the motion is made. If a motion is not in writing, and if it is necessary for full understanding of the matter before the Board of Directors, the President shall restate the question prior to the vote. Common motions may be stated in abbreviated form, and will be put into complete form in the minutes. Until the President states the question, the maker may modify their motion or withdraw it completely. However, after the President has stated the question, the motion may be changed only by a motion to amend which is passed by a majority vote of the Board of Directors.

The President of the Board may at any time, during debate or otherwise, declare a recess. Declaration of a recess shall not be subject to any motions.

E) PARLIAMENTARY PROCEDURES

Unless otherwise inconsistent with any provision stated herein, Parliamentary Procedure for Board of Directors meetings shall be based upon the current edition of Robert's Rules of Order Newly Revised. No action of the Board of Directors shall be deemed invalid for the reason that said action was not in conformance with Robert's Rules of Order Newly Revised.

F) ROUTINE BUSINESS

Matters of routine business such as approval of the minutes and approval of minor matters may be expedited by assuming unanimous consent of the members of the Board of Directors and having the President state that without objection the matter will stand approved. Should any Director object to such unanimous consent, the President shall then call for a vote.

G) ORDERLY DISCUSSION

In order to promote discussion of the issues before the Board of Directors, each Director shall be recognized by the chair before speaking. Notwithstanding any provision of this Policy, however, each Director shall have a right to be heard within reason on any issue before the Board of Directors. Each Director may seek information or comment by the staff on any question.

H) CLOSED SESSION

Except as provided by law, all proceedings in Closed Sessions shall remain confidential.

I) MEETING AGENDAS

The District Manager, in consultation with the Board President, shall be responsible for the preparation of a written agenda for each regular meeting and/or special meeting of the Board of Directors as those terms or its successor terms are defined by the Ralph M. Brown Act (California Government Code section 54950 et seq.). The District Manager and the Board President shall meet, annually, in January of each calendar year to identify recurring items of business which should be placed on written agendas at appropriate times during the coming year. The District Manager, in consultation with the President, shall be responsible for the preparation of a written agenda for each regular meeting and/or special meeting of "other legislative bodies," of the San Lorenzo Valley Water District, as those terms or its successor terms are defined by the Ralph M. Brown Act. Any Director may request that an item be placed on the agenda for a regular meeting of the Board of Directors. The District Secretary shall be responsible for the appropriate notice and agenda for all meetings of the Board of Directors and/or "other legislative bodies."

A copy of the agenda for each regular meeting of the Board of Directors shall be forwarded to each Board member, at least three (3) days in advance of each regular meeting, together with copies of all applicable supporting documentation; minutes to be approved; staff report; and other available documents pertinent to the meeting. shall review agenda materials before each meeting. Individual directors may confer directly with the District Manager to request additional information on the agenda items.

J) ORDER OF BUSINESS

As a practice for normal business. The Board President may rearrange this order at any time. Introductory language for each agenda section may be modified by action of the Board of Directors from time to time. Changes to the introductory language for each agenda section shall take effect at the next Board of Directors meeting.

- 1. Convene Meeting, Roll Call.
- 2. Additions and Deletions to Closed Session Agenda.

- 3. Public Comment Related to items on the Closed Session Agenda
- 4. Adjournment to Closed Session.
- 5. Reconvene to Open Session at 6:30 PM (time-certain).
- 6. Closed Session report.
- 7. Additions and Deletions to Open Session Agenda.
- 8. Public Comment on any topic within the jurisdiction of the District and which is not on the Open Session Agenda.
- 9. Unfinished Business.
- 10. New Business.
- 11. Consent Agenda
- 12. District Reports
 - a. District Manager Report
 - b. Department Status Reports
 - c. Committee Reports
 - d. Director Reports
- 13. Written Communications
- 14. Informational Material.
- 15. (If applicable) Adjournment to Closed Session.
- 16. (If applicable) Reconvene to Open Session to Report Actions Taken in Closed Session.
- 17. Adjournment

K) ADDITIONS AND DELETIONS TO AGENDA

Additions to the Agenda, if any, shall be made in accordance with California Government Code Section 54954.2 or as amended (Ralph M. Brown Act), which includes, but is not limited to, additions for which the need to take action is declared to have arisen after the agenda was posted, as determined by a two-thirds vote of the Board of Directors. If less than two-thirds of the members are present a unanimous vote of those members present is required.

L) PUBLIC COMMENT

The Board of Directors encourages public participation in the governance of the District through public comment periods. In order to present, members of the public must first be recognized by the president.

1. If the Board meeting has a Closed Session agenda, members of the public may comment on or ask questions about the items which are on the Closed Session portion of each agenda. Comments or questions may be submitted in writing or orally. If in writing, the entire written communications will be placed in the minutes. If orally, members of the public may have to up to five (5) minutes (unless time is shortened by the President due to circumstances—e.g., in the event of a large number of people wishing to comment orally) to present to the Board of Directors. The President may extend this time at his or her discretion—e.g., in order to allow for a wrap up of the presentation. Oral comments will be summarized and included in the minutes if the member of the public provides his or her name at the beginning of their comment time. 2. Prior to the start of the Open Session agenda, members of the public may comment on or ask questions about topics which are within the jurisdiction of the District and which are not on the Open Session portion of the agenda. It is the objective of the Board to have as close to a normal conversation with members of the public as possible while still conforming to the requirements of the Brown Act. This means that the Board cannot take action or discuss a topic or question in depth during this meeting (Ralph M. Brown Act Section 54954.3 or as amended). However, the Board can ask clarifying questions in order to make sure that it understands questions or comments. The Board can discuss how to best handle questions or comments. All questions will be answered either in realtime (by the Board or Staff) or at a later time, unless the questions relate to confidential topics. If a question is answered in real-time, the Board President will ask if the question was answered and, if not, allow a short follow-up request for clarification. If a question cannot be answered in real-time, it will be answered and included in the minutes for that meeting which will be published at a later time. In addition, the Board may agendize a public comment item for a future Board meeting if that seems appropriate or the Board may send the item to committee for follow-up and possible action. Comments and/or questions may be submitted in writing or orally. If in writing, the entire written communications will be placed in the minutes. If orally, members of the public may have to up to five (5) minutes (unless time is shortened by the President at his or her discretion due to circumstances-e.g., in the event of a large number of people wishing to comment orally) to present to the Board of Directors. The President may extend this time at his or her discretion-e.g., in order to allow for a wrap up of the presentation. Oral comments will be summarized and included in the minutes if the member of the public provides his or her name at the beginning of their comment time. In the interests of respecting everyone's time, members of the public are encouraged to (i) avoid repeating someone else's pointjust indicate agreement-and add new content and (ii) to avoid repetition during their comments.

In addition, members of the public may address each agenda item prior to Board disposition of that item, including items on the Consent Agenda. After presentation of the agenda item, the order of discussion will be: Board comment, public comment and then back to the Board for further deliberations. The Board President may establish a time limit for public comment on an agenda item and may also allow a second round of public comment at his or her discretion. In order to present, members of the public must first be recognized by the President.

No member of the public shall approach the Board of Directors table while the Board is in session unless granted permission by the President or presiding officer. Proper decorum must be observed by Directors, staff, speakers and the audience at all times. The President or presiding officer shall preserve order and decorum, discourage personal attacks, and confine debate to the question under discussion. The President shall rule out of order any irrelevant, repetitive or disruptive comments. Please mute or turn off your electronic devices while the Board is in session.

It is the policy of the Board of Directors to invite all members of the public to participate in the governance of the District and to provide wide latitude for the free expression of all points of view. However, the President, or a majority of the board, may eject from a meeting any person who becomes disorderly, abusive, or disruptive, or who fails or refuses to obey a ruling of the president regarding a matter of order or procedure. In addition, as a last resort, per California Government code 54957.9: *In the event that any meeting is willfully interrupted by a group or groups of persons so as to render the orderly conduct of such meeting unfeasible and order cannot be restored by the removal of individuals who are willfully interrupting the meeting, the members of the legislative body conducting the meeting may order the meeting room cleared and continue in session.*

Representatives of the press or other new media, except those participating in the disturbance, shall be allowed to attend any session held pursuant to this section. Nothing in this section shall prohibit the legislative body from establishing a procedure for readmitting an individual or individuals not responsible for willfully disturbing the orderly conduct of the meeting.

Changes to this section shall take effect at the next Board of Directors meeting.

M) CONSENT AGENDA

The purpose of a consent agenda is to minimize the time required for the handling of any non-controversial matters. Consent agenda items are considered to be routine and non-controversial, with documentation provided to the Board of Directors that is adequate and sufficient for approval without inquiry or discussion. Any item on the consent agenda will be moved to the regular agenda upon request from individual Directors or a member of the public. Unless moved to the regular agenda, the consent agenda shall be voted upon as one single item without discussion or debate.

N) STUDY SESSIONS

Study sessions or workshop meetings are for the purpose of discussing an item(s) that may come before the Board at a later time for official action, to facilitate planning, or discussion of special topics of interest. Study sessions provide a more informal forum for the Board of Directors, staff and the public to engage in openended discussion and share information on a particular subject(s). No formal action(s) can be taken at a study session; direction can be given to staff regarding preparation of an agenda item for discussion and possible action at a subsequent meeting. From time to time, study sessions may be duly authorized as deemed necessary by the President or a majority of the Board.

O) WRITTEN COMMUNICATIONS

The Written Correspondence portion of the agenda is established to act as a report of written materials received by the Board as a whole, but may also include items requested for inclusion by individual Directors or members of the public. Written Communications will always be presented in its entirety. Written Correspondence not presented in its entirety will be maintained by the District Secretary for a period of two (2) years.

10. <u>TECHNOLOGICAL CONFERENCING</u>

Teleconferencing may be used for all purposes in connection with any meeting within the subject matter jurisdiction of any legislative body of the District. Teleconferencing is defined as a meeting of a legislative body of the District, the members of which are in different locations, connected by electronic means, through either audio or video, or both. If a legislative body of the District elects to use teleconferencing, it shall comply with all applicable requirements of the Ralph M. Brown Act (Section 54953, or as amended.)

11. PRESIDENT

A) DUTIES

The President shall sit as presiding officer and conduct all meetings of the Board of Directors, shall carry out the resolution and orders of the Board of Directors and shall exercise such other powers and perform such other duties as the Board of Directors shall prescribe; including the following:

- 1. Call the meeting to order at the appointed time.
- 2. Announce the business to come before the Board of Directors in its proper order.
- 3. Enforce the Board of Directors policies and rules with respect to the order of business and the conduct of meetings.
- 4. Recognize persons who desire to speak, and protect the speaker who has the floor from disturbance or interference.
- 5. Explain what the effect of a motion would be if it is not clear to every member of the Board of Directors.
- 6. Restrict discussion to the question when a motion is before the Board of Directors.
- 7. Rule on parliamentary procedure.
- 8. Put motions to a vote, and state clearly the results of the vote.

B) RESPONSIBILITIES

The President shall have all the rights to discuss and vote on any issues before the Board of Directors. The President shall have the following responsibilities:

- 1. Sign all instruments, acts, and carry out stated requirements and the will of the Board of Directors.
- 2. Consult with the District Manager on the preparation of the Board of Directors agendas. In addition, any Director shall have the right to place any matter on the agenda for any meeting in accordance with the provisions of this policy.
- 3. Appoint and disband all committees, subject to Board of Directors approval.
- 4. Call such meetings of the Board of Directors as they may deem necessary, giving notice as prescribed by law.
- 5. Confer with the District Manager and/or District Counsel on matters which may occur between Board of Directors meetings.

- 6. Be responsible for the orderly conduct of all Board of Directors meetings.
- 7. Act as spokesperson for the Board of Directors.
- 8. Coordinate and prepare the Board of Directors annual evaluation of the General Manager and Legal Counsel.
- 9. Other duties as authorized by the Board of Directors.

12. <u>VICE-PRESIDENT</u>

When the President resigns or is absent or disabled, the Vice President shall perform the President's duties. When the President disqualifies himself/herself from participating in an agenda item, the Vice-President shall perform the duties of the presiding officer.

13. <u>MINUTES</u>

All Board of Directors meetings and committee meetings will be audio recorded and made available through the District's website. Said audio record shall be subject to inspection in accordance with State Laws, including the California Public Records Act.

In addition, the District Secretary shall record the minutes for Board of Directors meetings and committee meetings which shall also be posted on the District's website.

The minutes shall be of the form of summary minutes and will include the following information: the time the meeting was called to order, the names of the Directors (or, as appropriate, the committee members) attending the meeting, the vote (roll call or voice) on each matter considered at the meeting, the time the Board of Directors began and ended any closed session, the names of the Directors and the names, and titles where applicable, of any other persons attending any closed session, a list of those members of the public who spoke on each matter if the speakers identified themselves, whether such speakers supported or opposed the matter, a brief summary of each Board member's and public members statement during the public comment period for each agenda item (if they identified themselves), and the time the meeting was adjourned. Any person speaking during a public comment period may supply written comments which shall be included in the minutes.

The draft minutes of each meeting shall be available for inspection and copying upon request no later than ten working days after the meeting, unless circumstances prevent meeting that goal in which case the minutes shall be available as soon as possible. The officially adopted minutes shall be available for inspection and copying upon request no later than ten working days after the meeting at which the minutes are adopted, unless

circumstances prevent meeting that goal in which case the minutes shall be available as soon as possible.

Changes to this section shall take effect at the next Board of Directors meeting.

14. <u>COMMITTEES</u>

The Board shall organize committees that are advisory to the Board with regard to matters within their respective areas of responsibility.

The five District standing committees are as follows: Administrative, Budget & Finance, Engineering, Environmental and Lompico Oversight. Each standing committee shall have no power or authority to commit the District or to take any action on behalf of the Board of Directors. Standing Committees shall hold meetings at such times, frequency and locations as deemed necessary by consensus of the committee members. Committees are encouraged to meet at least monthly.

Committee meetings shall be held in accordance with the provisions of the Ralph M. Brown Act. In order to promote attendance by Directors at Committee meetings without inadvertently creating a violation of the Ralph M. Brown Act, Directors that are not members of a committee are discouraged from attending but may attend as observers, and, if attending, shall not participate at the Committee's meeting.

Committee appointments will be reviewed by the full Board at a Board of Director's meeting in December of each Calendar Year, or as soon thereafter as practical. Applications to serve as a Public Member will be available at the District's Office or online at the District's website (<u>www.slvwd.com</u>). Public Member Applications will be reviewed by the full Board. Each committee member shall be appointed by a simple majority vote of the Board.

Regardless of the start date, the terms of public member(s) of the Administrative, Budget & Finance, Engineering and Environmental Committees shall end on December 31st of each year.

Members of the public shall serve on no more than one standing committee at a time.

Administrative, Budget & Finance, Engineering, Environmental Committees may have no more than two Board Members and at least one Public Member. If more than one public member applies to serve on an individual committee, the full Board shall vote to determine which public member shall be seated on that committee for the year or may choose to appoint more than one public member to a committee by adjusting the size of the committee appropriately. At any time, the Board may also choose to appoint additional public members to any standing committee.

The Lompico Oversight Committee may have no more than five Public Members. Public members serving on the Lompico Oversight Committee shall have a residential mailing address within Assessment District 2016-1.

Members of the committees serve at the pleasure of the Board. Each committee shall designate their own chairperson. For the Administrative, Budget & Finance, Engineering and Environmental Committees the chairperson shall be a member of the Board. Each committee may elect a vice- chairperson. Members of committees, including the chairperson and vice-chairperson shall serve until their successors are appointed. The chairperson of a committee is its presiding officer and shall be responsible for communicating the recommendation of the committee to the Board. In the absence of the chairperson, the vice-chairperson shall perform the duties of the chairperson. The chairperson and vice-chairperson are not deprived of any of the rights and privileges of a committee member by reason of being the presiding officer.

A majority of the members of each committee shall constitute a quorum for the transaction of business. Only members of the committee are entitled to make, second or vote on any motion or other action of the committee. Each committee member shall be entitled to one vote on all matters considered by the committee. A simple majority vote of the members of the Committee shall designate approval of a motion.

During the first regular meeting after January 1st of each year, each Committee shall review the District's current Strategic Plan and identify Strategic Plan Elements pertaining to said Committee. The Committee's findings regarding such Strategic Plan review shall be reported back to the Board at the next available regular Board Meeting for discussion and to allow the Board to provide direction back to the committees regarding completion of identified Strategic Plan Elements.

During the first regular meeting after January 1st of each year, each Committee shall prepare a multi-month forward looking calendar of items to be discussed by said Committee. Said calendar shall be no less than a three month look-ahead. Each Committee chairperson s h a I I maintain said look-ahead calendar and submit same to the Board on a monthlybasis.

The committee Chairperson shall record summary minutes of each committee meeting. The minutes of each committee meeting and any recommendation of a committee shall include a summary of the information presented.

All committee member absences will be considered by the majority of the committee members to determine whether or not the absence is without cause. Sickness, jury duty, vacation and/or bereavement will be considered excused absences. When three meetings in a row or a total of six meetings in one calendar year are missed the remaining committee members will consider the removal of the individual from the committee. The removal must be voted upon and approved by the majority of the committee members with the exception of the committee member in question.

Vacancies shall be reported to the full Board as soon as practically possible. Vacancies shall be filled by simple majority vote of the Board.

Committee Members shall comply with the obligations and responsibilities of office including the obligation to comply with the disclosure requirements of the Political Reform Act (Form 700). The reporting categories made applicable to the Directors by San

Lorenzo Valley Water District's local conflict of code shall apply to the members of the committee members.

All committee communications must go through the designated committee chairperson.

A committee has jurisdiction to consider and make a recommendation to staff, other committees and to the Board regarding any item of business within the responsibility of the committee. Committee recommendations shall be communicated to the Board. A committee may consider other matters referred to it by the Board.

The Board may refer a recommendation back to any committee for reevaluation whenever the Board deems additional evaluation is required.

Each Standing Committee shall, as a minimum, be responsible for the following:

Administrative Committee

The Committee shall be responsible for matters of internal and external administrative matters including: communications, staffing and staff support; District's data gap grant programs; interagency relations; codes and policies, pending State and Federal legislation; and other administrative programs.

Budget and Finance Committee

The Committee shall be responsible for the review of District finances including: rates, fees, charges and other sources of revenue; budget and reserves; audit; investments; insurance; and other financial matters.

Engineering Committee

The Committee shall be responsible for the review matters of design, construction, replace and repair of the District facilities and property including: The Capital Improvement Program; Master Plans and other engineering, operational and planning related matters.

Environmental Committee

The Committee shall be responsible for matters of stewardship of the District's property including: Urban Water Management Plans; Water Conservation Programs; Classis Watershed Education Grants; Watershed Management; Resource Management and other environmental related matter.

Lompico Assessment District Oversight Committee

The Committee shall be responsible to fulfill their charter as it relates to Assessment District 2016-1 projects.

Changes to this Section 14 shall take effect immediately.

15. <u>MEETING STIPENDS</u>

Each Director may receive compensation as established by resolution of the Board of Directors. Pursuant to California Water Code section 30507, each Director may receive compensation in an amount not to exceed one hundred dollars (\$100.00) per day for each day's attendance at meetings of the Board, or for each day's service rendered as a Director by request or approval of the Board, not to exceed six hundred dollars (\$600.00) in any calendar month.

Consistent with California Water Code section 30507, by resolution of the Board of Directors, the District has established the following per day (daily meeting stipend) for each day's attendance at meetings, as defined herein. Such compensation is in addition to any approved reimbursement for meals, lodging, travel and other expenses consistent with the policies stated herein.

- A) To be entitled to a daily meeting stipend of one hundred dollars (\$100.00), the event in question must constitute one of the following:
 - 1. A meeting of the San Lorenzo Valley Water District Board of Directors within the meaning of California Government Code section 54952(a); or
 - 2. Any meeting attended or service provided on a given day at the formal request of the District Board of Directors, and for which the Board at a public meeting approved payment of a daily meeting stipend.
- B) To be entitled to a daily meeting stipend of twenty five dollars (\$25.00), the event in question must be a meeting of a designated District standing committee within the meaning of California Government Code section 54952(b). Only Directors appointed to the District standing committees shall be entitled to said daily meeting stipend.

16. TRAINING, EDUCATIONAL PROGRAMS, CONFERECENCES AND MEETINGS

The Board of Directors has determined that the following provisions shall be applicable to Director training, educational programs, conferences and meetings:

- A) Directors are encouraged to attend educational conferences and professional meetings when the purposes of such activities are to improve District operation. Directors may attend, on behalf of the District, such training, educational programs, conferences and meetings as have been approved by the Board of Directors.
- B) It is the policy of the District to encourage Board development and excellence of performance by reimbursing necessary and reasonable expenses incurred for tuition, travel, lodging and meals as a result of training, educational courses, participation with professional organizations, and attendance at local, state and

national conferences associated with the interests of the District. Cash advances or use of District credit cards for these purposes is not permitted. All reimbursement of actual and necessary expenses shall be pursuant to District policy on expenditure reimbursement as stated herein.

- C) Attendance by Directors at seminars, workshops, courses, professional organization meetings, and conferences etc. shall be approved by the Board of Directors at a public meeting prior to incurring any authorized reimbursable costs.
- D) The District Manager or designee is responsible for making arrangements for Directors for conference and registration expenses, and for per diem. Per Diem, when appropriate, shall include reimbursement of expenses for meals, lodging, and travel. All expenses for which reimbursement is requested by Directors, or which are billed to the District by Directors, shall be submitted to the District Manager, together with validated receipts.
- E) To conserve District resources and keep Directors' reimbursement expenses for training, educational programs, conferences and meetings within community standards for public officials, reimbursement expenditures should adhere to the following guidelines. Expenses to the District for Board of Directors' training, education programs, conferences and meetings should be kept to a minimum by:
 - 1. Utilizing hotel(s) recommended by the event sponsor in order to obtain discounted rates.
 - 2. Traveling together whenever feasible and economically beneficial.
 - 3. Requesting reservations sufficiently in advance, when possible, to obtain discounted air fares and hotel rates.
- F) A Director shall not attend a conference or training event for which there is an expense to the District if it occurs after the Director has announced a pending resignation, or if it occurs after an election in which it has been determined that a Director will not retain a seat on the Board. A Director shall not attend a conference or training event when it is apparent that there is no significant benefit to the District.
- G) Whenever a Director who has not previously attended a particular conference or educational program is available to attend same, that Director shall have preference for attendance over a Director who has previously attended the same program.
- Upon returning from seminars, workshops, conferences, etc., where expenses are reimbursed by the District, Directors will either prepare a written report for distribution to the Board, or make a verbal report during the next regular meeting of the Board. The report shall detail what was learned at the session(s) that will be of benefit to the District. Materials from the session(s) may be

delivered to the District office to be included in the District library for the future use of other Directors and staff.

 Nothing in this policy shall permit the conduct of business in violation of the Ralph M. Brown Act when more than three (3) Directors attend the same event.

17. <u>EXPENDITURE REIMBURSEMENT</u>

The purpose of this policy is to prescribe the manner in which members of the San Lorenzo Valley Water District Board of Directors may be reimbursed for expenditures related to approved District business. The District shall adhere to California Government Code sections 53232 through 53232.4 or as amended when dealing with issues of expenditure reimbursements for Directors. This policy shall apply to all members of the Board of Directors, and is intended to result in no personal gain or loss to a Director.

Directors may be reimbursed for out-of-pocket expenditure(s) relative to reasonable and necessary costs associated with appropriate District business. The Board of Directors must provide approval for said District business at a public meeting prior to incurring any authorized reimbursement costs.

Directors are eligible to receive reimbursements for travel, meals, lodging, and other reasonable and necessary expenses associated with approved District business. Reimbursement rates shall coincide with guidelines established herein, or rates set by Internal Revenue Service Publication 1542 or its successor publication(s), whichever are greater.

If lodging is in connection with a prior approved event, such lodging costs shall not exceed the maximum group rate published by the conference or activity sponsor. If the published group rate is unavailable, Directors shall be reimbursed for comparable lodging at government or IRS rates.

If travel is in connection with a prior approved event, the most economical mode and class of transportation reasonably consistent with scheduling needs must be used, using the most direct and time-efficient route. Directors shall use government or group rates offered by the event provider of transportation when available. If the group rate is unavailable, Directors shall be reimbursed for comparable travel at government or IRS rates.

Directors shall submit their requests for reimbursement on a form approved by the District Manager. The reimbursement form shall include an explanation of the District-related purpose for the expenditure(s). Receipts documenting all expenditure are required to be submitted in conjunction with the expense report form. Failure to submit necessary receipts will result in denial of the reimbursement claim. Expense reports shall be submitted within a reasonable time, and at no time more than fourteen (14) calendar days after incurring the expense. The District Manager will review and approve reimbursement requests.

Any and all expenses that do not fall within the adopted travel reimbursement policy or the IRS reimbursable rates are required to be approved by the Board of Directors in a public meeting prior to the expense(s) being incurred. Expenses that do not adhere to the adopted travel reimbursement policy or the IRS reimbursable rates, and that do not receive prior approval from the Board of Directors in a public meeting prior to the expense being incurred, shall not be eligible forreimbursement.

State law provides criminal penalties for misuse of public resources, which includes falsification of expense reports. Penalties include fines, imprisonment, and restitution.

18. PERSONNEL POLICIES

A) PERSONNEL SYSTEM RULES AND REGULATIONS

San Lorenzo Valley Water District is committed to the provision of an orderly, equitable and uniform personnel system. The Board of Directors by resolution shall establish written rules and regulations for the administration of the personnel system. Personnel system rules and regulations shall be reviewed at a Board of Directors meeting in December of each calendar year or as soon thereafter as reasonable.

B) SEXUAL HARASSMENT

The San Lorenzo Valley Water District is committed to creating and maintaining a work environment free of objectionable and disrespectful conduct and/or communication of a sexual nature and prohibits sexual harassment by all employees and the Board of Directors. The Board of Directors by resolution shall establish a written policy and procedure manual relative to sexual harassment. The District's sexual harassment policy shall be reviewed at a Board of Directors meeting in December of each calendar year or as soon thereafter as reasonable. Conduct which creates an intimidating, hostile or offensive work environment will not be tolerated. Verbal behavior, physical behavior, gestures and other non-verbal behavior which create said environment will not be tolerated. Any employee or member of the public who feel that they have been or are being harassed by a Director is strongly encouraged to immediately report such incident to the District Manager without fear of reprisal regardless of the outcome of the complaint. The District Manager shall assign the investigation of the alleged misconduct to an outside party such as an attorney or law firm experienced in such matters. The District Manager shall notify the President of the Board of Directors of said alleged misconduct. Thereafter, the President, at the next meeting of the Board of Directors, shall report the facts and nature of the allegations to the entire Board of Directors.

If the Director charged with sexual harassment is the President of the Board of Directors, the District Manager shall report the fact and nature of the allegation(s) to the entire Board of Directors at its next meeting.

If an allegation of sexual harassment against a Director is investigated and found to be supported, the Board of Directors reserves the right to take such remedial action as is appropriate under all of the circumstances, including, if warranted, initiating an action for recall of such Director. The Directors agree that an accusation of sexual harassment against any one of them must be investigated. It is further agreed that such an investigation is not an invasion of their right of privacy.

C) NONDISCRIMINATION

The District shall not unlawfully discriminate against qualified employees or job applicants on the basis of age, sex, race, color, creed, religion, national origin, ancestry, marital status, sexual orientation, physical or mental disability, veteran status, or status with regard to public assistance. Equal opportunity shall be provided to all qualified employees and applicants in every aspect of personnel policy and practice.

All employees are expected to carry out the responsibilities in a manner that is free from discriminatory statements or conduct.

D) REASONABLE ACCOMMODATION-AMERICANS WITH DISABILITIES ACT

Pursuant to the Americans with Disabilities Act, employers have a duty to reasonably accommodate employees and job applicants with known disabilities. This accommodation is not required for individuals who are not otherwise qualified for the job nor is accommodation generally required until the person with the disability requests it. The following optional regulation includes procedures recommended by the Equal Employment Opportunity Commission for use when determining what accommodation to make.

Requests for reasonable accommodation may first be considered informally by the site administrator. If an accommodation cannot be made at the site because it would impose undue hardship or because of a lack of funds, the site administrator shall ask that the request be submitted in writing to the General Manager. The site administrator shall provide the employee or applicant with any assistance he/she may need in order to submit this request.

The duty to reasonably accommodate an individual with a disability is limited to those accommodations which do not impose an undue hardship upon the district.

Undue hardship is determined on a case-by case basis and includes any action that is unduly costly, extensive, substantial, disruptive, or that fundamentally alters the nature or operation of the agency. The burden of proving undue hardship rests with the agency, and what may be an undue hardship for one agency may not be an undue hardship for another, depending on factors such as cost and agency size. Even if cost does pose an undue hardship, the disabled person should have the opportunity to pay for the portion of the cost that constitutes an undue hardship, or to personally provide the accommodation.
19. <u>CONFLICT OF INTEREST CODE</u>

Pursuant to provision of California Government Code section 81,000 et seq., commonly known as the Political Reform Act, the District shall adopt and maintain a Conflict of Interest Code. The Conflict of Interest Code and, any amendments thereto shall be adopted by resolution of the Board of Directors. The Board of Directors shall review the adopted Conflict of Interest Code on a bi-annual basis. At a regularly scheduled Board of Directors meeting in September of each even-numbered year, the Board of Directors shall submit said amendments to the Santa Cruz County Board of Supervisors in accordance with applicable deadlines. If no amendments are needed, the Board of Directors shall submit a written statement saying that its Conflict of Interest Code is still accurate.

20. <u>RESIGNATIONS</u>

Resignations by Directors shall be in writing, state the effective date and be submitted to the President of the Board of Directors and District Secretary. In the event the President of the Board of Directors resigns, the resignation shall be submitted to the Vice-President of the Board of Directors and the District Secretary.

21. VACANCIES

Directors are expected to carry out their responsibilities to the best of their abilities. In order to accomplish this goal, Directors should be present for scheduled meeting or events whenever possible. In accordance with California Government Code section 1770 a Director position vacancy will occur whenever "he or she ceases to discharge the duties of his or her office for the period of three consecutive months, except when prevented by sickness", or when absent from the Board of Directors without the permission of the majority of the Board of Directors.

If such vacancy occurs, the Board of Directors will take action in accordance with California Government Code section 1770.

In order to accomplish this in an orderly and consistent manner, when a vacancy of an elected Director occurs, the District Board of Directors, after discussion and consideration, shall when deemed appropriate, instruct staff to:

- A) Place a public notice advising that a vacancy has occurred in accordance with applicable provisions of law; and
- B) Said notice shall advise prospective candidates of the steps to take to apply for appointment; and

- C) The District's Board of Directors shall establish the closing date for the receipt of applications; and
- D) Applicants shall submit the following, by the date specified in the notice:
 - 1) a letter of interest, and
 - 2) a resume, with particular emphasis on the applicant's knowledge of special districts, and
- E) Applicant(s) shall be interviewed at the next regularly scheduled meeting of the District's Board of Directors following the date of closure for applications; and
- F) The District's Board of Directors shall make the appointment without undue delay, but need not act at the same meeting.

22. <u>INCONSISTENT, INCOMPATIBLE AND CONFLICTING</u> <u>EMPLOYMENT OR ACTIVITIES</u>

Pursuant to the provision of the California Government Code section 1126, the Board of Directors of the San Lorenzo Valley Water District has determined that it would be inconsistent and incompatible for a Board member to be a paid employee of the District. Therefore, based on this decision, a member of the Board of Directors shall not be a paid District employee.

23. DIRECTORS' LEGAL LIABILITIES

The District shall defend and indemnify Directors from any claim, liability or demand that arises out of a Director's performance of his or her duties or responsibilities as a Director or Officer of the District, as provided by Government Codes 825 and 995.

24. INVESTMENT POLICY

San Lorenzo Valley Water District is committed to the establishment of formal policies relative to the prudent investment of the District's unexpended cash. The Board of Directors by resolution shall establish written guidelines for the investment of all San Lorenzo Valley Water District funds or funds in the custody of the District, in a manner which conforms to all state and local statutes governing the investment of public funds. Said guidelines shall provide for an optimal combination of safety, liquidity and yield. The District's Investment Policy and, any amendments thereto, shall be adopted by resolution of the Board of Directors. The Investment Policy shall be reviewed at a Board of Directors meeting in December of each calendar year or as soon thereafter as reasonable.

25. <u>ANNUAL DISCLOSURE OF REIMBURSEMENTS</u>

The District shall annually disclose any reimbursements paid by the San Lorenzo Valley Water District of at least one hundred dollars (\$100.00) for each individual charge for services or products received. The Board of Directors shall review said reimbursement information for the preceding fiscal year (July 1 - June 30) at a regularly scheduled Board of Directors meeting in September of each calendar year.

26. <u>GENERAL PROVISIONS</u>

Any of the within policies not required by law may be altered, amended, or repealed by a majority of the Board at a duly authorized meeting.

27. <u>ANNUAL REVIEW</u>

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This Board of Directors Policy Manual shall be reviewed at least annually and ratified by Resolution of the Board of Directors at a Board of Directors meeting, at least in December of each calendar year or as soon thereafter as reasonable.

*** END ***

MEMO

To: Board of Directors

From: District Manager

Subject: Joint Boards Retreat

Date: February 7, 2019

Recommendation

It is recommended that the Board of Directors review this memo and decide if they are interested in moving forward with a Joint Boards Retreat.

Background

On January 25, 2019 staff received an email from Piret Harmon, General Manager of the Scotts Valley Water District, stating that she has received positive response to the idea of a Joint Boards Retreat hosted by SVWD and SLVWD and including the Santa Margarita Groundwater Agency Board. Ms. Harmon suggested that staff ask the SLVWD Board if they are interested moving forward with the plan.

Ms. Harmon attended a meeting where "Moving From Group to Team: Creating a Cohesive Board" was presented. They help leaders build healthy, productive and empowered teams through communication, listening, positivity and leadership. She found the presentation very worthwhile and thought it could help all three Boards locally and regionally with collaboration.

Additional questions regarding the Joint Boards Retreat:

- Timing -late morning followed by lunch -late afternoon followed by dinner
- Date -the next Board meeting of SMGWA (February 28th) there's not much on the agenda so it could be skipped in favor of retreat -check instructor availability

ACWA JPIA

Training for Board Members



Moving From Group To Team: Creating a Cohesive Board

November 27, 2018

800.231.5742 — www.acwajpia.com — training@acwajpia.com













GROUPto



What if there are **ONLY TWO OPTIONS?**

GROUP or **TEAM**

What if....

Everything that <u>you</u> do, <u>you</u> say, <u>you</u> think, <u>you</u> feel is either keeping <u>you</u> in *group* or elevating <u>you</u> into the *experience* of *TEAM*?









































MEMO

TO:	Board of Directors
FROM: PREPARED BY:	District Manager Environmental Programs Manager
SUBJECT:	Discussion and Possible Action to Review and Accept the Final Water Availability Assessment for a Conjunctive Use Plan for the San Lorenzo Valley Water District
DATE:	February 7, 2019

RECOMMENDATION:

It is recommend that the Board of Directors review and accept the Water Availability Assessment for a Conjunctive Use Plan.

BACKGROUND

On March 15, 2018 your Board approved a contract with Exponent for a Water Availability Assessment for a Conjunctive Use Plan for the San Lorenzo Valley Water District.

The San Lorenzo Valley Water District (SLVWD) and the County of Santa Cruz received California state grant funds to develop a conjunctive use plan to improve aquatic habitat and water-supply reliability within the San Lorenzo River watershed. As part of the plan's development, this water availability assessment identifies options for increasing water-supply reliability and dry-period streamflows through the conjunctive use of available surface water and groundwater resources.

SLVWD operates three water systems: the North system supplied by both stream diversions and pumped groundwater; the South system supplied solely by groundwater; and the Felton system supplied solely by stream and spring diversions. The neighboring Scotts Valley Water District (SVWD) and Mount Hermon Association (MHA) rely solely on groundwater. Each system produces water in response to relatively immediate water demand and all groundwater is produced from within the Santa Margarita Groundwater Basin (SMGB).

Increasing the conjunctive use of groundwater and surface water supplies within the San Lorenzo River watershed has the potential to improve water rights compliance, instream flows, and groundwater storage. The potential for increased conjunctive use is supported by the occurrence of divertible streamflows exceeding local demand, the recent construction of system interties, and SLVWD's mostly unused annual allotment of Loch Lomond Reservoir storage.

This report presents alternatives for optimizing the conjunctive use of current and potential water sources using existing and potential infrastructure to improve aquatic habitat and water-supply reliability within the San Lorenzo River watershed. For each alternative, Exponent performed an analysis of monthly water supply, water production, and projected 2045 water demand over the 48- year climatic cycle spanning water years (WY) 1970-2017. The approach requires estimates of monthly streamflows and potential diversions based on estimated frequencies of mean daily flow adjusted for month and hydrologic year-type (e.g., wet, dry, etc.). Alternative conjunctive-use scenarios are compared to a base case calibrated to SLVWD's proportional use of surface-water and groundwater during WYs 2000-2017.

The Grant has fund \$330,000 for this effort. SLVWD has agreed to provide \$285,000 in match through completed and planned activities. Additional costs, up to \$15,000 to be paid by SLVWD are included in the match.

It is recommend that the Board of Directors review and accept the Water Availability Assessment for a Conjunctive Use Plan.

2015 STRATEGIC PLAN: Strategic Element 1.0 - Water Supply Management Strategic Element 2.0 - Watershed Stewardship

FISCAL IMPACT: Department: 01 - Administration Account: 5020, Contract/Professional Services Cost: \$60,000 grant funded Up to \$15,000 District funded

Agenda: 2.7.19 Item: 10c

$E^{\chi}ponent^{\circ}$

Water Availability Assessment for San Lorenzo River Watershed Conjunctive Use Plan

Agenda: 2.7.19 Item: 10c

Exponent

Water Availability Assessment for San Lorenzo River Watershed Conjunctive Use Plan

Prepared for

San Lorenzo Valley Water District 13060 Highway 9 Boulder Creek, CA 95006

Prepared by

Exponent 475 14th Street, Suite 400 Oakland, CA 64612

January 30, 2019

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QAID: 1801115.000 - 4511

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Figures appear following each section's text and tables.

Agenda: 2.7.19 Item: 10c January 30, 2019

Acronyms and Abbreviations

% avg	percent of average
% dfa	percent departure from average
ac	acre
af	acre-feet
afm	acre-feet per month
afy	acre-feet per year
ASR	aquifer storage and recovery
avg	average
cfs	cubic feet per second
cfs/mi ²	cubic feet per second per square mile
ck	creek
CY	calendar year (January–December)
dfa	departure from average
ft	feet
ft bgs	feet below ground surface
ft msl	feet above mean sea level
gpm	gallons per minute
gpd	gallons per day
hp	horsepower
in	inches
in/yr	inches per year
max	maximum
MHA	Mount Hermon Association
mi	mile
mi ²	square miles
min	minimum
mgd	million gallons per day
mgy	million gallons per year
mth	month
Oly-#	Olympia well
Paso-#	Pasatiempo well
QH-#	Quail Hollow well
SCCWD	Santa Cruz City Water Department
SGMA	Sustainable Groundwater Management Act
SLR	San Lorenzo River
SLRBT	San Lorenzo River at Big Trees (USGS gauging station)
SLVWD	San Lorenzo Valley Water District
SMGB	Santa Margarita Groundwater Basin
sp	spring
SVWD	Scotts Valley Water District
USGS	U.S. Geological Survey
UWMP	Urban Water Management Plan
WAC	Water Systems Consulting

WTP	water treatment plant
WY	water year (e.g., WY 2018 was October 1, 2017, to September 30, 2018)

Conversion Factors

1 af	=	43,560 ft ³	=	325,851 gal	=	0.326 mg
1 afm	=	0.0166 cfs	=	7.434 gpm	=	0.0107 mgd
1 afy	=	0.00138 cfs	=	0.620 gpm	=	892.1 gd
1 cfs	=	448.8 gpm	=	0.646 mgd	=	724.5 afy
1 gpm	=	1,440 gpd	=	0.526 mgy	=	1.6141 afy
1 mgd	=	1.547 cfs	=	694.4 gpm	=	1,121 afy

Limitations

The results of this study are suitable for a planning-level evaluation of conjunctive use alternatives. The synthesized monthly records of water supply and use have limited precision and should not be used to evaluate compliance with specific regulatory, water-right, or habitat requirements. The alternatives are evaluated under optimal, hypothetical conditions without full regard for infrastructure and operational limitations, and as such likely overestimate potential yields. The actual yield of existing and future infrastructure will depend on numerous factors beyond the scope of this analysis.

The approach used to evaluate and compare conjunctive use alternatives does not consider the effects of stream diversions or groundwater pumping other than by San Lorenzo Valley Water District (SLVWD). Beyond the simplified approach used for this study, evaluating the effects of groundwater pumping on streamflow requires use of a calibrated numerical groundwater flow model, which was outside the scope of this study. The conjunctive use alternatives are evaluated and compared on the basis of the 1970-2017 climatic period without considering potential climate change.

The report provides additional details about the methods, results, and limitations of this study.

Executive Summary

The San Lorenzo Valley Water District (SLVWD) and the County of Santa Cruz received California state grant funds to develop a conjunctive use plan to improve aquatic habitat and water-supply reliability within the San Lorenzo River watershed. As part of the plan's development, this water availability assessment identifies options for increasing water-supply reliability and dry-period streamflows through the conjunctive use of available surface water and groundwater resources.

SLVWD operates three water systems: the North system supplied by both stream diversions and pumped groundwater; the South system supplied solely by groundwater; and the Felton system supplied solely by stream and spring diversions. The neighboring Scotts Valley Water District (SVWD) and Mount Hermon Association (MHA) rely solely on groundwater. Each system produces water in response to relatively immediate water demand and all groundwater is produced from within the Santa Margarita Groundwater Basin (SMGB).

Increasing the conjunctive use of groundwater and surface water supplies within the San Lorenzo River watershed has the potential to improve water rights compliance, instream flows, and groundwater storage. The potential for increased conjunctive use is supported by the occurrence of divertible streamflows exceeding local demand, the recent construction of system interties, and SLVWD's mostly unused annual allotment of Loch Lomond Reservoir storage.

This report presents alternatives for optimizing the conjunctive use of current and potential water sources using existing and potential infrastructure to improve aquatic habitat and water-supply reliability within the San Lorenzo River watershed. For each alternative, Exponent performed an analysis of monthly water supply, water production, and projected 2045 water demand over the 48-year climatic cycle spanning water years (WY) 1970-2017. The approach requires estimates of monthly streamflows and potential diversions based on estimated frequencies of mean daily flow adjusted for month and hydrologic year-type (e.g., wet, dry, etc.). Alternative conjunctive-use scenarios are compared to a base case calibrated to SLVWD's proportional use of surface-water and groundwater during WYs 2000-2017.

In addition to a simulated base case, a total of 22 conjunctive-use alternatives are evaluated, grouped as follows:

Scenario 1 – Optimizes the use of current sources assuming existing or modified infrastructure.

Scenario 2 – Adds use of SLVWD's allotment of Loch Lomond Reservoir storage, which substitutes for unpermitted diversions and groundwater pumping, contributing to groundwater storage recovery through in-lieu recharge.

Scenario 3 – Increases the yield of the Olympia wellfield in the North System through operating an aquifer storage and recovery (ASR) project supplied by available surface water in excess of monthly water demand.

Scenario 4 – Provides the remaining available surface water to the Scotts Valley area for use as in-lieu recharge (i.e., used as a substitute for groundwater pumping, contributes to groundwater storage recovery).

Each alternative consists of four parts: (1) a model of monthly water demand, (2) synthetic records of monthly unimpaired flows and potentially divertible flows, (3) estimates of sustainable groundwater yield, including estimated yield reductions during drought and heavy demand; and (4) a monthly accounting of demand and supply for an assumed set of production capacities and an assumed prioritized use of individual surface water and groundwater sources.

The evaluation of each alternative includes estimating (a) percent reductions in unimpaired flow downstream of simulated diversions and impaired flow downstream in Boulder Creek and the San Lorenzo River; and (b) percent reductions in drought minimum stream baseflow down gradient of simulated wells. The estimated reductions in flow are plotted and reported as percentages of streamflow remaining. These results reflect the influence of SLVWD stream diversions and SLVWD, SVWD, and MHA groundwater pumping only.

The results are suitable for a planning-level evaluation of conjunctive-use alternatives. The scenarios are simulated under optimal, hypothetical conditions without full regard for infrastructure and other operational limitations, and as such likely overestimate potential yields. The actual yield of modified infrastructure will depend on numerous factors beyond the scope of this analysis. The presented values of simulated monthly flow have limited precision and should not be used to evaluate compliance with specific regulatory, water-right, or habitat requirements. Evaluating the effects of groundwater pumping on streamflow, beyond the approach used for this study, will
require use of a calibrated numerical groundwater flow model, which was not within the scope of this study.

The results support the following observations:

- Potential water transfers using system interties are insufficient to achieve Felton water rights compliance. The North system has no unused potential diversions during months when the Felton system is not in compliance. Increased production from the Pasatiempo wells for transfer to Felton would require locally unprecedented rates of production from an over-drafted aquifer. A supplemental source, such as imports from Loch Lomond, may be needed more than 20 percent of the time to comply with water rights.
- Complying with the Felton system water rights notably increases the minimum percentages of flows remaining downstream, particularly for Bull Creek.
- Estimated increases in water production resulting from assumed increases in stream diversion capacity indicate a potential to increase yields from SLVWD's diversion streams.
- South system imports of North and/or Felton system unused potential diversions allow 30 to greater than 50 percent reductions in South system groundwater production.
- Supplementing the North system with Felton system unused potential diversions provides a 20 percent reduction in North system groundwater pumping.
- Supplementing the North system with extractions from a hypothetical ASR project supplied by North and/or Felton unused potential diversions provides roughly 30 to 60 percent net reductions in North system groundwater pumping.
- Stream diversions for in-lieu recharge and ASR occur during high-flow periods and have relatively little effect on minimum flows remaining downstream of the diversions.
- Use of SLVWD's Loch Lomond allotment allows the Felton system to comply with its permitted water rights as well as reduce South system groundwater pumping by roughly 60

to 70 percent; as a result, unused North and Felton system potential diversions are available for ASR instead of South system in-lieu recharge.

- A 60 to 70 percent reduction in South system groundwater pumping as a result of imports from Loch Lomond and/or unused potential diversions represents a significant contribution to SMGB groundwater storage recovery. The degree to which SLVWD could recover this storage is uncertain.
- Using the system interties to supply the South system with unused potential diversions uses roughly 40 and 50 percent of North and Felton system unused diversions, respectively.
- With the addition of a Loch Lomond supply, optimal use of North and Felton unused potential diversions requires ASR. As simulated under optimal conditions, ASR uses roughly half of the remaining unused diversions and helps reduce North system groundwater pumping by roughly 30 to 60 percent.
- Reduced groundwater pumping as a result of imports from Loch Lomond and the transfer of unused diversions increase the percentage of drought minimum baseflows estimated to remain in lower Newell, Zayante, and Bean creeks to 60 to 80 percent, compared to 50 percent or less for the base case.
- The remaining North and Felton system potential unused diversions (i.e., exceeding the capacity of the hypothesized ASR project) are assumed to be available for export to SVWD, which would further contribute to the recovery of SMGB groundwater storage.

In summary, system interties combined with potential supplemental water supplies provide SLVWD with significant options and flexibility for increasing conjunctive use and improving stream baseflows. The results provide qualitative indications of the potential relative magnitude and effects of the various conjunctive use alternatives. Further application of this work and the development of conjunctive use alternatives are expected to occur in the context of in-stream flow objectives proposed by fishery biologists, in addition to cost, feasibility, and water rights considerations.

1 Introduction

The San Lorenzo Valley Water District (SLVWD) and the County of Santa Cruz (the County) received California state grant funds to develop a conjunctive use plan to improve aquatic habitat and water-supply reliability within the San Lorenzo River watershed. As part of this plan's development, this water availability assessment identifies options for increasing water-supply reliability and dry-period streamflows through the conjunctive use of available surface water and groundwater resources.

SLVWD provides water to three service areas by operating three separate water systems supplied by diversions from San Lorenzo River tributaries and groundwater pumped from the Santa Margarita Groundwater Basin (SMGB; Figures 1-1 and 1-2). The North system is supplied by both stream diversions and pumped groundwater, whereas the South system is supplied solely by groundwater and the Felton system is supplied solely by stream and spring diversions (Figure 1-3). The neighboring Scotts Valley Water District (SVWD) and Mount Hermon Association (MHA) rely solely on groundwater pumped from the SMGB and, in the case of SVWD, recycled water. Each system produces water in response to immediate water demand given that these systems lack substantial surface storage.

Increasing the conjunctive use of groundwater and surface water supplies within the San Lorenzo River watershed has the potential to address several water-resource issues and opportunities. Increased conjunctive use practices may address the following issues:

- Under existing water rights, Felton system stream diversions are not permitted during defined low-flow periods and are not permitted for use outside the Felton service area.
- State and federal fish and wildlife agencies may impose limitations on the North system's pre-1914 appropriative water rights to divert surface water.
- Groundwater overdraft in the Scotts Valley area, including in the vicinity of SLVWD's South system, must be addressed in compliance with the 2014

California Sustainable Groundwater Management Act (SGMA), which includes preventing impacts to groundwater dependent ecosystems.

Opportunities that may facilitate increased conjunctive use include:

- Since 2014, SLVWD has constructed bidirectional emergency interties between its three systems and between SLVWD and SVWD. Although currently permitted for emergency use, these interties provide a potential means for transferring water supplies among service areas.
- When exceeding local demand, divertible streamflows within the North and Felton systems have the potential to supply demand in other areas and to augment groundwater recharge.
- SLVWD has an agreement, unused since 1977, allowing it to purchase from the City of Santa Cruz a portion of the water stored in Loch Lomond Reservoir, which could be used to offset stream diversions and increase groundwater storage.

The reader is referred to previous reports for descriptions of the climate, hydrology, and hydrogeology of the San Lorenzo River watershed and SLVWD's water use and management (e.g., Johnson 2009, 2015).

1.1 Objectives

This assessment evaluates alternatives for optimizing the conjunctive use of current and potential water sources, with existing and potential infrastructure, to improve aquatic habitat and water-supply reliability within the San Lorenzo River watershed. Specific objectives include:

- Optimizing the conjunctive use of available water resources for water-supply reliability and long-term sustainability.
- Reducing Felton diversions to comply with low-flow and dry-period waterrights restrictions.
- Reducing the effect of North system stream diversions and groundwater pumping on dry-period streamflows.

• Reducing groundwater pumping (e.g., by in-lieu recharge) to promote the recovery of groundwater storage and production in the South system and other portions of Scotts Valley.

The considered means for achieving these objectives include:

- Using the inter-system emergency interties to provide:
 - The Felton service area with excess water produced by the other two service areas at times when Felton system diversions are not permitted.
 - The South system and SVWD with excess stream diversions from the Felton and North systems.
 - The North system with excess diversions from the Felton system.
- Using SLVWD's Loch Lomond Reservoir allotment to reduce Felton system diversions, South system groundwater pumping, and North system diversions and groundwater pumping.
- Using excess surface water to supply an aquifer storage and recovery (ASR) project in the Olympia wellfield.

1.2 Approach

To address these objectives, this assessment performs a monthly analysis of SLVWD water demand, available supply, and production over a varied climatic cycle. This approach is based on the following assumptions:

• The evaluated climatic cycle is a repeat of the 48-year period from October 1969 through September 2017, i.e., water years (WYs) 1970–2017. This period includes three critical drought periods, WYs 1976–1977, 1987–1992, and 2012–2016, and is reasonably well supported by historical precipitation,

streamflow, and water production records (Section 1.3). The potential impacts of climate change on water supplies have not been considered.

- Average annual water demand for each service area for the design climatic cycle is based on 2045 demands projected by the 2015 SLVWD Urban Water Management Plan (UWMP) (WAC 2016) (Section 2). Water-year and monthly demand is varied in response to the climatic cycle in a manner similar to the historical record.
- The effective capacities of existing stream diversions, groundwater wells, pipelines, and treatment plants are approximated from near-maximum monthly rates achieved during the historical record (Section 3).
- Estimates of monthly total, divertible, bypassed, and downstream flows are simulated from estimated monthly frequencies of mean daily flow, adjusted for water-year percent-of-average streamflow (Section 4). Synthetic monthly flows of the San Lorenzo River and Boulder Creek are generated using the same method to trigger Felton system diversion restrictions and evaluate the effect of diversions on downstream flows. This method improves upon previous conjunctive use analyses that used monthly timesteps without accounting for daily flow variability (e.g., HEA 1983, 1984; Geomatrix 1999; Johnson 2009, 2015, 2016).
- The historical record of groundwater pumping, groundwater levels, and precipitation is used to estimate sustainable rates of seasonal groundwater production during average and wet years and reduced rates of production as a result of lowered groundwater levels during drought years (Section 5). The application of numerical models to obtain more dynamic estimates of groundwater-surface water interactions was outside the scope of this study.

On this basis, Section 6 presents analyses of monthly water supply and demand for the WY 1970–2017 climatic cycle that address the objectives presented in Section 1.1. Alternative conjunctive use scenarios are compared to a base case representative of the proportional use of

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surface water and groundwater supplies during WYs 2000–2017. Four alternative scenarios are analyzed:

- Scenario 1 optimizes the use of current sources assuming existing or modified infrastructure.
- Scenario 2 adds the use of SLVWD's allotment of Loch Lomond Reservoir storage.
- Scenario 3 increases the yield of the Olympia wellfield through operating an ASR project supplied by surface water supplies in excess of monthly water demand.
- Scenario 4 uses available surface water in excess of local demand to further increase groundwater storage in the Scotts Valley area through in-lieu recharge (i.e., in addition to in-lieu recharge for the Pasatiempo area in Scenarios 1 through 3).

The results of each case are summarized in tables and plots, including monthly plots of the estimated percent of streamflow remaining downstream of each diversion. Appendix A provides the tabulated monthly results for the simulated base case and each alternative conjunctive use scenario.

Section 7 provides conclusions and recommendations based on a summary of the results.

1.3 Available Data

Tables 1-1 and 1-2 summarize data records relevant to this study for precipitation, streamflow, diversions, and groundwater levels and pumping.

The climatic record is well represented by several stations with long-term precipitation records and the U.S. Geological Survey (USGS) gauging record for the San Lorenzo River at the Big Trees (SLRBT) station near Felton (Tables 1-1 and 1-2; Figure 1-4). However, the applicability of the SLRBT record to SLVWD's tributary diversion watersheds is limited because of significant differences in watershed area, physiography, hydrology, geology, and land use.

SLVWD has records of its North system monthly surface water diversions beginning January 1984 (Table 1-1). The available record for the Felton system surface water diversions extends back to January 1993. Because the diversion streams have not been fully gauged until recently, these records provide a lower bound for estimating total streamflow. Previous studies have extrapolated these records on a monthly basis to estimate potential diversions under existing infrastructure and water-rights conditions (Johnson 2009, 2015). However, these records are insufficient for estimating the remaining portion of streamflow available to support habitat or the potential for additional diversions.

Each SLVWD diversion stream has been gauged more or less continuously since 2013 or 2014 (Table 1-1). Except for the gauge immediately upstream of the Fall Creek diversion, the gauged records do not include the amount diverted. The first years of gauging coincided with the WY 2012–2015 drought, followed by nearly average precipitation in WY 2016, and a very wet WY 2017. Despite nearly average to well-above-average precipitation in WYs 2016 and 2017, stream baseflows during those years had not recovered fully from the preceding drought. Provisional gauging records of mean daily flow expressed in cubic feet per second (cfs) were provided for this study (Ruttenberg 2018, pers. comm.).

SLVWD has records of its North and South system monthly groundwater pumping since January 1984 and groundwater levels as early as 1976 (Table 1-1). SVWD and MHA groundwater pumping and water-level records extend back to 1976 and 1992, respectively.

Table 1-2 summarizes periods of record for selected stream gauges other than those summarized in Table 1-1. Boulder Creek, the receiving stream for two SLVWD North system diversion streams, was gauged continuously by the USGS during WYs 1969–1993. USGS-gauged streams potentially influenced by SLVWD groundwater pumping include Zayante Creek (gauged WYs 1958–1993) and Bean Creek (gauged WYs 1989–2007). Other USGS gauged streams with watershed conditions somewhat similar to SLVWD's diversion watersheds include Laguna and Majors creeks (gauged WYs 1969–1976) and San Vicente Creek (gauged WYs 1970–1985;

Figure 1-4). The County has gauged streams at stations throughout the San Lorenzo River watershed with varying frequency since 1975, mostly under low-flow conditions. Since 2014, gauging has been conducted for SLVWD at stations on Boulder, Zayante, Lompico, and Bean creeks, and the San Lorenzo River (Balance Hydrologics 2015, 2016, 2018). The City of Santa Cruz has gauged Newell Creek during portions of WYs 2009–2010 and 2014–2016 (Bassett 2018, pers. comm.).

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Figure 1-2 SLVWD Service Areas, Diversion Watersheds, Points of Diversion, Treatment Plants, and Production Wells



* e.g., WY 2018 was from October 1, 2017 to September 30, 2018.

SLVWD Annual Water Production by System, WYs 1985–2017



Figure 1-4 Selected Watershed Areas, North-Central Santa Cruz County

2 Water Demand

SLVWD's record of monthly raw water production is nearly equivalent to its customer monthly water demand. This is because SLVWD's above-ground storage, imports, and exports of water are minor. Surface water is diverted and treated, and groundwater is pumped, only in response to fairly immediate water demand. SLVWD has sold relatively small amounts of water to MHA and SVWD under short-term, emergency situations and similarly has purchased relatively small amounts of water from SVWD, in each case less than 1 percent of SLVWD's annual water supply. This study defines water demand as total water use, including system losses and other unaccounted for produced water.

Table 2-1 provides the available record of annual water production from SLVWD's current sources since WY 1985 as well as a partial record for WY 1977. Annual water production for the North, South, and Felton service areas is plotted in Figures 2-1, 2-2, and 2-3, respectively.

Based on estimated 2045 total water demand for each SLVWD service area (WSC 2016), and including water demand for the recently annexed Lompico area (now part of the North service area), this study assumes the following average annual water demand:

- North service area: 1,545 acre-feet per year (afy)
- South service area: 365 afy
- Felton service area: 430 afy

SLVWD annual water demand fluctuates by as much as approximately ± 20 percent in response to the climatic cycle, with the following characteristics (Johnson 2009, 2015):

- During multi-year droughts (e.g., 1976–1977, 1987–1992, and 2007–2009), water use may increase initially before declining in response to voluntary or mandatory water conservation.
- Reduced demand may persist for a year or more following a drought.

- Water demand tends to decrease during years with exceptionally high precipitation.
- Water demand tends to gradually increase to above-average levels between droughts.
- Water demand may vary as a result of additional factors, e.g., the significant reduction in water demand that occurred in apparent response to the economic recession that began in 2008.
- SLVWD's three service areas have not responded identically to these influences (Figures 2-1, 2-2, and 2-3).

Table 2-2 presents values of annual water demand assumed by this study for each SLVWD service area for the WY 1970–2017 design climatic cycle. In response to the climatic cycle, assumed annual demands vary above and below the projected 2045 average demand in a manner similar to the historical record of each service area. Figures 2-1, 2-2, and 2-3 compare the historical and assumed annual water demand for the North, South, and Felton service areas, respectively. Figure 2-4 is a plot of assumed annual demand for all three service areas.

The assumed annual demands are distributed monthly for each service area based on average monthly percentages for near-to-above average, dry, and very dry years (Figure 2-5). The monthly distribution of demand during the driest years reflects conservation rates of up to 40 percent during dry-season months of peak use.

Estimated SVWD water demand for 2040 is approximately 1,650 afy, of which 250 afy is assumed to be supplied by recycled water (Kennedy/Jenks 2016).

$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$			Percent of			North	System					To	tal
Normal Matrix Stream Normal Matrix Lonnond Normal Matrix Produc- tion System Diversions Mall Current by SLVWD Sourcest Sourcest 1977 41% 400 55% 350 47% 350 1.00 160 - 1.260 - 1987 83% 941 60% 636 40% 0 1.576 204 - 1.711 - 1986 137% 866 59% 593 41% 0 1.467 2144 -<			Average						Total	South	Felton		
Wear Ben Diversions Wells Lonnol ton Wells solves by SLWD Sources 1877 ⁶ 41% 40 53% 350 47% 350 1.100 160 -			Rainfall at	Strea	m			Loch	Produc-	System	Diver-		All Current
Year Lormond afy % ^a afy	Wat	er	Ben	Divers	ions	Wel	ls	Lomond	tion	Wells	sions ^b	by SLVWD	Sources
1977 41% 300 1700 160 1.200 1984 83% 941 60% 636 40% 0 1.576 204 1.781 1986 83% 941 60% 533 41% 0 1.457 214 1.671 1986 65% 500 35% 921 65% 0 1.426 224 1.670 1989 70% 647 48% 697 52% 0 1.330 265 - 1.607 1990 50% 693 52% 637 48% 0 1.330 265 - 1.607 - 1991 66% 501 37% 863 63% 0 1.384 310 - 1.608 - 1.705 1991 66% 724 84% 792 52% 0 1.621 308	Yea	ar	Lomond	afy	% ^a	afy	% ^a				afy		
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	197	7 ^c	41%	400	53%	350	47%	350	1,100	160	-	1,260	-
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	198	34	83%	-	-	I	-	-	-	-	-	-	-
1986 137% 865 59% 59% 14% 0 1.487 214 1.671 1987 55% 569 38% 918 62% 0 1.486 224 1.700 1988 62% 500 35% 921 65% 0 1.421 229 1.650 1990 65% 501 37% 663 63% 0 1.336 265 1.607 1991 65% 501 37% 663 63% 0 1.384 276 1.608 1992 118% 870 62% 526 33% 0 1.385 310 1.705 1.705 1995 141% 1.047 7% 448 0 1.484 386 420 2.031 2.461 1997 120% 1.118 64% 528 32% <t< td=""><td>198</td><td>35</td><td>83%</td><td>941</td><td>60%</td><td>636</td><td>40%</td><td>0</td><td>1,576</td><td>204</td><td>-</td><td>1,781</td><td>-</td></t<>	198	35	83%	941	60%	636	40%	0	1,576	204	-	1,781	-
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	198	36	137%	865	59%	593	41%	0	1,457	214	-	1,671	-
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	198	37	55%	569	38%	918	62%	0	1,486	224	-	1,710	-
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	198	88	62%	500	35%	921	65%	0	1,421	229	-	1,650	-
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	198	39	70%	647	48%	697	52%	0	1,344	263	-	1,607	-
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	199	90	50%	693	52%	637	48%	0	1,330	265	-	1,595	-
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	199	91	65%	501	37%	863	63%	0	1,364	276	-	1,640	-
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	199	92	84%	671	48%	727	52%	0	1,398	301	-	1,698	-
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	199	93	118%	870	62%	526	38%	0	1,395	310	-	1,705	1,705
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	199	94	67%	729	48%	792	52%	0	1,521	308	498	1,829	2,328
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	199	95	141%	1,047	70%	446	30%	0	1,493	376	414	1,869	2,283
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	199	96	125%	1,117	68%	528	32%	0	1,645	386	420	2,031	2,451
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	199	97	120%	1,118	64%	618	36%	0	1,735	430	351	2,165	2,516
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	199	98	169%	1,163	78%	331	22%	0	1,494	336	366	1,829	2,195
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	199	99	94%	1,196	75%	392	25%	0	1,588	406	419	1,994	2,413
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	200	00	115%	1,037	64%	590	36%	0	1,628	434	489	2,062	2,551
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	200)1	76%	908	56%	724	44%	0	1,632	447	487	2,079	2,567
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	200)2	96%	935	56%	727	44%	0	1,662	433	484	2,095	2,579
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	200)3	100%	928	55%	758	45%	0	1,685	436	470	2,122	2,592
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	200)4	90%	889	51%	851	49%	0	1,739	428	481	2,167	2,648
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	200)5	136%	1,121	63%	651	37%	0	1,772	341	424	2,113	2,538
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	200)6	152%	1,114	62%	686	38%	0	1,800	403	432	2,203	2,635
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	200)7	59%	768	43%	1,015	57%	0	1,783	440	435	2,223	2,658
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	200)8	79%	712	45%	870	55%	0	1,581	441	402	2,079	2,425
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	200)9	79%	684	46%	803	54%	0	1,486	410	400	2,297	2,297
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	201	0	115%	947	67%	468	33%	0	1,415	371	399	2,185	2,185
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	201	1	126%	1,128	80%	275	20%	0	1,403	385	426	2,213	2,213
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	201	2	77%	834	57%	625	43%	0	1,460	386	399	2,244	2,244
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	201	3	75%	791	51%	747	49%	0	1,538	392	405	2,335	2,335
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	201	4	47%	421	32%	911	68%	0	1,332	355	354	2,042	2,042
2016 95% 753 59% 530 41% 0 1,283 252 323 1,858 1,858 2017 193% 1,080 73% 404 27% 0 1,484 237 324 2,044 2,044 2018 ////////////////////////////////////	201	5	70%	534	46%	631	54%	0	1,164	311	317	1,793	1,793
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	201	6	95%	753	59%	530	41%	0	1,283	252	323	1,858	1,858
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	201	7	193%	1,080	73%	404	27%	0	1,484	237	324	2,044	2,044
avg 98% 855 56% 663 44% 0 1,518 346 413 1,968 2,324 2017 min 47% 421 32% 275 20% 0 1,164 204 317 1,595 1,705 max 193% 1,196 80% 1,015 68% 0 1,800 447 498 2,335 2,658 2000- 2017 avg 99% 866 56% 681 44% 0 1,547 384 414 2,120 2,345 2000- 2017 min 47% 421 32% 275 20% 0 1,164 237 317 1,793 1,793 2001- 2017 max 193% 1,128 80% 1,015 68% 0 1,800 447 489 2,335 2,658	201	8											
Min 47% 421 32% 275 20% 0 1,164 204 317 1,595 1,705 Max 193% 1,196 80% 1,015 68% 0 1,800 447 498 2,335 2,658 2000- 2017 avg 99% 866 56% 681 44% 0 1,547 384 414 2,120 2,345 2000- 2017 min 47% 421 32% 275 20% 0 1,164 237 317 1,793 1,793 max 193% 1,128 80% 1,015 68% 0 1,800 447 489 2,335 2,658	1005	avg	98%	855	56%	663	44%	0	1,518	346	413	1,968	2,324
2017 max 193% 1,196 80% 1,015 68% 0 1,800 447 498 2,335 2,658 2000- 2017 avg 99% 866 56% 681 44% 0 1,547 384 414 2,120 2,345 2007 min 47% 421 32% 275 20% 0 1,164 237 317 1,793 1,793 max 193% 1,128 80% 1,015 68% 0 1,800 447 489 2,335 2,658	2017	min	47%	421	32%	275	20%	0	1,164	204	317	1,595	1,705
2000- 2017 avg 99% 866 56% 681 44% 0 1,547 384 414 2,120 2,345 2017 min 47% 421 32% 275 20% 0 1,164 237 317 1,793 1,793 max 193% 1,128 80% 1,015 68% 0 1,800 447 489 2,335 2,658	2017	max	193%	1,196	80%	1,015	68%	0	1,800	447	498	2,335	2,658
2000- 2017 min 47% 421 32% 275 20% 0 1,164 237 317 1,793 1,793 2017 max 193% 1,128 80% 1,015 68% 0 1,800 447 489 2,335 2,658	0000	avg	99%	866	56%	681	44%	0	1,547	384	414	2,120	2,345
max 193% 1,128 80% 1,015 68% 0 1,800 447 489 2,335 2,658	2000-	min	47%	421	32%	275	20%	0	1,164	237	317	1,793	1,793
	2017	max	193%	1,128	80%	1,015	68%	0	1,800	447	489	2,335	2,658

Apparent partial record.

WY water year, e.g., WY 2018 was from October 1, 2017 to September 30, 2018.

Not part of SLVWD. No or partial record.

afy acre-feet per year avg average

max maximum

min minimum

^a Percent of North system annual supply.

^b Adjusted for WTP bypass flows.

^c WY 1977 is for July 1976 through June 1977; WY 1984 partial record.

Table 2-1 SLVWD Annual Water Use by Service Area, WYs 1977 and 1985–2017

		Rainfall			SLVWD				
V	Vater	Percent of	No	rth	Sou	ıth	Felt	on	Total
	Year	Average*	% dfa	afy	% dfa	afy	% dfa	afy	afy
1	1970	108%	0.0%	1,544	0.0%	360	0.0%	418	2,323
2	1971	90%	0.0%	1,544	0.0%	360	0.0%	418	2,323
3	1972	64%	7.5%	1,660	10.0%	395	15.0%	486	2,542
4	1973	138%	2.5%	1,583	0.0%	360	5.0%	441	2,384
5	1974	146%	0.0%	1,544	-2.5%	351	0.0%	418	2,314
6	1975	86%	5.0%	1,621	5.0%	378	10.0%	464	2,463
7	1976	44%	-5.0%	1.467	-5.0%	343	-5.0%	396	2.205
8	1977	41%	-17.5%	1,274	-17.5%	299	-20.0%	328	1,901
9	1978	144%	-5.0%	1.467	-5.0%	343	-2.5%	407	2.217
10	1979	87%	2.5%	1,583	2.5%	369	5.0%	441	2,393
11	1980	125%	0.0%	1,544	0.0%	360	0.0%	418	2.323
12	1981	67%	5.0%	1 621	17.5%	422	12.5%	475	2,518
13	1982	164%	0.0%	1 544	2.5%	369	2.5%	430	2 343
14	1983	195%	-2.5%	1,506	-5.0%	343	-2.5%	407	2 255
15	1984	82%	5.0%	1,600	5.0%	378	10.0%	464	2 463
16	1985	83%	7.5%	1,621	22.5%	439	17.5%	498	2,100
17	1986	137%	-2.5%	1,000	-2.5%	351	-2.5%	407	2,007
18	1087	55%	0.0%	1,500	5.0%	378	2.5%	430	2,204
10	1088	62%	2.5%	1,544	2.5%	351	2.5%	407	2,002
20	1080	70%	-7.5%	1,000	-10.0%	325	-10.0%	373	2,207
20	1000	50%	10.0%	1,420	15.0%	307	15.0%	351	2,127
21	1001	65%	7.5%	1,090	12.5%	216	10.0%	272	2,040
22	1991	94%	-7.5% 5.0%	1,420	7.5%	224	-10.0%	206	2,110
23	1992	1100/	-0.0%	1,407	-7.5% E 0%	242	-5.0%	420	2,197
24	1993	67%	-5.0%	1,407	-5.0%	270	2.070	430	2,239
20	1994	07%	2.5%	1,000	5.0%	3/8	12.3%	475	2,435
20	1995	141%	0.0%	1,544	0.0%	360	7.5%	452	2,357
27	1990	125%	5.0%	1,021	2.5%	309	7.5%	452	2,443
28	1997	120%	10.0%	1,699	10.0%	395	0.0%	418	2,512
29	1998	169%	-2.5%	1,500	-5.0%	343	5.0%	441	2,289
30	1999	94%	0.0%	1,544	2.5%	369	10.0%	464	2,377
31	2000	115%	0.0%	1,544	12.5%	404	15.0%	480	2,435
32	2001	/b%	2.5%	1,583	17.5%	422	17.5%	498	2,502
33	2002	96%	5.0%	1,621	12.5%	404	15.0%	486	2,512
34	2003	100%	7.5%	1,660	15.0%	413	12.5%	475	2,548
35	2004	90%		1,099	10.0%	395	15.0%	480	2,380
30	2005	130%	12.5%	1,737	0.0%	360	10.0%	452	2,550
31	2006	152%	15.0%	1,775	12.5%	404	10.0%	404	2,644
38	2007	59%	TZ.5%	1,737	20.0%	430	TU.U%	404	2,031
39	2008	79%	5.0%	1,621	20.0%	430	5.0%	441	2,493
40	2009	79%	2.5%	1,583	5.0%	378	2.5%	430	2,390
41	2010	115%	0.0%	1,544	0.0%	360	2.5%	430	2,334
42	2011	126%	0.0%	1,544	0.0%	360	5.0%	441	2,345
43	2012		-2.5%	1,506	0.0%	360	2.5%	430	2,295
44	2013	75%	0.0%	1,544	2.5%	369	5.0%	441	2,354
45	2014	4/%	-10.0%	1,390	-10.0%	325	-7.5%	385	2,099
46	2015	70%	-20.0%	1,235	-17.5%	299	-17.5%	339	1,873
47	2016	95%	-12.5%	1,351	-17.5%	299	-15.0%	351	2,000
48	2017	193%	-5.0%	1,467	-10.0%	325	-12.5%	362	2,154
<u> </u>	Avg.**	100%	0.1%	1,545	1.4%	365	2.6%	430	2,340
	Min.	41%	-20%	1,235	-17.5%	299	-20%	328	1,873
	Max.	195%	15%	1,776	22.5%	439	17.5%	498	2,644



% dfa assumed percent departure from average

afy acre-feet per year

* NOAA Ben Lomond 4 station (estimated for WYs 1970-1974; Johnson, 2015)

** Averages adopted from 2015 UWMP for WY 2045 (WAC, 2016); approximately 50 AFY are added to the North service area projected demand to account for the recent annexation of the Lompico service area.

Table 2-2 Assumed Water Demand for Design Climatic Period, WYs 1970–2017



WY water year, e.g., WY 2018 was October 1, 2017 to September 30, 2018.





WY water year, e.g., WY 2018 was October 1, 2017 to September 30, 2018.





WY water year, e.g., WY 2018 was October 1, 2017 to September 30, 2018.

Figure 2-3





WY water year, e.g., WY 2018 was October 1, 2017 to September 30, 2018.

Figure 2-4 Assumed 2045 Water Demand by Service Area, WYs 1970–2017 Climatic Period

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North	≥ Average	Dry	Driest
Oct	7.8%	8.5%	9.9%
Nov	7.1%	7.2%	8.0%
Dec	6.9%	7.0%	7.6%
Jan	6.4%	6.7%	7.8%
Feb	6.1%	6.2%	6.2%
Mar	6.5%	6.7%	7.0%
Apr	7.3%	8.1%	7.7%
May	9.1%	9.2%	8.6%
Jun	10.2%	9.5%	9.1%
Jul	11.4%	11.0%	9.8%
Aug	11.1%	10.3%	9.8%
Sep	10.1%	9.6%	8.5%
WY	100%	100%	100%

Percent of WY Demand

Monthly Demand (af)									
North	Average	Dry	Driest						
Oct	121	118	122						
Nov	110	100	99						
Dec	107	97	94						
Jan	99	93	96						
Feb	94	86	77						
Mar	100	93	86						
Apr	113	113	95						
May	141	128	106						
Jun	158	132	112						
Jul	176	153	121						
Aug	171	143	121						
Sep	156	133	105						
WY	1,545	1390*	1235**						

af acre-feet Assumption basis: Recent near-average period: approximate monthly averages for WYs 2008-2012. WY water year Dry years: approximate monthly averages for WYs 1988-1991, 2009, 2013. Driest years:

approximate monthly averages for WYs 2014, 2015.

See Table 2-2 for WY rainfall record.

Percent conservation calculated from monthly acre-feet values as (average - dry or driest) ÷ average.

Percent of WY Demand									
South	≥ Average	Dry	Driest						
Oct	8.0%	9.2%	10.3%						
Nov	7.1%	6.7%	8.3%						
Dec	5.9%	6.0%	7.4%						
Jan	5.1%	5.4%	7.3%						
Feb	4.9%	5.3%	5.6%						
Mar	5.8%	5.7%	7.0%						
Apr	7.4%	8.0%	7.6%						
May	9.6%	8.7%	8.6%						
Jun	11.2%	10.9%	9.2%						
Jul	12.4%	12.1%	10.0%						
Aug	11.5%	11.4%	9.9%						
Sep	11.1%	10.6%	8.8%						
WY	100%	100%	100%						

1	Monthly Demand (af)										
South	Average	Dry	Drie								
Oct	29	31	3								
Nov	26	22	2								
Dec	22	20	2								
Jan	19	18	2								
Feb	18	18	1								
Mar	21	19	2								
Apr	27	27	2								
May	35	29	2								
Jun	41	36	2								
Jul	45	40	3								
Aug	42	38	3								
Sep	41	35	2								
WY	365	332*	299*								



2%

0%

Percent of WY Demand										
Felton	≥ Average	Dry	Driest							
Oct	8.0%	8.2%	9.3%							
Nov	6.8%	6.7%	7.6%							
Dec	7.0%	6.5%	7.4%							
Jan	6.7%	6.3%	7.3%							
Feb	5.8%	5.7%	6.0%							
Mar	6.4%	6.6%	7.2%							
Apr	7.7%	7.9%	7.8%							
May	9.5%	9.8%	9.0%							
Jun	10.1%	10.7%	9.2%							
Jul	11.3%	11.1%	9.9%							
Aug	10.8%	10.6%	9.9%							
Sep	9.9%	9.9%	9.4%							
WY	100%	100%	100%							

Monthly Demand (af)										
Felton	Average	Dry	Driest							
Oct	34	31	31							
Nov	29	25	25							
Dec	30	25	24							
Jan	29	24	24							
Feb	25	22	20							
Mar	28	25	24							
Apr	33	30	26							
May	41	37	30							
Jun	43	41	30							
Jul	49	42	32							
Aug	46	40	32							
Sep	43	38	31							
WY	430	379*	328**							

Assumed Monthly Water Demand as Percent of Annual Demand for

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Percent Conservation								
North	Dry	Driest						
Oct	2%	-1%						
Nov	9%	10%						
Dec	9%	12%						
Jan	6%	3%						
Feb	9%	19%						
Mar	7%	14%						
Apr	0%	16%						
May	9%	24%						
Jun	16%	29%						
Jul	13%	31%						
Aug	17%	29%						
Sep	14%	33%						
WY	9%	18%						

* Average of average and driest. ** Minimum value from Table 2-2.

st
1
5
2
2
7
1
3
6
7
0
0
6
*

Percent Conservation
 Dry
 Driest

 -5%
 -5%
 South Oct 14% 4% Nov Dec 8% -3% Jan 4% -17% Feb 2% 7% 11% Mar 1% Apr 2% 16% May 18% 26% Jun 12% 33% Jul 11% 34% 10% Aug 30% Sep 13% 35% WÝ 8% 13%



Perce	ent Conse	rvation
Felton	Dry	Driest
Oct	10%	11%
Nov	13%	15%
Dec	18%	19%
Jan	17%	17%
Feb	13%	21%
Mar	9%	14%
Apr	10%	23%
May	9%	28%
Jun	7%	31%
Jul	13%	33%
Aug	13%	30%
Sep	12%	28%
WY	12%	22%

Figure 2-5 Near-to-Above Average, Dry, and Driest Years

3 System Capacities

SLVWD's three water systems are currently supplied by the following surface water and groundwater sources:

North System	South System	Felton System									
Active Stream Diversions (number of points of diversion)											
Peavine Creek (1)	none	Fall Creek (1)									
Foreman Creek (1)		Bennett Spring (2)									
Clear Creek (3)		Bull Creek (2)									
Sweetwater Creek (1)											
Surface	Water Treatment Plants (WT	P)									
Lyon WTP	none	Kirby WTP									
A	ctive Groundwater Wells										
Quail Hollow (QH) wells:	Pasatiempo (Paso) wells:	none									
QH-4A and QH-5A	Paso-5A and Paso-8*										
Olympia (Oly) wells:	(*under construction as										
Oly-2 and Oly-3	replacement for Paso-7)										

Figure 3-1 schematically illustrates the configuration and interconnection of these water sources within and between the three systems. Table 3-1 provides a detailed record of the water produced by these sources since WY 1985.

Table 3-2 provides the twenty highest ranked monthly yields of each SLVWD source during the period of record, expressed as an equivalent continuous rate in gallons per minute (gpm). Table 3-3 summarizes the design, peak-month, and planned capacities of SLVWD diversions, wells, conveyance, and treatment facilities.

Based on maximum monthly rates of record (Tables 3-2 and 3-3), SLVWD's stream and spring diversions have the following estimated maximum capacities (expressed as equivalent continuous monthly rates):

North service area:	gpm	cfs
Foreman Creek	930	2.1
Peavine Creek	270	0.6
Clear Creek	300	0.7
Sweetwater Creek	260	0.6
Felton service area:	gpm	cfs
Felton service area: Fall Creek	gpm 280	cfs 0.6
Felton service area: Fall Creek Bennett Spring (to WTP)	gpm 280 200	cfs 0.6 0.45
Felton service area: Fall Creek Bennett Spring (to WTP) Bennett Spring (2-in. line)	gpm 280 200 13	cfs 0.6 0.45 0.03

These maximum rates generally cannot occur simultaneously because of limited raw water conveyance and treatment capacities. For example, the diversion capacities of Foreman, Peavine, Clear, and Sweetwater creeks exceeds the 1,100-gpm capacity of the trunk raw water line from the Foreman mixing vault to the Lyon water treatment plant (WTP) (Table 3-3).

North system diversions are processed by the Lyon WTP, which has a design capacity of 1,100 gpm, a maximum monthly output equivalent to approximately 980 gpm, and a potential capacity of 1,650 gpm if expanded. Felton system diversions are processed by the Kirby WTP, which has a design capacity of 700 gpm but typically operates at half capacity using only one of two units. The maximum continuous monthly production rate of the Kirby WTP is approximately 425 gpm (Table 3-3).

Based on maximum monthly rates of record (Table 3-2), SLVWD's groundwater production wells have the following estimated maximum capacities (expressed as equivalent continuous monthly rates):

North service area:	gpm	cfs
Quail Hollow wells	545	1.2
Olympia wells	780	1.7
Quail Hollow and Olympia wells	1,150	2.6
South service area:		
Pasatiempo wells	435	1.0

The design capacities of the inter-system emergency interties are as follows (Table 3-3):

System Intertie:	gpm	cfs
North-South	150/300/550 ª	0.3/0.7/1.2 ª
North-Felton	150	0.3
Felton-South (via North/direct)	150	0.3
South-SVWD	350	0.8
^a current/expected/potential		

Inspection of Table 3-2 suggests that maximum-monthly rates of water production, conveyance, and treatment may be considered outliers representative of peak performance during optimal circumstances atypical of normal conditions. Peak diversion rates reflect a combination of various operational constraints, including water rights; high-flow limitations; and limited intake, conveyance, and treatment capacities. The effective capacities assumed for simulating conjunctive use scenarios in Section 6 are generally somewhat less than the highest ranked monthly rates of record.

												No	rth Sys	stem											S	outh Sy	/stem					Felt	on Sys	stem					
						Stream	n Divers	ions					Ŵ	ells					Int	erties			Pa	asatiemp	o Wells			Intertie		Streams	Bennet	tt Spring			Inte	ertie			
		WY			Fore-						Q	uail Hol	low	(Dlympia																							Τc	otal
		Rain-			man &			Clear &	t l								Total	То	From	То	From					Mañ	- Total	To Fror	n					Total	То	From		Pro-	All
		fall at	Fore-	Pea-	Pea-		Sweet	- Sweet-								Loc	h Pro-	South	South	Felton	Felton	n				ana	Pro-	North Nort	h Net		to	as	Felton	Pro-	North	North	Net	duced	SLVWD
		Ben Lo-	man	vine	vine	Clear	water	water	Othe	r						Lo	- duc-	Svs-	Svs-	Svs-	Svs-	Net Sup	Paso-	Paso-	⊃aso-	Wds	duc-	Svs- Svs	- Sup-	Fall Bull	Kirbv	around-	Acres	duc-	Svs-	Svs-	Sup-	bv	Current
Wa	ater	mond	Ck	Ck	Cks	Ck	Ck	Cks	Cks	Total	QH-4	QH-5	Total	Olv-2	Olv-3 Tota	al mor	nd tion	tem	tem	tem	tem	nlv	5A	6	7 Tot	tal Well	tion	tem tem	ply	Ck Ck	WTP	water	Well	tion ^b	tem	tem	ply	SI VWD	Sources
Ye	ear	% avg		ÖN	0110	OIL	ÖN	0110	ono	1 otal	Q	4		0.9 =	0.90			tom	tom	toni	tom	afv	0,1	•	1 10							mator	TTON	tion	tonn	toni	<u></u>		
19	77 ^a	<u>41%</u>	1.	-	-	-	-		-	400	-	_	350			3	50 1 100	-	-	1.	-	1 100	. I	-	- 16	i0 -	160		160		_	_	-	_	-	T	<u> </u>	1 260	_
10	11	83%			706	103	109	2 221	1	4 0/1	185	122	422	167	21	1	0 1,100					1,100			20	10	204		204									1,200	
10	00	1270/	<u> </u>	-	620	100	11/	1 200		4 341 6 065	240	122	422	115	- 21	† 1	0 1,570	-	-	-	-	1,570		-	- 20	4 -	204		204		-	-	-	-	-			1,701	-
10	00	13770	·	-	029	109	11			0 000	240	100	421	110	- 17	1	0 1,457	-	-	-	-	1,407	-	-	- 21	4 -	214		214		-	-	-	-	-			1,071	-
15	107	55%	·	-	333	111	8		0 3	0 505	240	100	490	362	- 42	-	0 1,480	-	-	-	-	1,480	-	-	- 22		224		224		-	-	-	-	-	-		1,710	-
19	88	62%	· ·	-	305	100	12	2 1/2	2 24	4 500	252	131	516	336	- 40	2	0 1,421	-	-	-	-	1,421	-	-	- 22	9 -	229		229		-	-	-	-	-			1,650	-
19	89	70%	· ·	-	419	116	85	p 201	2	64/	1/5	91	349	306	- 34	3	0 1,344	-	-	-	-	1,344	-	-	- 26	63 6	3 263		263		-	-	-	-	-	-	-	1,607	-
19	90	50%	·	-	526	73	80) 153	3 1	4 693	151	65	268	348	- 37)	0 1,330	-	-	-	-	1,330	-	-	- 26	65 7 4	4 265		265		-	-	-	-	-	-	-	1,595	-
19	91	65%	· ·	-	347	72	53	3 125	5 3	0 501	223	89	348	363	121 51	5	0 1,364	-	-	-	-	1,364	-	86	6 27	- 6	276		276		-	-	-	-	-	-	-	1,640	-
19	92	84%	-	-	501	83	66	5 150) 2	1 671	169	57	261	357	106 46	5	0 1,398	-	-	-	-	1,398	-	4	260 30)1 -	301		301		-	-	-	-	-	-	-	1,698	-
19	93	118%	·	-	647	105	101	1 206	6 1	6 870	123	39	188	204	133 33	3	0 1,395	-	-	-	-	1,395	-	31	269 31	0 -	310		310		-	-	-	-	-	- /	-	1,705	1,705
19	94	67%	-	-	466	117	135	5 252	2 1	1 729	151	87	291	348	150 50	1	0 1,521	-	-	-	-	1,521	-	41	252 30	- 8	308		308	211 16	0 127	0	20	498	-	- /	498	1,829	2,328
19	95	141%	-	-	956	35	56	6 91		0 1,047	108	41	161	269	15 28	5	0 1,493	-	-	-	-	1,493	-	96	271 37	6 -	376		376	94 13	7 184	0	25	414	-	- /	414	1,869	2,283
19	96	125%	· ·	-	1.105	0	12	2 12	2	0 1.117	126	55	181	200	146 34	7	0 1.645	-	-	-	-	1.645	-	111	275 38	6 -	386		386	51 15	7 213	1	22	420	-	- 1	420	2.031	2.451
10	97	120%	· .	_	873	81	6	1 143	3	0 1 1 1 8	111	76	187	305	126 43	1	0 1 735	-	-	-	-	1 735	-	167	263 43	- 0	430		430	0 17	3 202	6	9	351	-	- 1	351	2 165	2 5 1 6
10	98	169%	781	102	883	186	Q/	1 280		0 1 163	105	32	137	180	14 10	1	0 1 4 9 4	_	-		-	1 494	- I	183	152 33	6 6	3 336		336	47 13	5 202	6	0	366	_		366	1 829	2,010
10	00	0/0/	700	1/7	8/7	100	15	200		0 1,100	100	1	107	246	23 26	т С	0 1,404			-		1,588	-	204	201 40		a 106		406	87 1/	3 200	7	0	410	_		410	1,025	2,100
20	000	<u>34</u> /0	524	147	657	190	102	2 343		0 1,190	122	27	123	240	23 20	2	0 1,000	-	-	-	-	1,000		204	201 40		400		400	145 12	2 2 14 2 2 12	1	0	419	-		413	2.062	2,413
20	00	760/	324	140	007	200	192	2 300		0 1,037	57	150	147	221	210 44))	0 1,020	-	-	-	-	1,020		102	209 40		+ 434		434	140 120	0 212	3	0	409	-		409	2,002	2,001
20		70%	409	149	000	200	144	+ 350		0 900	57	100	215	2/5	234 30	1	0 1,032	-	-	-	-	1,032	-	103	204 44		0 447		447	201 0	2 137	1	0	407	-		407	2,079	2,307
20	02	96%	688	144	832	62	4	1 103	5	0 935	160	124	283	264	179 44	1	0 1,662	-	-	-	-	1,662	-	230	203 43	53 6	8 433		433	244 94	4 140	6	0	484	-		484	2,095	2,579
20	03	100%	598	150	/48	107	12	2 180)	0 928	1//	155	332	268	158 42	j	0 1,685	-	-	-	-	1,685	-	230	207 43	6 6	6 436		436	224 10	0 139	8	0	470	-	-	470	2,122	2,592
20	04	90%	523	140	663	135	91	1 226	6	0 889	210	159	369	275	205 48	1	0 1,739	-	-	-	-	1,739	-	290	138 42	28 6	0 428		428	254 8	7 129	10	0	481	-	-	481	2,167	2,648
20	05	136%	682	121	803	191	127	7 318	3	0 1,121	205	152	357	205	89 29	1	0 1,772	-	-	-	-	1,772	-	292	49 34	1 5	<mark>9</mark> 341		341	144 9	8 174	9	0	424	-	-	424	2,113	2,538
20	006	152%	686	129	815	179	119	9 299	9	0 1,114	171	158	329	246	111 35	7	0 1,800	-	-	-	-	1,800	-	261	111 37	2 3	1 403		403	113 12	7 184	9	0	432	-	-	432	2,203	2,635
20	07	59%	291	106	397	223	149	9 371	(0 768	270	178	461	321	233 554	4	0 1,783	-	-	-	-	1,783	-	247	141 38	39 5 [°]	1 440		440	221 10	4 101	9	0	435	-	-	435	2,223	2,658
20	800	79%	403	48	451	156	104	4 260)	0 712	219	129	348	307	214 52	2	0 1,581	-	-	-	-	1,581	-	264	126 39	0 5	1 441		441	187 114	4 90	11	0	402	-	- /	402	2,079	2,425
20	09	79%	363	49	411	163	109	9 272	2	0 684	151	111	262	315	226 54	1	0 1,486	-	-	-	-	1,486	-	258	109 36	67 43	3 410		410	234 7	5 82	8	0	400	-	- /	400	2,297	2,297
20)10	115%	603	86	689	155	103	3 258	3	0 947	78	93	171	266	32 29	7	0 1.415	-	-	-	-	1.415	-	245	86 33	31 3	9 371		371	214 9	2 86	6	0	399	-	-	399	2.185	2.185
20)11	126%	577	224	801	196	131	1 326	6	0 1.128	96	50	146	123	6 12	2	0 1.403	-	-	-	-	1,403	-	287	74 36	51 24	4 385		385	168 12	1 129	7	0	426	-	-	426	2,213	2,213
20	12	77%	482	76	558	166	11'	1 276		0 834	192	36	228	268	129 39	7	0 1 460	-	-			1 460	- I	258	90 34	8 3	7 386		386	190 9	6 106	. 7	0	399	-		399	2 244	2 244
20	12	75%	361	1/3	504	172	11	270	7	0 701	178	00	260	283	106 /7	2	0 1,400			_	_	1,400	0	200	0/ 38	10 0	7 302		302	246 5		7	0	405	_		405	2,244	2,244
20	11	/ 70/	202	40	252	101	69	207		0 /01	109	140	203	203	195 57	2	0 1,000	_	-	-	-	1 222	27	231	72 22	10 17 10	0 355		355	240 0	7 66	5	0	254	-		254	2,000	2,000
20	/14 //r	41 /0	203	49	200	101	00			0 421	190	140	004	307	100 07	2	0 1,002	-	-	-	-	1,002	37	201	70 00		9 300		000	200 1	7 00	5	0	247	-		247	2,042	2,042
20	115	70%	2/0	4/	325	124	8			0 534	1/5	89	264	298	69 30	/	0 1,104	-	-	-	-	1,104	93	134	13 30		2 311		311	234 4	/ 29	1	0	317	-	-	317	1,793	1,793
20	16	95%	405	/1	4/6	162	114	4 276		0 753	155	84	239	234	5/ 29		0 1,283	12	2 6			1,275	123	88	41 25	2	0 252	6	2 259	165 9	8 53	8	0	323	0	1	324	1,858	1,858
20	017	193%	928	115	1,042	22	1:	s 3/	(0 1,080	137	80	217	158	29 18	(0 1,484	82	2 10) 20) (1,391	237	0	0 23	57 (0 237	10 8	2 309	110 /	/ 128	8	0	324	0	20	344	2,044	2,044
1005	Ava	98%	524	111	622	127	97	7 224	4	6 855	164	96	283	267	126 38	1 -	1.518	47	7 8	3 11	1 (1.515	98	183	150 33	37 4	5 346	8 4	7 349	171 10	5 135	7	3	413	0	11	414	1.968	2.324
1900-	Min	47%	203	47	253	0	12	2 12		0 421	57	1	123	115	6 12) -	1,164	12		5 1	1 () 1.164	0	0	0 20)4 (0 204	6 1	2 204	0 1	7 29	0	0	317	0	1	317	1,595	1,705
2017	Max	193%	928	224	1 105	223	193	2 380) 3	6 1 196	270	178	516	387	234 57	2 -	1 800	82	2 10	20^{-2}) (1 800	237	292	275 44	7 7	6 447	10 8	2 447	266 17	3 214	11	25	498	0	20	498	2,335	2 658
				<u></u>	1,100	450	102	- 000	-	0 000			070	000		- 1	1,000	02					201	202	440 00				7 000	004 0			20	100			445		2,000
2000-	Avg	99%	500	110	610	150	105	255		0 866	163	112	2/6	262	143 40		1,547	4/		5 11		1,541	98	223	116 36	00 39	9 384	8 4	1 388	201 9	J 116	8	0	414	0	11	415	2,120	2,345
2017	Min	4/%	203	47	253	22	15	5 37	(0 421	57	36	146	123	6 12	9 0	1,164	12	2 6	<u>j</u> 1	(1,164	0	0	0 23	57	0 237	6 1	2 259	110 1	/ 29	5	0	317	0	1	317	1,/93	1,793
	Max	193%	928	224	1,042	223	192	2 380)	0 1,128	270	178	461	387	234 57	2 0	1,800	82	2 10) 20) (0 1,800	237	292	264 44	7 74	4 447	10 8	2 447	266 12	8 212	11	0	489	0	20	489	2,335	2,658
		Appa	rent p	artial r	ecord		af	/ Acre-fe	eet ne	er vear								á	^a WY 1	977 is	for Jul	v 1976 t	hrough	June 1	977 [.] WY	1984 o	nlv par	tial-vear red	ord										
		, ippa	. one p		550ru.		uij	, , , , , , , , , , , , , , , , , , , ,														, .0/01			, ** 1		, pui												
		Not p	art of	SLVW	/D.		% avg	g Percer	nt of a	verage,	WYs ´	970-2	017 (W	/Ys 197	'0-74 estin	nated)		ł	° Adjus	sted for	r WTP	bypass	flows.															Tabl	e 3-1
	-	No or	partia	al reco	rd.		W۲	/ Water	year,	e.g., W	Y 2017	was fi	rom Oc	tober 1	, 2016 to \$	Septer	nber 30,	2017.										S	LVWD	Historio	cal Wa	ater Pi	roduc	ction,	, WYs	s 1977	7 and	1985	-2017

	Water So	ource				M	onth and	l Amoun	t of High	nest Ran	ked Rate	es of Mo	onthly Wa	ater Proc	duction	for Perio	d of Rec	ord ^a (gp	m)			
	•	Rank:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
North System	Stream Diver-	Foreman Creek	Mar-17 926	Apr-17 921	Apr-99 857	Apr-06 855	Jan-06 813	May-06 780	Mar-98 772	Mar-05 769	Apr-04 765	May-17 758	Feb-00 756	Jan-05 742	Mar-99 739	Apr-98 738	May-98 730	Feb-99 724	Feb-08 718	Mar-10 700	Mar-06 700	Feb-05 697
	sions	Peavine Creek	Apr-97	May-97	Sep-17	Jun-97 214	Jul-11 208	Jan-13	Jun-99 197	Jun-11	Jul-99 172	May-11	Jan-11 169	Feb-13	Apr-01	Aug-11	Apr-11	Oct-17	Jul-97	Aug-99	Aug-98	Feb-06
		Foreman &	Mar-17	Apr-17	May-17	May-06	Apr-99	Apr-06	Mar-05	Jan-06	Jun-96	Jan-05	Apr-04	Jul-95	Jul-96	Mar-97	May-95	Apr-96	Apr-95	Mar-96	Apr-02	Feb-97
		Peavine Cks	926	921	881	867	866	861	829	823	821	815	815	810	805	805	796	795	784	783	783	778
		Clear Creek	302	277	268	258	249	241	237	235	231	230	228	223	221	221	213	213	211	206	204	202
		Sweetwater Creek	May-00 258	Jun-00 228	Jul-00 194	Jul-06 179	Aug-98 172	Aug-00 171	Jun-10 166	Aug-11	Jul-11 158	Mar-07 157	Jun-84 156	Sep-98	Jun-86	Jun-06 153	Jul-99 149	Jul-10 149	Apr-08	Jun-05 147	Aug-99 145	May-84 1 <i>44</i>
		5-Mile Pipeline ^B	May-00	Jun-00	Jul-06	Jun-99	Jun-10	Aug-98	Aug-11	Jul-11	Mar-07	Jul-00	Jun-06	Jul-98	Jul-10	Apr-08	Jun-05	Aug-06	May-01	Aug-00	Apr-09	Apr-16
			515	457	447	416	416	403	402	395	392	388	383	381	372	369	368	354	352	343	340	337
		Lyon WTP	983	963	947	926	921	908	908	906	904	892	889	881	881	877	Apr-05 873	864	Apr-06 861	845	3an-06 838	835
	Ground- water	QH-4 & -4A	Jul-05 362	May-13	Jun-86 302	Jul-86 299	May-91 281	Nov-08 270	Aug-86 255	Sep-03	Jul-06 239	Sep-85 234	Sep-10	Sep-07	Jun-06 225	Jun-07 224	Jun-87 224	Aug-08	Jul-04 223	Jul-07 223	Aug-07	Jul-87 221
	Wells	QH-5 & -5A	Jul-05	Oct-84	Jul-06	Jan-87	Jul-03	Jul-04	Aug-03	Jun-01	Sep-03	Oct-02	Oct-03	May-01	Jul-08	Jun-07	Aug-04	Jun-06	Aug-08	Sep-04	Aug-02	Sep-02
		Quail Hollow	183 Jul-05	182 Aua-84	182 Jul-86	181 Aug-87	181 Jul-87	1// Oct-84	175 Jun-87	173 Aug-85	172 Sep-85	168 Jun-86	167 Jun-85	166 Jul-84	164 Sep-87	164 Aua-86	162 Sep-84	161 Aug-88	160 Jul-88	159 Sep-03	158 Jun-84	157 Jul-85
		(QH) wells total	545	523	511	511	504	496	493	472	468	468	460	460	451	450	441	430	430	424	422	422
		Oly-2	Aug-87 494	Jul-88 482	Aug-88 473	Jul-89 465	Sep-88 459	Aug-89 449	Jul-84 444	Jun-90 443	Sep-90 443	Oct-90 439	Sep-84 436	Sep-87 436	Jul-13 434	Aug-90 430	Sep-93 426	Aug-08 417	Jul-90 406	Jul-97 406	Feb-91 400	Aug-85 397
		Oly-3	Jul-93	Aug-96	Sep-96	Oct-96	Aug-94	Jun-91	Jun-07	Jul-07	Sep-01	Jun-01	Aug-03	Aug-08	Sep-03	Aug-02	Jul-01	Sep-12	Aug-01	Aug-07	Sep-94	Aug-12
		Olympia (Oly)	429 Aug-94	423 Aug-08	403 Jul-13	Aug-02	Jun-07	Jul-07	Sep-01	303 Aug-03	352 Sep-03	Jun-01	349 Aug-07	Jul-01	345 Aug-01	345 Sep-94	343 Aug-04	Sep-12	Sep-04	Jul-02	323 Jul-94	320 Sep-07
Ocuth	Cround	wells total	779	763	734	713	712	711	708	704	702	702	696	689	680	659	654	649	646	645	644	642
South	water	Paso-5A	Jun-17 276	May-17 251	Oct-17 246	Aug-17 230	Sep-16 223	Jul-17 209	Dec-17 197	Feb-18 191	Oct-16 188	Nov-17 188	Nov-16 164	Sep-17 159	Jan-18 156	Jul-16 156	Aug-16 144	Mar-18 131	Dec-14 111	Jan-15 109	Feb-15 101	Sep-14 99
	Wells	Pasatiempo 6	Aug-05	Jul-04	Jul-05	Jun-04	Jul-06	Sep-04	Sep-05	Jul-09	Jun-05	Apr-04	Oct-05	Jul-13	Jun-13	May-04	Jul-10	Sep-13	Aug-08	Jul-03	Aug-09	Jul-11
		Pasatiempo 7	200 Aug-92	Sep-92	200 Apr-95	200 Jul-95	249 Jun-96	 May-01	240 May-02	245 Jul-96	244 Aug-95	244 Sep-95	244 Jul-93	242 Mar-95	Jun-95	240 May-97	240 Apr-97	240 May-93	239 Jul-92	230 Aug-96	235 Aug-93	235 May-96
			279	259	258	256	256	248	243	241	240	239	237	229	228	228	225	223	222	213	213	212
		wells total	May-01 435	Jul-00 422	Jul-03 420	May-02 408	Jul-99 405	Aug-03 399	Jun-01 396	Jul-06 388	Aug-02 388	Jul-97 386	Jul-02 382	Jun-02 378	Jul-95 376	Aug-98 368	May-97 368	Aug-00 364	Aug-97 363	Jul-01 362	Jul-04 360	Jun-97 356
Felton System	Stream and	Fall Creek	Sep-13	Aug-03	Jul-13	Jul-03	Jul-01	Jun-01	Sep-03	Jun-12	Jul-07	Jul-12	Aug-04	Jun-13	Aug-13	Jul-04	May-13	Aug-01	Aug-12	Sep-02	Jun-07	Jul-94
Gystein	Spring	Bennett Spring	Apr-17	Apr-00	Jul-98	Apr-99	May-99	Jun-98	Aug-07	Jun-99	Jan-17	Aug-98	Jun-06	Mar-99	May-06	May-00	Jun-95	Jul-95	Feb-99	Apr-96	Mar-98	Jun-96
	Diver- sions	(to WTP)	199	176	175	173	172	170	165	164	163	163	162	162	159	159	159	158	157	157	156	154
		Bull Creek	Jan-94 226	Jan-93 168	Apr-97 166	гер-95 158	Mar-93 155	мау-97 154	Feb-93 150	Jun-96 146	Jun-93 144	Jun-97 141	Dec-93 141	138	Sep-93 137	136	rep-08 136	Apr-11 135	Jan-06 133	May-99 133	Mar-11 132	131
		Kirby WTP	Jun-01 424	Jun-02 412	Jul-00 412	Jul-02 403	Jul-03 ∡∩2	Aug-00 401	Jun-00 ∡∩∩	Aug-03	Jul-01 385	Jul-06 377	Jun-04 372	Sep-02	Jun-03	Aug-01	Aug-04	Jul-04 364	Sep-03	Jul-05 362	Aug-02	Aug-05
		Bennett Spring	424 Apr-08	Jun-17	Aug-08	Jul-08	Jun-00	Jun-08	Jul-07	Jun-07	Dec-08	Jun-12	Jun-04	Jul-17	Aug-04	Aug-11	Jul-04	Dec-15	May-00	Jun-09	Dec-03	Jul-03
		2-inch line	13.4	10.8	10.1	10.0	9.7	9.7	9.2	9.1	8.7	8.6	8.3	8.2	8.2	8.2	8.1	8.1	8.1	8.0	8.0	8.0

^a See Table 1-1 for periods of record.

^b 5-mile pipeline is the conveyance for Clear and Sweetwater Creek diversions.

gpm gallons per minute; equivalent continuous monthly rate.

WTP water treatment plant

Table 3-2 SLVWD Highest Ranked Monthly Rates of Water Production

System		Water Source		sign, Max lanned C	kimum, a apacitie	ind s	Raw-Water	Design, Maximum, and Planned Capacities						
		Source	afm	gpm	cfs	note	Conveyance	afm	gpm	cfs	note			
		Foreman Ck	125	926	2.06	а	Peavine line (to Foreman	36	270	0.60	g			
		Peavine Ck	36	270	0.60	а	mixing vault)				_			
		Foreman & Peavine	161	1,196	2.66	b	5-mile pipeline (Clear &	74	550	1.23	е			
	Divor	Cks	125	926	2.06	С	Sweetwater diversions to	69	515	1.15	a,f			
	biver-	Clear Ck	41	302	0.67	a,d	Foreman mixing vault)	54	400	0.89	i			
	510115	Sweetwater Ck	35	258	0.57	a,d	Foreman line (all diver-	148	1,100	2.45	е			
		Clear & Sweetwater	75	560	1.25	b,c	sions to Lyon WTP)	138	1,030	2.29	С			
North		Cks						222	1,650	3.68	j			
North		Total diversions	236	1,755	3.91	b	Quail Hollow & Olympia	198	1,468	3.27	b			
		QH-4 or QH-4A	49	362	0.81	а	wells	155	1,150	2.56	С			
		QH-5 or QH-5A	25	183	0.41	а	WaterTreatment							
		Quail Hollow total	73	545	1.21	b,c	Lyon WTP	148	1,100	2.45	е			
	Wells	Oly-2	66	494	1.10	а		135	983	2.19	а			
		Oly-3	58	429	0.96	а		126-130	940-970	2.10	g			
		Ohmania tatal	124	923	2.06	b		222	1,650	3.68	j			
		Olympia total	105	779	1.74	С					-			
		Fall Ck	37	278	0.62	а	WaterTreatment	94	700	1.56	е			
		Bennett Sp (to WTP)	27	199	0.44	а	Kirby WTP	57	424	0.95	a,I			
Faltan	Diver-	Bennett Sp 2-inch line	1.8	13.4	0.03	а		47	350	0.78	g,k			
reiton	sions	Bull Ck	31	226	0.50	а		141	1,050	2.34	j			
		Total diversions	96	712	1.59	b	Notes:							
			61	459	1.02	С	a Equivalent continuou	s rate for	maximu	m month	of record.*			
		Pacatiompo 5A	37	276	0.62	а	b Equivalent continuou	s rate for	sum of r	naximum	months.*			
		rasaliempo JA	47	350	0.78	g	c Equivalent continuou	s rate for	maximu	m of mor	thly sums.*			
		Pasatiempo 6	38	286	0.64	a,x	d Approximate apportion	onment.						
South	Wolle	Pasatiempo 7	38	279	0.62	а	e Design capacity (as r	eported).		* from Ta	able 3-1			
South	Wells	Pasatiempo 8	-	-		h	f Maximum month occ	urs in spi	ing.					
		Pasatiempo wells total	77	576	1.28	b	g R. Rogers/SLVWD, p	personal	communi	cation, A	pril-May, 2018			
			60	435	0.97	С	h Under construction.							
		Manana Woods	11	80	0.18	a,x	i As tested February-M	/larch 200	06.					
			20	150	0.33	g,m	j Planned or potential.		Abbrev	viations:				
		North-South	40	300	0.67	g,n	k Capacity as common	ly used.	afm	acre-fee	t per month			
Intertic			74	550	1.23	g,j	I 1993, first year of rec	ord.	cfs	cubic fee	et per second			
Capaciti	06	North-Felton	20	150	0.33	g,m	m Current.		ck	creek				
Sapaciti	63	Felton-South (via North)	20	150	0.33	g,m	n Expected near term.		gpm	gallons p	per minute			
		South-SVWD	47	350	0.78	g,m	x Inactive.		sp	spring				
		Felton-South direct	-	-	-	j					Та			

Table 3-3 Design, Maximum-Monthly, and Planned Capacities of SLVWD Diversions, Wells, Conveyance, and Treatment Facilities 47



Figure 1-2 shows the location of SLVWD's diversion watersheds and Table 4-1 provides diversion intake elevations, watershed drainage areas, and estimated watershed average precipitation. SLVWD's diversion watersheds have a combined area of approximately 4,310 acres, or 7.1 square miles (mi²), equal to 6.3 percent of the San Lorenzo River watershed above the USGS SLRBT gauge. Additionally:

- Diversions on Peavine and Foreman creeks have a combined watershed area of 710 acres, equal to about 10 percent of the Boulder Creek watershed above its confluence with the San Lorenzo River.
- Diversions on Clear and Sweetwater creeks have a combined watershed area of 660 acres, about 2 percent of the San Lorenzo River watershed above its confluence with Clear Creek.
- The Fall Creek diversion has a watershed area of approximately 2,770 acres (4.3 mi²), including the 225-acre watershed above the Bennett Spring diversion.
- The two Bull Creek diversions have a combined watershed area of 175 acres.
- The Fall, Bennett, and Bull Creek diversion watersheds compose 4.3 percent of the San Lorenzo River watershed above the Big Trees gauge.

The potential yields of SLVWD diversions are constrained by water rights and existing and potential bypass flow requirements (Section 4.1), and by the seasonal and year-to-year variability of divertible flows (Section 4.2) relative to existing and potential diversion capacities (Section 3).

4.1 Water Rights and Bypass Flow Requirements

This section describes SLVWD's stream and spring diversion water rights.

4.1.1 North System Diversion Streams

SLVWD has pre-1914 appropriative rights to divert water from Peavine, Foreman, Clear, and Sweetwater creeks, which has allowed it to supply water from these streams to its North system without restriction (Table 4-2). SLVWD has an agreement with a downstream water user to allow 30 gpm to bypass its Clear Creek diversion at all times. SLVWD's legal right to transfer potential available diversions outside the North system should be verified.

4.1.2 Felton System Diversion Streams

SLVWD has a permitted appropriative right to divert from Fall and Bull creeks and Bennett Spring to supply water to its Felton system (Table 4-3). The right is limited to a total diversion rate of 1.7 cfs and total annual diversions of 1,059 afy. Additionally, Fall Creek required bypass flows are defined separately for dry and non-dry years, and diversions are not permitted from any Felton source during defined low-flow conditions. Dry-year and low-flow conditions are defined in terms of the gauged flow of the San Lorenzo River at Big Trees.

The water rights permit defines Fall Creek bypass flows as follows:

Dry years:	0.75 cfs November 1–March 31
	0.50 cfs April 1–October 31

Other years: 1.5 cfs November 1–Mar 31 1.0 cfs April 1–October 31

Dry years are triggered when SLRBT cumulative monthly flows are less than the following amounts:

October:	< 500 af
October–November:	< 1,500 af
October–December:	< 5,000 af
October–January:	<12,500 af
October–February:	< 26,500 af

Table 4-4 identifies dry and non-dry years for the SLRBT record since WY 1970. Dry years are triggered during 46 percent of all years.

Table 4-4 also identifies low-flow months since WY 1970 based on SLRBT monthly average flows below the permit thresholds. Diversions are not permitted from any of the Felton system sources during low-flow conditions when SLRBT flows are less than the following amounts:

October: 25 cfs November–May: 20 cfs September: 10 cfs

On an average monthly flow basis, low-flow conditions have occurred 11 percent of all months during WYs 1970–2017, nearly 50 percent of which occurred in October, with the remainder mostly in November (17 percent), September (13 percent), and May (10 percent). Because low-flow criteria are applicable on a daily basis, this is likely an under estimate of the number of months during which non-compliant diversions occur.

Finally, use of the water produced from Felton system diversions is permitted only within the Felton service area. Use of an existing or potential intertie between the Felton system and one or more other systems would require modification of the water right permit.

4.1.3 Loch Lomond Reservoir

In 1958, SLVWD sold 2,500 acres encompassing a portion of the Newell Creek watershed to the City of Santa Cruz with the agreement that SLVWD would be entitled to purchase 12.5 percent of the annual safe yield from a reservoir planned by the city. The city created Loch Lomond Reservoir with the completion of Newell Creek Dam in 1960. The reservoir has a drainage area of 8.3 mi² and a reservoir capacity of approximately 9,000 af. The city's appropriative right allows a maximum direct diversion of 3,200 afy and a maximum use of 5,600 afy.

SLVWD began receiving a portion of the reservoir yield after the dam was completed, although records are only available for 1976–77, when it received 353 af. SLVWD has not received any water from Loch Lomond since 1977. Since implementation of the Federal 1989 Surface Water Treatment Rule, SLVWD has not had the means to treat diversions from Loch Lomond. In 1996 the City and SLVWD reached a draft agreement that allows SLVWD to purchase up to 313 afy of raw Loch Lomond water, or purchase the same amount of treated city water with the understanding that it would be interruptible during declared water-shortage emergencies (Kocher 1996). SLVWD has yet to exercise either allowance under this agreement. To exercise its allotment, SLVWD may need to connect to the City's raw water line and expand the Kirby WTP (SPH Associates 2010).

4.2 Method for Estimating Total and Divertible Flows

SLVWD has maintained a monthly record of the water it diverts from each stream since WY 1985 and began gauging the total or remaining flow of these streams in WY 2013 (Table 1-1). These data are insufficient for estimating potential diversions under a variety of conditions. This section presents the approach Exponent used to estimate total and potentially divertible flows under alternative infrastructure, operational, and water rights assumptions.

To estimate SLVWD's potentially available diversions and flows downstream of its diversions, Exponent synthesized monthly flow records representative of the WY 1970–2017 climatic cycle. The monthly flow estimates are derived from monthly probability curves of mean daily flow ("flow duration curves") for representative dry and wet years. Flow duration curves were also developed for SLRBT and Boulder Creek to synthesize equivalent records for use evaluating Felton water-rights restrictions and estimating the significance of diversions on downstream flows.

Figure 4-1 is a schematic illustration of a flow duration curve and its use to estimate the volume of divertible flows. A flow duration curve is a cumulative probability curve defined for some period (e.g., a water year or a month of the year) representing the percent of time mean daily flows are greater than flow rates indicated along the y-axis. The area under the curve represents the total volume of flow for the defined period. As illustrated in Figure 4-1, potentially

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divertible flows may be estimated as the portion of the area below the curve bounded at the low end by required minimum bypass flows and at the high end by diversion capacities and limitations associated with high flows (elevated turbidity and the potential for storm damage).

This approach allows for a more accurate evaluation of diversion capacities, water rights, and bypass flow requirements than previous studies that used monthly timesteps without accounting for the variability of daily flows (HEA 1983; Geomatrix 1999; Johnson 2009, 2015, 2016). The 1983 and 1999 studies estimated mean monthly flows based on correlations with the SLRBT and other gauged records, whereas the latter studies estimated potentially divertible monthly flows by extrapolating the diversion record while assuming no changes in infrastructure or water rights.

This study uses the SLRBT record to assign each year of the WY 1970–2017 climatic cycle to one of 14 increments between the driest and wettest years, labeled "A" through "N," respectively (Table 4-5). Each increment represents an interval of 20 percent of average annual flow within an overall range of 10 to 320 percent of average. Estimated total and divertible monthly flows are calculated for each category using a weighted average monthly flow duration curve interpolated between the driest and wettest conditions.

Information used to develop flow duration curves for SLVWD's diversion streams includes:

- Watershed area, estimated average precipitation, and average runoff estimated from average precipitation (e.g., Geomatrix 1999).
- Flow duration curves calculated for the USGS WY 1970–1985 gauged record of San Vicente Creek, which has watershed conditions similar to SLVWD's diversion watersheds in terms of location, elevation, precipitation, geology, and streamflow hydrograph with sustained baseflows (Figure 1-4; Johnson 2009).
- SLVWD diversion records, which provide a lower bound for estimating total streamflow.
Continuous gauging records for SLVWD diversion streams during portions of WYs 2013–2017 (Balance Hydrologics 2018). This period was characterized by extreme drought (WYs 2012–2015) followed by extreme precipitation (WY 2017) and thus may not be representative of more typical conditions. Except for the gauging station installed immediately upstream of the Fall Creek diversion, these records exclude flows diverted by SLVWD. Based on reported monthly average rates of water production, SLVWD's diversions must be added to the daily flow record before calculating the flow duration curves used to support this analysis.

Figures 4-2 and 4-3 present monthly flow duration curves derived from the driest and wettest years, respectively, of the USGS gauged record for San Vicente Creek near Davenport. Although slightly smoothed for plotting, the shapes of these curves are difficult to interpret in light of statistical noise associated with too short a gauging record (Table 4-5).

The units of the y-axis of these plots, and all flow duration curves presented in the remainder of this report, are in cubic feet per second per square mile (cfs/mi²). Flow duration curves expressed in these units are easily compared between different watersheds and data sets.

Figures 4-4 and 4-5 present monthly flow duration curves for the driest and wettest years derived from SLVWD's combined record of Foreman and Peavine Creek diversions. This study used these and similar curves derived for each SLVWD diversion to interpret the lower limits of monthly flow.

The flow duration curves used in this study and presented in the remainder of this section were calibrated (adjusted) to reproduce SLVWD's historical record of diversions during WYs 2000–2017 (see Section 6-1). The calibration was most sensitive to seasonal and drought low-flow periods and poorly constrained by the available information for high flows. Thus, the results of this analysis are suitable for estimating divertible flows and flows remaining downstream of diversions during dry and average conditions but should not be used to support estimates of peak or total annual flow given a greater potential for errors.

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4.3 Estimated Flow Duration Curves

Figures 4-6 and 4-7 present sets of monthly flow duration curves for SLRBT representative of the driest and wettest years, respectively, during WYs 1970–2017. These curves represent the impaired flow conditions of the historical record. In comparison to the historical record, Table 4-6 summarizes the monthly and annual SLRBT flows synthesized using weighted averages of these curves interpolated for each of the 14 intervals of annual flow defined in Table 4-5. To be consistent with dry-year designations defined by Felton water rights (Table 4-3), simulated monthly flows were exchanged among categories "A" through "N" (Section 4.2) some years as needed to represent later starts to the wet season. The bar charts presented in Figure 4-8 show a reasonably good fit between synthesized and gauged SLRBT annual flows and average monthly flows.

As shown in Figure 4-9, synthesized and gauged monthly flow hydrographs for WYs 1970– 2017 match reasonably well for low to moderate flow conditions, consistent with the calibration approach discussed above. Although the synthesized hydrograph underestimates peak annual flows most years, potential errors associated with flows many times greater than diversion capacities are relatively inconsequential to the results of this study.

The wet- and dry-year monthly flow duration curves presented in Figures 4-10 and 4-11 were derived in a similar manner for Boulder Creek using the USGS WY 1977–1993 gauging record. Figure 4-12 shows a reasonably good fit between synthesized and gauged Boulder Creek annual flows and average monthly flows, and the bottom plot in Figure 4-9 shows a similarly good fit to the WY 1970–2017 hydrograph of monthly gauged flows. Similar to the synthesized record for SLRBT, these curves represent flows impaired by SLVWD and other upstream diversions.

Figures 4-13 and 4-14 are monthly flow duration curves for Foreman Creek representative of the driest and wettest years, respectively, developed using the approach and information discussed above. In the case of these and SLVWD's other diversion streams, these curves represent unimpaired flows at the point of diversion. Figures 4-15 and 4-16 present similar sets of curves for Peavine Creek, and Figures 4-17 and 4-18 present the monthly flow duration curves for Clear and Sweetwater creeks combined. The Clear and Sweetwater Creek diversion

watersheds are treated as one source given their diversion records are essentially combined; the diversions reported for each stream are typically estimated as a fixed percentage of the total diversion conveyed by the 5-mile pipeline.

Sets of monthly flow duration curves representative of the driest and wettest years are presented in Figures 4-19 and 4-20 for the combined monthly flows of Fall and Bennett creeks. Although each stream has separate diversions, Bennett Creek is a sub-watershed within the Fall Creek watershed such that its non-diverted flows contribute to total flow at the Fall Creek diversion. Thus, it was reasonable to develop sets of monthly flow duration curves only for the entire watershed above the Fall Creek diversion. Figures 4-21 and 4-22 present similarly derived sets of curves for the watershed above SLVWD's Bull Creek diversion.

Based on the SLRBT daily flow duration curves presented in Figures 4-6 and 4-7, Figure 4-23 provides plots of the estimated percent of time SLRBT flows are above the minimum thresholds required for permitted Felton diversions (Table 4-3). For example, these plots show that during the driest years, flows permitted for diversion occur less than 10 percent of the time during October and no more than 30 percent of the time during September to May. Exponent used these curves to help evaluate permitted Felton diversions on a statistically daily basis for the alternative conjunctive use scenarios presented in Section 6.

4.4 Low-Flow Records of Streams Potentially Effected by Groundwater Pumping

Tables 4-7 through 4-10 are a compilation of continuously gauged flows and intermittent lowflow measurements for streams potentially effected by SLVWD groundwater pumping, expressed in units of equivalent acre-feet per month (afm). Specifically, these tables provide flows for the following streams and periods of record:

Table 4-7.Selected San Lorenzo River Low-Flow Measurements at Stationsbetween Brookdale and Felton, WYs 1986–2017

- Table 4-8.Selected Newell Creek Low-Flow Measurements and Estimates,WYs 1974–2016
- Table 4-9.Zayante Creek at Zayante Continuous Gauged Flow and SelectedLow-Flow Measurements, WYs 1958–2016
- Table 4-10.Selected Zayante Creek and Lompico Creek Low-FlowMeasurements, WYs 1986–2017

The tables highlight selected minimum drought flows when the effects of groundwater pumping are potentially most significant. This information is used to support an evaluation of the potential effects of groundwater pumping under current conditions (Section 5.2) and alternative conjunctive use scenarios (Section 6).

Based on these records, impaired stream baseflows representative of worst drought conditions are approximated as follows for the purposes of this study:

	<u>afm</u>
San Lorenzo River between Brookdale and Felton	150
Newell Creek at San Lorenzo River	6
Lompico Creek	0
Zayante Creek at Zayante	1
Zayante Creek above Bean Creek	20
Bean Creek at Mount Hermon Bridge	80
Bean Creek at Zayante Creek	110
Zayante Creek at San Lorenzo River	130
San Lorenzo River at Big Trees (SLRBT)	400

Figure 4-24 is a map showing the distribution of these estimated minimum stream baseflows in relation to SLVWD, MHA, and SVWD production wells.

		Elev	ation			A	Approxim	ate Area	S			
		At				Above	e Con-	Diver	sion Wa	tershed as	s % of:	Estimated
		Intake	Water-	Abo	ve	fluenc	e with					Average
		or	shed	Inta	ke	Next-N	lamed	Above	Bould-	SLR	SLR at	Precip-
Waters	hed	Gage	Max.	or G	age	Stre	am ^a	Conflu-	er Ck	above	Big	itation
		(ft r	nsl)	(ac)	(mi ²)	(ac)	(mi ²)	ence ^a	at SLR	Clear Ck	Trees	(in/yr) ^h
North System Div	versions											
Peavine Creek		1,264	2,610	230	0.36	285	0.45	81%	3.2%	0.7%	0.3%	
Foreman Creek ^b		927	2,610	480	0.75	580	0.91	83%	6.6%	1.4%	0.7%	60
Boulder Ck wate	rshed total	-	-	710	1.11	865	1.35	82%	10%	2.0%	1.0%	
	intake 1	1,378		360	0.56	_		34%	-	1.0%	0.5%	_
Clear Creek	intake 2	1,350	2 6 1 0	55	0.09			5.2%	-	0.2%	0.08%	_
	intake 3	1,350	2,010	20	0.03	1,050	1.64	1.9%	-	0.06%	0.03%	60
Sweetwater Cree	ek	1,350		225	0.35	-		21%	-	0.6%	0.3%	
Clear Ck watersh	ned total	-	-	660	1.03			63%	-	1.9%	1.0%	
North system tota	al	-	-	1,370	2.14	1,915	2.99	72%	-	3.9%	2.0%	-
Felton System Di	versions											
Fall Creek		352	2,300	2,770	4.33	3,155	4.93	88%	-	-	4.1%	56
Bull Creek 1 and	2 ^c	800	1,680	175	0.27	455	0.71	38%	-	-	0.3%	51
Deprett Crime ^c	2-inch line ^d	875	1 600	225	0.25	295	0.45	70%			0.3%	53
Bennett Spring	to Kirby WTP	810	1,000	225	0.55	205	0.45	1970	-	-	0.370	- 55
Felton system to	tal ^e	-	-	2,940	4.95	3,895	6.09	81%	-	-	4.3%	-
SLVWD total		-	-	4,310	7.09	5,810	9.08	78%	-	-	6.3%	-
Boulder Creek an	d San Lorenzo	River										
Boulder Ck at Bo	oulder Creek ^f	430	2,650	7,300	11.4	-	-	-	100%	21%	11%	53
San Lorenzo R. a	above Clear Ck ^g	370	3,230	35,100	54.8	-	-	-	-	100%	51%	46
San Lorenzo R a	t Big Trees ^f	220	3,230	68,200	106.6	-	-	-	-	-	100%	46
Notes:									Abbrev	iations:		

^a Next-named streams: Boulder Ck for Peavine & Foreman Cks; SLR for Clear, Fall, & Bull Cks; Fall Ck for Bennett Sp.

^o Included minor contribution from Silver Creek diversion (30 ac watershed) prior to 2007.

 $^{\circ}$ Groundwater recharge areas contributing to springs may differ from watershed areas above intakes.

^d Portion of Bennett Spring diversion supplied as groundwater.

[®] Bennett Spring is within the Fall Creek watershed.

USGS gauged watershed.

^g Portion of San Lorenzo River watershed upstream and including all current SLVWD North System diversions (not gaged).

^hGeomatrix (1999).

ac acres

ft msl feet above mean sea level

in/yr inches per year

mi² square miles

SLR San Lorenzo River

Table 4-1 SLVWD Diversion Watersheds

							Permit for	Diversion	and Use of	Water, Div	ision of Wate	r Rights
								Applicant:	Citizen U	tilities Com	ipany	-
							Wate	r Sources:	Fall and I	Bull Creeks	and Bennett	Spring
							Appli	cation No.:	24652	filed:	7/26/1974	
							F	Permit No.:	20123	issued:	8/3/1987	
							Section 5:	Beneficia	l use not to	exceed (a	all sources):	
							Total	Diversion F	Rate	Tota	I Annual Dive	rsion
	Voor	State-					cfs	mgd	afm	afy	mgy	cfs
	of	ment	1				1.7	1.1	103	1,059	345	1.46
	First	OT	Initiai	Ctracm			Section 12	: Required	d Fall Creek	k bypass f	lows	
Stream	l Ise ^a	sion	Filing Date	Code	Point of Diversion	Tributary to:	(bypass al	l natural fl	low if less):			
Foreman Creek	1905	S008670	1/1/76	301109060	NW 1/4 of NE 1/4 Sec 25, T9S, R3W				Non-Dr	y Years	Dry Ye	ears*
Peavine Creek	1905	S008669	1/1/76	301109040	SW 1/4 of SW 1/4 Sec 24, T9S, R3W	Boulder Creek			cfs	afm	cfs	afm
Clear Creek ^b	1905	S008416	1/1/74	301111000	NW 1/4 of SE 1/4 Sec 31, T9S, R3W	San Lorenzo R	April	-October	1	60	0.5	30
Sweetwater Ck	1905	S008671	1/1/76	301111008	SW 1/4 of SE 1/4 Sec 31, T9S, R2W	Clear Creek	Novemb	er-March	1.5	91	0.75	45
^a Pre-1914 approp	oriative	rights.					* Dry year t	riggered w	hen cumula	tive monthl	ly SLRBT flov	vs are
^b 30 gpm bypass r	required	d for dow	nstrean	n user.			less than:	:	af			
Source: http://w	ww.wat	errights.	ca.gov/					October	500	SI RBT da	aina record c	orrected
					-		October-N	ovember	1,500	for City Sa	nta Cruz dive	rsions at
					lable 4-2		October-D	ecember	5,000	Felton We	ir.	
ç	SLVW	VD No	rth S	ystem	Active Water Rights		October	-January	12,500			
							October-	February	26,500			
							Section 13	: No diver	sions (all s	ources) if	flow of San	Lorenzo
							River at Fe	elton Diver	sion Weir i	s less thai	n:	
										cfs		
			Ck	creek					September	10		
			R	river					October	25		
			SLRBT	San Loren	zo River USGS gauge at Big Tree	es		Nove	ember-May	20		
							Section 20	: Daily ma	iximum tota	al diversio	n rate:	
								cfs	afm			
								1.87	113			
							Bold indica	ates values	from permi	t, <i>italics</i> inc	dicate calcula	ted,
						Table 4-3	equivalent	values.		ofo	aubia faat na	raccord
				SLVW	D Felton System Div	ai afm	acre-feet r	er month	CIS	million caller	n second	
					Source:	copy of cited permit.	aill	acre-feet r	er vear	mav	million dallor	is per uay
							u,					

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total	Perc	ent of
WY						af	m						afy	Ave	rage
1970	1,998	1,845	11,301	49,534	14,701	23,273	6,218	4,015	2,565	1,549	1,451	1,154	119,605	130%	
1971	1,199	7,599	21,594	9,869	4,204	7,163	4,481	2,810	1,827	1,420	941	839	63,946	70%	
1972	922	1,505	6,462	3,363	4,044	1,826	1,964	1,224	803	639	561	649	23,963	26%	111%
1973	1,986	13,412	3,314	37,446	63,035	27,756	7,010	3,812	2,190	1,543	1,138	1,006	163,647	178%	
1974	1,691	11,002	15,587	23,611	7,014	36,481	27,306	6,143	3,291	2,767	1,894	1,386	138,173	151%	
1975	1,666	2,208	5,214	4,243	17,727	27,190	8,658	4,046	2,487	1,709	1,371	1,172	77,692	85%	
1976	1,918	1,440	1,420	1,260	1,277	1,734	1,470	990	702	551	658	591	14,012	15%	37%
1977	707	863	1,008	1,390	922	1,316	732	713	558	410	400	541	9,558	10%	
1978	508	1,327	4,304	52,633	29,773	28,069	16,298	6,481	3,070	2,048	1,304	1,244	147,059	160%	
1979	916	1,607	1,500	8,166	19,827	13,410	7,254	3,277	1,797	1,242	1,260	857	61,113	67%	
1980	1,623	1,517	8,639	35,128	53,333	15,753	7,908	4,212	2,761	2,189	1,482	1,291	135,837	148%	
1981	1,101	1,196	2,404	7,858	3,499	11,953	4,011	1,949	1,023	793	683	666	37,136	40%	
1982	978	6,069	10,355	71,756	28,996	35,632	54,791	8,166	3,671	2,644	2,054	1,547	226,659	247%	143%
1983	1,783	7,503	19,037	40,367	60,813	91,186	27,235	19,811	6,694	4,046	2,705	2,005	283,186	309%	
1984	1,998	12,186	29,668	11,332	7,253	5,946	3,701	2,669	1,987	1,525	1,205	904	80,376	88%	
1985	1,580	6,801	5,528	2,822	6,664	9,063	4,504	2,386	1,571	1,088	898	887	43,793	48%	
1986	904	2,059	3,197	7,360	85,083	50,414	8,949	4,439	2,523	1,777	1,340	1,363	169,409	185%	
1987	1,211	1,208	1,506	2,097	6,476	5,288	1,666	1,304	1,059	812	664	649	23,939	26%	
1988	769	1,107	4,913	5,067	1,611	1,377	1,654	1,230	785	646	583	495	20,236	22%	
1989	569	1,351	3,160	1,845	1,355	9,672	2,106	1,347	904	633	756	714	24,413	27%	
1990	1,838	2,452	1,765	2,564	2,738	1,752	1,279	1,802	1,077	836	701	586	19,390	21%	42%
1991	621	678	904	849	1,161	19,547	2,594	1,347	916	652	519	493	30,280	33%	
1992	935	857	2,441	2,232	25,810	8,885	2,547	1,672	1,071	805	615	519	48,389	53%	
1993	1,107	702	5,472	44,394	30,718	13,503	5,778	3,419	2,321	1,531	1,187	934	111,065	121%	
1994	1,021	1,380	3,314	2,312	10,502	2,736	2,178	1,857	1,041	775	664	678	28,459	31%	
1995	830	2,820	2,792	58,505	11,424	65,300	13,501	11,947	4,689	2,822	1,838	1,392	177,862	194%	
1996	1,211	1,166	5,620	19,215	48,392	24,712	8,676	7,747	3,850	2,380	1,623	1,363	125,955	137%	
1997	1,476	3,969	30,971	72,063	14,773	6,948	4,040	2,699	1,999	1,482	1,260	1,006	142,687	155%	154%
1998	1,064	3,844	5,196	26,409	102,910	21,551	16,155	11,006	7,813	4,027	2,496	1,833	204,305	223%	10170
1999	1,765	3,195	3,333	11,006	25,253	15,378	13,037	5,460	3,261	2,177	1,716	1,327	86,907	95%	
2000	1,285	2,053	1,605	16,934	46,746	22,037	7,908	4,489	2,701	2,023	1,470	1,345	110,595	120%	
2001	2,115	1,595	1,642	6,229	13,123	12,513	4,338	2,576	1,553	1,254	1,027	893	48,857	53%	
2002	941	3,493	22,658	15,526	5,881	7,280	4,022	2,755	1,738	1,365	1,125	988	67,772	74%	76%
2003	947	2,350	28,893	11,332	5,004	5,331	10,068	6,536	2,678	1,648	1,285	1,018	77,090	84%	
2004	935	1,577	16,952	17,020	25,091	11,603	4,005	2,380	1,624	1,242	996	857	84,280	92%	
2005	2,478	1,976	15,864	28,887	16,706	24,281	12,728	7,034	3,856	2,558	1,789	1,470	119,626	130%	173%
2006	1,359	1,565	28,684	26,163	9,902	45,913	62,360	10,188	5,034	3,210	2,220	1,720	198,318	216%	
2007	1,574	1,839	3,283	2,078	8,269	3,954	2,249	1,636	1,137	922	787	750	28,478	31%	
2008	990	869	1,802	23,734	13,546	4,950	2,315	1,629	1,077	879	762	684	53,238	58%	69%
2009	799	1,720	1,918	1,383	18,866	12,279	2,755	2,017	1,256	947	805	714	45,460	50%	
2010	6,087	1,172	2,410	22,640	21,054	15,839	14,477	4,888	2,380	1,642	1,230	976	94,796	103%	119%
2011	1,328	2,225	16,608	8,135	17,933	47,622	11,585	5,786	5,522	2,785	2,011	1,476	123,016	134%	
2012	1,789	1,839	1,488	4,120	2,134	16,817	9,842	3,271	1,952	1,488	1,088	922	46,750	51%	
2013	1,002	3,856	29,084	6,880	2,849	2,730	2,095	1,322	1,023	885	824	720	53,271	58%	
2014	701	851	978	812	2,721	3,074	1,803	867	607	519	430	468	13,831	15%	48%
2015	470	964	16,368	1,968	5,587	1,549	1,529	1,058	732	536	435	398	31,594	34%	
2016	430	702	2,570	14,517	3,181	43,533	4,677	2,582	1,505	1,125	892	738	76,453	83%	
2017	2,109	2,166	14,609	99,979	106,243	28,469	21,380	7,803	4,356	2,755	1,931	1,488	293,286	320%	320%
Avg	1,359	2,868	8,945	19,271	21,169	18,637	9,330	4,142	2,313	1,569	1,189	994	91,787	100%	117%
Min	430	678	904	812	922	1,316	732	713	558	410	400	398	9,558	10%	37%
Max	6,087	13,412	30,971	99,979	106,243	91,186	62,360	19,811	7,813	4,046	2,705	2,005	293,286	320%	320%

Source: https://waterdata.usgs.gov/ca/nwis/sw (gaged record extends back to WY 1937).

Dry-year designation triggered sometime from October through February as defined by water right (Table 4-3).

Felton diversions not permited based on monthly average SLRBT flow below permit threshold (Table 4-3).

afm, afy acre-feet per month, acre-feet per year

WY water year; e.g., WY 2017 extended from Oct. 1, 2016 through Sep. 30, 2017.

San Lorenzo River at Big Trees Monthly Record of USGS Gauged Streamflow, WYs 1970-2017

Table 4-4

Agenda: 2.7.19 Item: 10c

Ben L	.omond	4 NOAA	Precipita	ation Gauge		San Lorei	nzo River a USGS	at Big Tr Gauge	ees (S	LRBT)	SLVM/D	;	San Vice	nte Creek USGS G	near Da iauge	avenport	
Rank	Water Year	Precip- itation (inches/ year)*	Percen Annual for Perio (WYs	t of Average Precipitation od of Record 1975-2017)	Rank	Water Year	Annual Stream- flow (afy)	Percen Strear (W	t of Ave nflow fo Reco Ys 193	erage Annual or Period of ord 7-2017) Group	Diversion Streams Gauged by Balance Hydrologics	Rank	Water Year	Annual Stream- flow (afy)	Percer Annua for Per (WYs	nt of Average al Streamflow iod of Record 1970-1985)	
1	1977	20.0	41%	_	1	1977	9,569	10%		.000/		1	1977	602	9%	.450/	
2	1976	21.6	44%	-	2	2014	13,824	15%	A	<20%	2014	2	1976	1,147	17%	<15%	
3	2014	22.8	47% 50%	40-60%	3	1976	14,010	15%				<u> </u>					
5	1990	24.5	55%	-	5	1990	20 230	21%									
6	2007	29.0	59%	-	6	1987	23,929	26%									
7	1988	30.3	62%		7	1972	23.968	26%				3	1972	1.474	22%	20-25%	
8	1972	31.2	64%	-	8	1989	24,418	27%		00.400/		<u> </u>		.,			
9	1991	32.0	65%		9	1994	28,456	31%	В	20-40%							
10	1981	33.0	67%		10	2007	28,472	31%									
11	1994	33.1	67%		11	1991	30,286	33%									
12	1989	34.3	70%	60-80%	12	2015	31,609	34%	_		2015						
13	2015	34.4	70%	00 00 /0	13	1981	37,141	40%				4	1981	2,196	32%	30-50%	
14	2013	36.8	75%	_	14	1985	43,789	48%				5	1985	3,217	47%		
15	2001	37.2	76%	_	15	2009	45,622	50%	-								
16	2012	37.8	77%	-	16	2012	46,677	51%		40.000/		I					
17	2009	38.0	79%	-	17	1992	48,391	53%	C	40-60%							
10	2000	30.0	79% 82%	+	10	2001	40,000	58%									afv. acre feet per vear
20	1085	40.3	83%	-	20	2000	55 119	60%				I					WY water year
21	1992	41.1	84%	1	21	1979	61 114	66%				6	1979	3 594	53%		Wi Water year
22	1975	42.0	86%	-	22	1971	63.944	70%	D	60-80%		7	1971	4.013	59%	-	
23	1979	42.7	87%		23	2002	67,758	74%						,			*Estimated for WYs 1970-
24	2004	43.9	89%	80-100%	24	2016	76,344	83%			2016					55-85%	1974 using regression with
25	1971	43.9	90%		25	2003	77,081	84%				1					Santa Cruz and Lockheed
26	1999	46.3	94%		26	1975	77,699	84%	F	80-100%		8	1975	4,862	72%		gauges (Johnson 2015).
27	2016	46.6	95%	_	27	1984	80,375	87%	-	00 100 /0		9	1984	5,766	85%		
28	2002	47.3	97%	_	28	2004	84,292	92%	-								
29	2003	49.0	100%	-	29	1999	86,920	95%		400 400%							
30	1970	53.1	108%	-	30	2010	95,008	103%	F	100-120%	4						
30	2010	56.2	115%	100-120%	32	2000	112 261	121%	-								
33	1993	57.7	118%	100.12070	33	1970	110 500	130%	1			10	1970	8 272	122%		
34	1997	58.7	120%	1	34	2011	123.010	134%	G	120-140%		<u> </u>			,0	1	
35	1996	61.1	125%		35	2005	124,138	135%	1								
36	1980	61.4	125%	120-140%	36	1996	125,958	137%	1								
37	2011	61.7	126%		37	1980	135,840	148%]	11	1980	9,988	147%	100%-200%	
38	2005	66.9	136%		38	1974	138,170	150%	н	140-160%		12	1974	13,643	201%	1	
39	1986	67.2	137%	4	39	1997	142,717	155%		110 10070						4	
40	1973	67.8	138%	140.4005	40	1978	147,068	160%	<u> </u>	400 1001		13	1978	6,636	98%	4	Table 47
41	1995	69.1	141%	140-160%	41	1973	163,637	178%		160-180%		14	1973	9,652	142%		
42	1978	70.7	144%	-	42	1986	169,439	184%	J	180-200%							Precipitation and
43	2006	7/6	140%	-	43	2006	108 330	216%	ĸ	200-220%							Streamflow
44	1082	80.5	16/%		44 45	1008	204 206	210%	I N	200-220%		⊢				<u> </u>	Annual Records
46	1998	82.8	169%	160-180%	46	1982	226 686	246%	M	240-260%		15	1982	15,627	230%	1	Donkad from
47	2017	94.6	193%	100 0000	47	1983	283.194	308%		000 0000	1	16	1983	17,849	263%	220%-300%	
48	1983	95.7	195%	180-200%	48	2017	293,305	319%	N	300-320%	2017			,		1	Driest to Wettes
116		•							-	•	~			•		•	61

1							
			— ,			Sum of	
			Target			Synthesized	
	Range o	of SLRBT	Flow for	Flow D	uration	Monthly	
	Gauged A	nnual Flows	Category	Curve W	/eighting	Flows	Percent
W	Y Category	(afy)		Wettest	Driest	(afy)	Difference
Α	10-20%	9,500 - 14,000	10,000	0%	100%	10,170	1.7%
В	20-40%	20,000 - 37,000	27,000	6%	94%	26,982	-0.1%
С	40-60%	44,000 - 55,000	49,000	14%	86%	49,004	0.0%
D	60-80%	61,000 - 68,000	64,300	19%	81%	64,302	0.0%
Е	80-100%	76,000 - 87,000	80,500	25%	75%	80,512	0.0%
F	100-120%	95,000	95,000	30%	70%	94,784	-0.2%
G	120-140%	111,000 - 126,000	119,000	38%	62%	118,999	0.0%
н	140-160%	136,000 - 147,000	141,000	46%	54%	141,020	0.0%
I	160-180%	164,000	164,000	52%	48%	158,312	-3.5%
J	180-200%	169,000 - 178,000	174,000	58%	43%	173,980	0.0%
Κ	200-220%	198,000	198,000	63%	37%	189,648	-4.2%
L	220-240%	204,000	204,000	69%	31%	206,741	1.3%
Μ	240-260%	227,000	227,000	75%	25%	223,833	-1.4%
Ν	300-320%	283,000 - 293,000	288,000	88%	12%	288,163	0.1%



* Monthly flows swapped among categories some years to simulate late start to wet season, relevant to Felton water rights; shown by dashed line as example.

> afm, afy acre-feet per month, acre-feet per year WY water year

Table 4-6

Summary of Synthesized Annual and Monthly Flows of the San Lorenzo River at Big Trees

	Oct	Nov	Dec	Jan	Feb	Apr	May	Jun	Jul	Aug	Sep		Oct	Nov	Dec	Jan	Feb	Apr	May	Jun	Jul	Aug	Sep	
WY						afm						WY						afm						
Averag	ge of B	alance	Hydro	ologics	s low-f	low me	easure	ments	below	Clear	Ck*	Avera	ge of S	Santa (Cruz Co	o. Iow-	flow n	neasur	ement	s at Mi	t. Cros	s Bridg	ge*	
2014						608	304	167	105	61	62	1986	339	808								613	675	
2015	100							216	170	93	90	1987	496											
2016	68								409	195	168	1990							497	455		291		
2017	144								920	563	391	1991	224	190	406	410	291		813	430	344	209	243	
Averag	ge of S	anta C	ruz Co	. low-	flow m	easure	ements	abov	e Love	Ck*		1992	226	287		879				677	410	251		
1986	230	618								448	574	1993	287	395							675	561	453	
1987	457											1994	399	456		744		834			342	298	211	
1990					792	679	619	424	369	248	233	1995	256										647	
1991	188	196	369	378	250		694	408	288	207	166	1997												
1992	47	239	333	748			864		299	261	396	1999												
1993	228	190							476		411	2000												
1994	377	366		574				756	223	210	201	2001	644							768		393		
1995	164								834		364	2002	349									560		
1996										596		2003	499											
1997										341		2004 420 877 2005												
1998											678	2005	2005 2006 875											
1999	575									809		2006	875											
2000	518									450		2007	868							498				
2001	455							655		316		2008	386							380				
2002	275							793	384			2009								646				
2003	315										344	2010											498	
2004	326							738		319		2013										278		
2005	659									504		Avg	448	427	406	678	291	834	655	591	443	384	455	
2006	681									889		Min	224	190	406	410	291	834	497	380	342	209	211	
2007	808							405				Max	875	808	406	879	291	834	813	877	675	613	675	
2008	333					745		324			226	Avera	ge of E	Balanc	e Hydr	ologic	s low-	flow m	easure	ements	s belov	v Fall C	℃k*	
2009	861							553		268		2014						869	595	403	293	246	210	
2010								875			415	2015	2015 283 374 302 213									213	231	
2013										288		2016	2016 200 749 501											
2015								255		85		2017	430											
2017									841				1											
Avg	416	322	351	567	521	712	725	562	464	390	364		Selected drought minimums *Equivalent rate for average of											
Min	47	190	333	378	250	679	619	255	223	85	166	afm	acre-f	eet pei	r month	ı		1-2 m	easure	ments	per mo	onth;		
Max	861	618	369	748	792	745	864	875	841	889	678	cfs cubic feet per second flows >15 cfs omitted.												
Data so	ource: s	ee Tab	ole 1-2									WY	wate	r year										

Table 4-7 Selected San Lorenzo River Low-Flow Measurements at Stations Between Brookdale and Felton, WYs 1986–2017

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Sum WY afm															
WY						af	m						W	Υ							afm						
Averag	je of U	ISGS	low-fl	ow me	asure	ments	at Be	en Lon	nond ^a				Es	stima	ted b	aseflo	w at S	San Lo	orenzo	River	. d						
1974											34	45	198	84	97	119	146	163	160	167	149	136	112	98	87	84	1,517
1975	61	54	80	60	72		89	80	60				198	85	98	114	137	155	147	159	138	122	96	82	73	76	1,398
Averag	je of Sa	anta C	Cruz C	o. low	-flow	meası	ureme	nts at	San L	orenz	o Riv	er ^b	198	86	96	117	149	178	182	216	212	207	178	155	124	95	1,908
1986	115	107	108	122							158		198	87	81	74	82	93	95	112	108	105	89	79	67	57	1,044
1987	157												198	88	60	65	79	92	96	109	103	99	84	74	62	53	975
1990								64	88		40		198	89	53	58	71	84	87	102	99	94	79	67	54	44	894
1991	57	27	51	58	66		101	93	61	68	59	54	19	90	45	50	62	75	79	95	94	90	74	60	44	31	799
1992	66	54	55	73		102	97	81	78	65	58	65	19	91	27	32	47	66	77	98	101	100	85	74	61	52	820
1993	56	59	77				54	114		87	74	76	199	92	56	63	78	91	95	106	100	93	76	66	56	52	932
1994	76	78		87		96	74	149	87	77	74	74	199	93	59	68	85	100	101	118	114	112	99	91	80	70	1,098
1995	103				172	174			187	207		199	199	94	71	73	83	92	88	99	89	81	66	60	60	70	931
1996							193				123		199	95	91	112	139	160	156	175	160	146	118	99	81	71	1,506
1997							159		100		117	96	199	96	81	97	125	151	162	184	176	166	138	117	94	78	1,569
1998	125								215		179	137	199	97	81	91	116	140	145	171	164	155	128	109	88	73	1,459
1999	124								113				199	98	77	95	134	178	196	240	237	232	199	173	138	104	2,004
2000	103								174		124	4 1999 88 81 100 133 152 187 183 177 151 131 107 88 1,578 122 2000 86 91 110 130 140 165 168 171 154 143 123 102 1,583															
2001	69											122 2000 86 91 110 130 140 165 168 171 151 161 56 1,51 2000 86 91 110 130 140 165 168 171 154 143 123 102 1,583 2001 90 92 90 100 120 140 120 141 123 102 1,583															
2002	62								136			122 2000 86 91 110 130 140 165 168 171 154 143 123 102 1,883 2001 92 83 90 102 108 136 146 158 148 136 111 83 1,392															
2003	132								16			2001 92 83 90 102 108 136 146 158 148 136 111 83 1,392 2002 67 59 71 93 108 143 156 166 153 141 121 97 1,374												1,374			
2004	85								89		78		200	03	86	80	91	110	120	151	159	164	147	132	109	86	1,436
2005	75										99		200	04	78	77	95	118	133	157	153	148	125	108	88	73	1,353
2006	89										176		200	05	73	83	108										
2007	118						98		72				Av	/g	75	81	100	119	125	147	143	139	119	105	87	73	1,313
2008	73								90		58		Mi	in	27	32	47	66	77	95	89	81	66	60	44	31	799
2009							115		96				Ma	ax	98	119	149	178	196	240	237	232	199	173	138	104	2,004
2010								119	64		76																
2011											98			a	Equiv	alent n	nonthl	y rate	for 1 i	nstanta	aneous	s mea	surem	ent pei	r mont	h.	
2012									101		86	52		b	Equiv	alent r	ate foi	r avera	age of	1-2 me	easure	emente	s/mont	h.			
2013		93					83		81					c	Equiv	alent r	ate foi	r avera	age of	2-5 m	easure	ement	ts/mon	th; flow	/s >8 (cfs omi	tted.
2014	65						24		17		14			d	Month	nly bas	eflows	s estin	nated f	rom av	vailable	e data	a for gro	oundw	ater flo	ow mo	del
2015							19		6		7				calibra	ation (Johns	on, 20	05).								
2016							73		62		47	_															
Averag	je of C	ity Sa	nta Cr	uz low	/-flow	meas	ureme	ents at	Glen	Arbo	r Bridg	ge ^c			Selec	ted dro	ought	minim	ums								
2009											73	58															
2010	63	68	76					90	83	83	75	77	a	afm a	acre-fe	eet per	mont	h									
2011	77													cfs (cubic f	feet pe	r secc	ond									
2014					38	45	26	20	16	15	15	15 WY Water year; e.g., WY 2017 extended from Oct. 1, 2016 through Sep. 30, 2017.															
2015	24	15	79	35	31	25	21	18	13	12	11	Data sources: see Table 1-2															
2016	10	15	30	121								Table 4-8															
Avg	83	57	69	79	76	88	82	83	84	77	78	77 Selected Newell Creek Low-Flow Measurements and Estimates,															
Min	10	15	30	35	31	25	19	18	6	12	7	7 <u>10</u> WYs 1974–2016															
Max	157	107	108	122	172	174	193	149	215	207	179	7 10 9 199 WYs 1974–2016															

Agenda: 2.7.19 Item: 10c

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
WY						afm							afy	WY						af	m					
USGS	contin	uous ga	uge at	Zayante	e									Avera	ge of Sa	anta Cr	uz Cou	inty low	-flow m	easure	ements	at Zaya	nte*			
1958	62	57	207	614	5,762	3,911	5,962	547	290	174	105	58	17,751	1976	-	30	12	98	51	86	-	-	-	7	-	1
1959	36	52	48	1,945	2,281	509	220	134	77	42	30	307	5,681	1977	-	-	-	-	50	-	-	-	12	-	-	280
1960	51	50	62	262	1,871	183	122	94	42	24	18	19	2,798	1978	9	-	-	-	-	-	-	-	-	105	-	12
1961	30	93	127	95	116	169	91	61	28	10	6	6	832	1980	39	-	-	-	-	-	-	-	-	-	-	57
1962	13	48	115	84	3,169	1,431	165	116	67	42	27	32	5,307	1981	-	-	-	-	-	-	-	129	-	-	-	15
1963	971	79	333	3,213	3,328	1,290	3,189	691	301	145	95	69	13,704	1982	-	-	-	-	-	-	-	-	-	-	-	65
1964	92	530	149	774	209	175	111	87	69	32	10	24	2,262	1984	-	-	-	-	-	-	214	-	-	-	-	-
1965	45	184	2,408	3,096	544	353	1,303	378	151	84	58	32	8,636	1986	194	146	531	979	-	-	-	578	953	226	324	151
1966	39	185	324	469	668	268	144	88	49	27	19	17	2,296	1987	206	216	323	365	657	882	390	571	337	147	31	115
1967	15	217	1,652	5,442	960	3,924	2,803	813	352	165	121	86	16,551	1988	116	245	519	168	-	366	395	386	103	793	84	45
1968	73	85	190	1,318	801	734	296	145	89	45	33	23	3,832	1989	135	333	181	322	126	1,063	600	278	157	57	56	14
1969	39	71	293	8,361	8,892	2,444	889	367	206	137	88	72	21,858	1990	22	237	168	111	167	176	125	95	92	31	30	48
1970	86	67	898	6,035	908	2,073	367	224	134	79	69	60	11,000	1991	14	44	18	45	41	-	-	157	61	40	51	10
1971	40	569	1,747	692	275	469	328	181	83	47	28	22	4,479	1992	7	51	80	261	86	-	92	242	61	14	-	4
1972	21	55	315	184	182	71	87	50	34	14	9	14	1,034	1993	46	12	160	-	-	-	178	-	227	32	34	39
1973	94	978	214	3,852	6,163	2,033	499	257	145	69	43	32	14,378	1994	49	78	-	66	-	140	63	132	49	26	22	16
1974	66	797	941	2,079	604	3,638	1,906	422	186	135	62	47	10,883	1995	26	17	169	-	187	-	-	-	287	167	-	65
1975	82	118	454	152	1,705	3,085	862	376	177	80	51	40	7,183	1996	-	-	-	-	-	-	-	-	-	-	-	-
1976	115	70	62	61	67	105	84	40	28	9	18	19	679	1997	-	83	-	-	-	-	288	-	93	-	-	51
1977	22	39	65	93	45	82	31	32	11	4	1	14	439	1998	51	-	-	-	-	-	-	-	-	-	202	-
1978	13	83	388	7,385	3,188	3,217	1,277	544	222	125	64	58	16,566	1999	120	-	-	-	-	-	-	-	149	-	112	-
1979	48	100	84	890	1,652	1,106	561	245	107	68	51	35	4,945	2000	44	-	-	-	-	-	-	-	194	-	151	-
1980	77	85	619	2,915	5,250	1,350	651	321	177	121	74	56	11,696	2001	-	-	-	-	-	-	-	-	-	56	-	81
1981	52	45	178	705	263	880	242	121	55	43	20	16	2,620	2002	107	-	-	-	-	-	-	-	-	-	-	-
1982	34	554	907	6,230	2,600	1,975	5,256	531	259	202	99	77	18,725	2003	44	-	-	-	-	-	-	-	-	-	-	243
1983	100	389	1,754	4,790	6,910	11,244	2,229	2,900	522	282	152	94	31,367	2004	61	-	-	-	-	-	-	-	95	-	50	-
1984	141	852	3,020	834	442	385	242	177	126	87	61	49	6,414	2005	28	-	-	-	-	-	-	-	-	-	130	-
1985	58	417	262	149	480	545	248	120	65	36	40	28	2,447	2006	-	-	-	-	-	-	-	-	-	-	154	-
1986	36	113	207	640	11,857	6,865	611	278	138	101	65	62	20,973	2007	86	-	-	-	-	-	118	-	59	-	26	-
1987	52	49	83	104	711	503	89	65	39	22	15	23	1,754	2008	27	-	-	-	-	-	-	-	68	-	17	-
1988	24	49	387	398	91	63	96	65	35	18	15	11	1,252	2009	-	-	-	-	-	-	215	-	74	-	-	-
1989	18	87	164	99	75	749	131	62	69	49	23	22	1,548	2010	-	-	-	-	-	-	-	-	161	-	87	-
1990	139	226	141	144	193	148	86	121	71	42	33	27	1,370	2011	-	-	-	-	-	-	-	-	-	-	128	-
1991	32	39	47	53	66	2,131	224	80	55	34	22	12	2,794	2012	-	-	-	-	-	-	-	-	89	-	47	-
1992	19	36	98	124	2,715	615	223	105	55	28	10	5	4,034	2013	-	-	-	-	-	-	116	-	-	-	-	-
1993	28	22	342	-	-	-	-	-	-	-	-	-	-	2014	16	-	-	-	-	-	47	-	61	-	10	-
Avg	80	208	536	1,837	2,144	1,678	904	310	129	75	47	45	8,003	2015	-	-	-	-	-	-	77	-	41	-	10	-
Min	13	22	47	53	45	63	31	32	11	4	1.3	5	439	2016	-	-	-	-	-	-	262	-	92	-	23	-
Max	971	978	3 020	8 361	11 857	11 244	5 962	2 900	522	282	152	307	31 367	Ava	66	124	216	268	170	452	212	285	153	131	81	60
afm	acre	feet ner	month	0,001	11,007	11,274	0,002	2,000	522	202	102	507	51,007	Min	7	12	12	200	41	88	Δ1Z	200 Q5	12	7	10	1 2
afv	acre-	-feet per	vear		Γ		Selecte	d drough	t minim	ums				Max	206	333	531	979	657	1 063	600	578	953	793	324	280
ofo	oubio	foot nor	second				2010010	a arougn		anno				*Equive	alent rate	from a	veranin	1-6 m	easurer	nents/n	onth: fl		cfs omitt	, 55 od	027	200

WY Water year; e.g., WY 2011 began Oct. 1, 2010 and extended through Sep. 30, 2011.

*Equivalent rate from averaging 1-6 measurements/month; flows >5 cfs omitted. Data sources: http://waterdata.usgs.gov/ca/nwis/sw; Table 1-2.

Table 4-9

Zayante Creek at Zayante Continuous Gauged Flow and Selected Low-Flow Measurements, WYs 1958–2016

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
WY						af	m						WY						af	m					
Zaya	nte Cre	ek: ave	erage o	of Sant	a Cruz	Co. low	/-flow n	neasure	ements	at San	Lorenz	zo	Lom	pico C	reek:	avera	age of	Sant	a Cru	z Co.	low-f	low n	neasu	remer	nts
River	a												at Ca	arrol A	venue	, b									
1986	425	284		837	1,311		1,803	1,138	648		438	541	1986	2.5	7.1	39					52	24		11	15
1987	432	378						372					1987	26											
1988		280						291					1991		0.6	3.1	3.1	2.8		47	6.8		5.5	1.8	3.0
1989		228						920					1992	1.8	2.4	0.6	8.6	5.0	41	11	17	4	1.2	1.2	0.0
1990					474	453	312	299	300	350	193	224	1993	0.0	1.8	18				45	27	19	6.8	5.5	1.2
1991	215	196	242		218			310	246	205	210	315	1994	1.2	0.0		1.8		12	7.1	5.5	3.6	6.1	6.1	0.0
1992	128	184	221	374	274	1,522	619	374	246	204	204	187	1995	0.0	6.5	22		16				51	21		8.3
1993	190	265	633			4,899	660	678	450	377	274	208	1996							43					
1994	264	243		311	2,032	638	463	460	363	220	242	183	1997		12					44		17			3.0
1995	198	1,232	443		1,770	1,479			777	484		318	1998	3.1										20	
1996							1,722				346		1999	37								23		32	
1997							833		415		333	304	2000	16						55		18		20	
1998	283						2,276		1,336		739		2001										15		
1999	496						2,039		794		377	2002													
2000	352						1,776		661		439	2003 17 41									19				
2001	285										332		2004	1.8						34		10		6.0	
2002	518						767		392			228	2005	13										14	
2003	309						1,351		935			571	2006	10								44		16	
2004	244						786		368		283		2007	12						27		9.2		3.5	
2005	283						1,674				539		2008									10		6.0	
2006	337						4,156		1,171				2009							34		14			
2007	400						540		317				2010									19		12	
2008	234								425		253		2011											15	
2009							709		291				2012									23		16	
2010								1,165	501		382		2013							12		11			
2011										724	559		2014							10		10		3.9	
2012									458		212	303	303 2015 16								5.2		2.2		
2013	416	345					551		348			2016								37		18		5	
2014	301						400		256		206		Avg	10	4.4	17	5	8	27	30	22	19	9.3	11	4.4
2015	189						413		160		166		Min	0.0	0.0	0.6	1.8	2.8	12	7.1	5.5	3.6	1.2	1.2	0.0
2016							808		430		310		Max	37	12	39	9	16	41	55	52	51	21	32	15
2017									1,028	633			^b Equ	ivalen	t rate f	rom a	verag	ing 1-	2 mea	asurei	ments	/mont	h;		
Avg	309	364	385	507	1,013	1,798	1,174	601	533	400	335	308	flow	/s >1 c	fs omi	tted.	Ū	-							
Min	128	184	221	311	218	453	312	291	160	204	166	183	afm	acre-f	eet pe	r mor	nth						Та	able 4	4-10
Max	518	1,232	633	837	2,032	4,899	4,156	1,165	1,336	724	739	571	cfs	cubic	feet p	er sec	cond		S	Selec	ted Z	Zavar	nte C	reek	and

cfs cubic feet per second WY water year

Selected Zayante Creek and Lompico Creek Low-Flow Measurements, WYs 1986-2017

Selected drought minimums

^a Equivalent rate from averaging 1-3 measurements/month; flows >12 cfs omitted.

Agenda: 2.7.19

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w	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Aug Sep Iotal Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep afy WY afm Average of USGS low-flow measurements near Scotts Valley [®] Image: Contract of the second														Sep
USGS	continu	ious dai	uge near	Scotts V	Vallev	aini							aiy	Avera	age of l	JSGS lo	w-flow i	measur	ements	near Sc	otts Va	llev ^o				
1989	-	-	-	-	175	1,045	251	143	131	115	113	118	-	1973	-	-	-	-	-	-	-	-	-	172	-	-
1990	183	244	185	248	258	241	156	185	127	123	117	105	2,172	1974	-	262	-	-	-	-	-	-	-	264	-	-
1991	121	119	133	130	134	1,967	272	143	117	105	115	109	3,465	Avera	ge of Sa	anta Cri	uz Co. lo	w-flow	measu	rements	at Mou	int Hern	non Rd	USGS (Gauge)	c
1992	152	133	258	178	2,889	809	224	151	150	140	122	120	5,327	1976	-	155	172	-	-	-	-	-	-	-	-	-
1993	131	117	745	4,925	2,896	1,387	470	239	179	143	140	134	11,506	19//	-	-	-	-	-	-	-	-	113	-	80	-
1994	102	200	273	6 129	726	234 4 413	668	732	258	125	125	125	3,020	1970	-	-	-	-	-	-	-	-	-	-		101
1996	100	123	435	1.994	3.535	2.281	678	644	272	182	157	132	10.553	1980	_	-	-	-	-	-	_	_	_	-		129
1997	142	310	4,459	5,917	873	394	284	219	165	124	124	128	13,139	1981	-	-	-	-	-	-	-	114	-	-	-	116
1998	139	351	459	3,250	9,267	2,097	1,290	750	560	301	204	156	18,824	1982	-	-	-	-	-	-	-	-	-	-	-	119
1999	179	298	295	1,432	2,620	1,121	1,017	256	184	147	133	124	7,808	1986	-	-	-	-	-	-	-	-	258	-	-	-
2000	120	219	169	2,304	5,309	1,617	514	329	225	178	147	149	11,279	1987	205	-	-	-	-	-	-	167	-	-	-	-
2001	233	163	166	679	1,725	1,424	275	172	129	124	114	103	5,307	1988	193	-	-	-	-	-	-	-	138	-	-	-
2002	127	255	1,805	1,542	513	640	311	210	150	134	120	109	5,916	1989	-	124	-	-	-	-	-	-	-	- 05	-	- 112
2003	125	144	2,911	1,150	1 755	434	288	201	163	148	123	125	6 958	1990	- 124	120	-	- 135	- 112	-	-	140	120	95	117	105
2004	340	242	1,711	2.497	1,439	2.216	879	360	253	196	158	140	10.430	1992	117	120	-	232	64	-	220	-	152	117	108	122
2006	125	154	2,375	2,067	652	3,237	4,491	596	322	245	206	166	14,637	1993	129	132	-	-	-	-	-	243	174	168	136	132
2007	164	200	279	200	553	292	194	140	128	119	109	102	2,479	1994	126	122	-	136	-	261	152	179	89	85	100	97
Avg	158	207	1,022	2,030	1,939	1,402	689	321	202	157	136	125	8,549	1995	168	138	-	-	-	52	-	-	82	146	157	-
Min	117	117	133	130	134	234	156	140	106	105	109	102	2,172	1996	117	132	-	-	-	-	-	-	-	-	208	174
Max	340	351	4,459	6,129	9,267	4,413	4,491	750	560	301	206	166	166 18,824 1997 - 113 - - - 267 - 163 - 146 - 1998 168 - - - - - - 246 - - 212 - 1999 191 - - 187 - - - 202 154 - 2000 138 - - - - - 250 - 146 - ep 2001 141 - - - - 274 - 113 - 123 -													-
2017	ce Hyar	ologics	continuo	ous gage	above m	nouth at M	Nount H	ermon		283	245	212														-
2017	-	-	-	-	-	-	-	-	-	200	240	212														-
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep														-
WY						afm								2002	123	-	-	-	-	-	292	-	149	-	-	119
Avera	ge of Sa	inta Cru	z Co. low	v-flow m	easurem	ents at Za	ayante C	reek ^a						2003	154	-	-	-	-	-	-	-	-	-	129	-
1990	400							180			143			2004	117	-	-	-	-	-	238	-	155	-	129	-
1991	126							163	100			150		2005	1/2	-	-	-	-	-	-	-	232	-	129	-
1992	140								102			100		2006	148	-	-	-	-	-	- 155		292	-	117	-
1994				168					127			130		2008	123	-	-	-	-	-	-	_	-	-	-	-
1996												190		2015	89	-	-	-	-	-	-	-	-	-	-	-
1997											222			Avg	145	150	172	172	88	156	216	168	162	157	135	126
1998												229		Min	89	113	172	135	64	52	131	114	82	85	80	97
1999	216										197			Max	205	262	172	232	112	261	292	243	292	264	215	174
2000	195									154	218															
2001	213								1/3	154	144	116		а	Equival	ont rato	for aver	ane of 1	2 maas	urement	e/month	. flowe	>4 cfs o	mitted		
2002	160								140		125	110		b	Equival	ent mon	thly rate	for 1 ins	stantane	eous mea	asureme	ent per n	nonth fl	ows >5 c	fs omitt	ted
2004	154								193		156			с	Equival	ent rate	for avera	age of 1	-2 meas	urement	s/month	n: flows :	>5 cfs o	mitted.	lo onnic	.04.
2005	206										148				•			5				,				
2006	167														Select	ed drou	ght mini	mums								
2007	172						183		133		130															
2008	135								141			128		afm, afy	acre-f	eet per	month, a	cre-feet	per yea	ar						
2009	139	147	162	134				197	145		135	400		cfs	cubic	feet per	second	2047				0040 "			- 00 00	47
2010	160								212	222	217	182		WY	Water	r year; e	.g., WY 2	201/ex	tended f	rom Octo	ober 1, i	2016 th	rough Se	eptember	30, 20	17.
2011	001									232	∠17 130	109	9 Data source: see Table 1-2													
2014											100	112	112 													
2015	108						148			123																
2016								200																		
2017	152	165										231	231 Table 4-11													
Avg	168	156	162	134			166	198	161	170	161	169 Bean Creek Continuous Gauged Flow and Selected Low-Flow														
Min	108	147	162	134			148	197	133	123	125	5 112 Measurements, WYs 1973–2017														
Max	216	165	162	134			183	200	212	232	218	231														



Figure 4-1 Method of Estimating Divertible Flows from a Flow Duration Curve



 cfs/mi^2 cubic feet per second per square mile





Period of record: WYs 1970-1985 (Table 1-2) cfs/mi² cubic feet per second per square mile

Figure 4-3 San Vicente Creek near Davenport Monthly Flow Duration Curves, Wettest Years







Monthly Flow Duration Curves for Foreman and Peavine Creeks Combined Diversions, Wettest Years



San Lorenzo River at Big Trees Monthly Flow Duration Curves, Driest Years



Period of record used: WYs 1970-2017 (Table 1-2 cfs/mi² cubic feet per second per square mile

Figure 4-7 San Lorenzo River at Big Trees Monthly Flow Duration Curves, Wettest Years





Note differences in vertical-axis scaling.

See Table 1-2 for source of gauged records.

San Lorenzo River at Big Trees and Boulder Creek Gauged versus Synthesized Monthly Streamflow, WYs 1970–2017

Figure 4-9



Figure 4-10

Boulder Creek at Boulder Creek Monthly Flow Duration Curves, Driest Years



Boulder Creek at Boulder Creek Monthly Flow Duration Curves, Wettest Years



Boulder Creek Gauged versus Synthesized Annual Flows, WYs 1970-2017



cfs/mi² cubic feet per second per square mile Represents estimated total flow at point of diversion.

Figure 4-13 Foreman Creek Estimated Monthly Flow Duration Curves, Driest Years



Represents estimated total flow at point of diversion.

Figure 4-14 Foreman Creek Estimated Monthly Flow Duration Curves, Wettest Years



Represents estimated total flow at point of diversion.

Peavine Creek Estimated Monthly Flow Duration Curves, Driest Years



Represents estimated total flow at point of diversion.

Peavine Creek Estimated Monthly Flow Duration Curves, Wettest Years



Clear and Sweetwater Creeks Combined Estimated Monthly Flow Duration Curves, Driest Years



Represents estimated total flow at point of diversion.





Represents estimated total flow at point of diversion.

Figure 4-19 Fall Creek Estimated Monthly Flow Duration Curves, Driest Years



Fall Creek Estimated Monthly Flow Duration Curves, Wettest Years



Represents estimated total flow at point of diversion.

Figure 4-21 Bull Creek Estimated Monthly Flow Duration Curves, Driest Years



Represents estimated total flow at point of diversion.

Figure 4-22 Bull Creek Estimated Monthly Flow Duration Curves, Wettest Years
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Estimated Percent of Time SLRBT Flows are Above Minimum Required for Felton Diversions (derived from SLRBT flow duration curves, Figures 4-6 and 4-7)

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The map presented in Figure 5-1 identifies three loosely defined groundwater subareas from which SLVWD draws approximately 45 percent of its average annual water supply: the Quail Hollow and Olympia areas, each encompassing about 3 mi², and the approximately 2-mi² Pasatiempo area. These subareas occur within the 35-mi² SMGB and are distinguished in places by sandhills of exposed Santa Margarita Sandstone and associated aggregate quarrying. Quail Hollow groundwater is relatively separate from the other groundwater subareas, whereas the Olympia and Pasatiempo subareas are contiguous with the loosely defined Mission Springs, Camp Evers, and Scotts Valley groundwater subareas to the east.

5.1 SLVWD Groundwater Production

SLVWD typically operates two wells in each of the Quail Hollow, Olympia, and Pasatiempo subareas. Table 5-1 provides a summary of SLVWD's current and/or recent operating wells. The Quail Hollow and Olympia wells draw solely from separate portions of the Santa Margarita Sandstone aquifer, whereas the Pasatiempo wells draw predominantly from the underlying Lompico Sandstone aquifer (Figure 5-1).

Wells operated by SLVWD do not draw directly from alluvial aquifers and do not directly induce streamflow infiltration, consistent with area groundwater levels that are generally higher than the elevation of the gaining streams that dissect or bound the groundwater subareas (Figure 5-1). The Monterey Formation aquitard partially separates the Santa Margarita and Lompico sandstone aquifers from streams bounding and/or overlying the groundwater subareas. SLVWD's pumping wells may intercept groundwater flowing toward springs and streams, but generally do not draw streamflow into the aquifer. This distinction is important with regard to conjunctive use because it helps distinguish groundwater and surface water as somewhat separate sources.

Since WY 2000, SLVWD annual groundwater production has averaged approximately 280 afy from the Quail Hollow wells, 400 afy from the Olympia wells, and 380 afy from the Pasatiempo

wells (Table 3-1). The Quail Hollow and Olympia wells supply the North system and their use increases and decreases substantially in response to the availability of divertible streamflows (Figure 1-3). Since the 1970s, the Quail Hollow wells have experienced little if any long-term net decline in groundwater levels (Figure 5-2), whereas water levels in the Olympia wells have exhibited a slight long-term downward trend since the 1980s (Figure 5-3), suggesting that higher rates of extraction may be unsustainable without augmenting recharge.

As the sole water supply for the South system, production from SLVWD's Pasatiempo wells fluctuates with seasonal water demand. Pasatiempo groundwater levels have declined by as much as 200 ft since the early 1980s (Figure 5-4), consistent with long-term groundwater level declines throughout much of the general Scotts Valley area. Although well yields have been sufficiently reliable, replenishment of the aquifer through reduced pumping and possibly managed aquifer recharge is an expected outcome of future groundwater management under SGMA.

The simulation of alternative conjunctive use scenarios presented in Section 6 generally assumes that each well can produce continuously up to its capacity as needed when surface water supplies are insufficient. Based on information presented in Section 3, the combined wellfield capacities are assumed to be:

gpm Quail Hollow wells: 500 Olympia wells: 780 Pasatiempo wells: 450

Lower capacities are assumed for particular months of the climatic cycle based on detailed plots of monthly groundwater levels, pumping, and precipitation in relation to pump intake and well screen elevations. These plots are provided in Figures 5-5, 5-6, and 5-7 for the Quail Hollow, Olympia, and Pasatiempo wells, respectively. Reduced well capacities are indicated when water levels are drawn down to the elevation of the pump intake, typically during drought periods with heavy demand (such as during the early years of a drought before conservation reduces demand). Based on inspection of these plots and the groundwater level and production record summarized in Table 5-2, the capacities of the Quail Hollow and Olympia wells are assumed to decline in as many as three monthly steps to as low as 250 and 475 gpm, respectively, during the following months of the climactic cycle: July–September 1977; July–August 1989; July–September 1990; May–October 1991; May–September 1992; June–October 2008; June–October 2009; June–September 2014; May–November 2015; and May–October 2016.

5.2 Potential Effects of Groundwater Pumping on Stream Baseflow

As stated above in Section 5.1, SLVWD's wells may intercept groundwater flowing toward springs and streams, but generally do not draw water directly from streams. For this reason, and because of the slow rate of groundwater flow, it is reasonable to evaluate the potential effects of groundwater pumping by comparing rates of average annual pumping to minimum rates of stream baseflow. This implies there is effectively no difference between summer and winter groundwater pumping with regard to the potential effects on stream baseflow. A more refined evaluation of potential surface water-groundwater interactions would require the use of a numerical groundwater flow model, which was beyond the scope of this study.

Table 5-3 compares estimates of minimum monthly impaired baseflow from Section 4.4 with recent average monthly groundwater pumping rates. Because the effects of pumping are already reflected in the gauged and estimated streamflow records, the potential percent reduction in minimum monthly baseflow is calculated as the average groundwater pumping rate divided by the combined rates of baseflow and pumping. Subtracting this fraction from 1 and multiplying by 100 percent gives the estimated percent of baseflow remaining as a result of pumping. Based on this method, average rates of SLVWD, SVWD, and MHA groundwater pumping may reduce Newell, Zayante, and Bean Creek baseflows by as much as roughly 50 percent during worst case drought conditions (Table 5-3).

			Ground	W	ell	Depth:			Screened Intervals					Pump	
			Surface	Diam	neter	Com-	Sani-	Grav-			Total			Suc-	
			or Ref.	Bor-	Cas	pleted	tary	el		Total	Inter-			tion	
	Abbrev-	Year	Pt. Elev.	ing	ing	Well	Seal	Pack	Depth	Length	val		Size	Intake	
Well Name	iation	Drilled	(ft msl)	ni)	n)			(ft bg	s)	(f	t)	Aquifer ^a	(hp)	(ft bgs)	
North System We															
Quail Hollow 4A	QH-4A	2001	597	22	12	260	120	266	180 - 250	70	70	Tsm	20	237	
Quail Hollow 5A	QH-5A	2000	516	22	12	174	112	174	124 - 164	40	40	Tsm	20	155	
Olympia 2	Oly-2	1981	525	24	12	310	160	325	230 - 250 280 - 300	20 20	70	Tsm	60	279	
Olympia 3	Oly-3	1990	538	24	12	310	160	340	230 - 300	70	70	Tsm	60	279	
South System W															
Pasatiempo 5A	Paso-5A	2012	750	24	12	710			400 - 700	300	300	Tlo			
									560 - 580	20					
Pasatiempo 6 ^b	Paso-6	1990	775	24	12	790	381	805	600 - 620	20	210	Tlo	60	700	
									710 - 770	60					
Pasatiempo 7 ^b	Paso-7	1990	734	24	12	540	260	560	380 - 440	60	145	Tlo	60	535	
	1 400 7	1000	701	- 1	14	010	200	000	495 - 525	30	110	110	00	000	
Pasatiempo 8 ^c	Paso-8	2018	-	-	-	-	-	-		-	-	-	-	-	
Manana Woods									190 - 210	20					
	MWd-1	1988	516	18	10	380	160	405	240 - 280	40	170	Tlo			
									320 - 360	40					

^aAquifers: Tsm = Santa Margarita Sandstone; Tlo = Lompico Sandstone.

^bWells to be replaced with Paso-8.

^cUnder construction as of October 2018.

ft bgs feet below ground surface ft msl feet elevation above sea level hp horsepower in inchres Table 5-1 SLVWD Groundwater Production Wells

				Diversions						Quail Hollow Wells				Olympia Wells			
	WY						Base-			Minii	Minimum				num		
	Rain-		Drought					flow			During	g Dry, 🛛			During	g Dry,	
	fall %		Cumu-					reces-			Heav	Heavy-Use			Heavy-Use		
	of	Year of	lative %	Maximum		Minimum		sion	Maximum		Period		Maximum		Period		
CY	Avg.*	Drought	of Avg.	gpm	month	gpm	month	months	gpm	month	gpm	month	gpm	month	gpm	month	
1985	83%	-	-	813	Dec	282	Sep	6	496	Oct	436	Jul	454	Aug	380	Sep	
1986	138%	-	-	882	May	264	Dec	7	511	Jul	314	Dec	300	Aug	115	Nov	
1987	55%	1	55%	606	Apr	123	Oct	6	511	Aug	399	Oct	540	Aug	373	Oct	
1988	62%	2	59%	630	Feb	108	Sep	8	430	Aug	380	Oct	527	Jul	500	Sep	
1989	71%	3	63%	766	Apr	229	Sep	4	352	Jul	264	Sep	527	Jul	422	Sep	
1990	50%	4	60%	682	Nov	158	Dec	15	370	Dec	210	Oct	522	Oct	443	Jul	
1991	66%	5	61%	733	Apr	163	Oct	8	365	May	258	Sep	544	Sep	508	Oct	
1992	85%	6	65%	694	Apr	182	Nov	6	298	Aug	207	Jul	609	Aug	453	Oct	
1993	119%	-	72%	871	Apr	182	Nov	7	243	Oct	192	Aug	473	Jul	310	Nov	
1994	68%	7	72%	748	Mar	199	Sep	6	298	Jul	229	Sep	779	Aug	659	Sep	
1995	142%	-	-	832	Jul	215	Oct	4	208	Oct	177	Sep	505	Oct	325	Sep	
1996	125%	-	-	805	Jul	482	Nov	4	223	Jul	128	Sep	456	Jul	318	Oct	
1997	120%	-	-	805	Mar	362	Aug	6	266	Jul	211	Sep	603	Sep	466	Jul	
1998	170%	-	-	1,011	Jul	600	Nov	3	128	Jul	124	Oct	326	Sep	264	Oct	
1999	95%	-	-	955	Jun	424	Oct	4	163	Jul	145	Oct	473	Sep	389	Jul	
2000	116%	-	-	924	May	413	Oct	5	206	Aug	132	Oct	570	Sep	342	Oct	
2001	77%	1	77%	810	Mar	253	Oct	5	306	Aug	231	Oct	708	Sep	575	Oct	
2002	97%	2	87%	807	Apr	207	Sep	3	353	Oct	353	Oct	713	Aug	492	Oct	
2003	101%	-	-	918	May	230	Nov	5	424	Sep	286	Nov	704	Aug	549	Oct	
2004	91%	-	-	972	Apr	317	Oct	6	401	Jul	328	Oct	654	Aug	407	Oct	
2005	137%	-	-	947	May	374	Nov	5	545	Jul	231	Oct	523	Aug	424	Oct	
2006	153%	-	-	983	May	376	Oct	5	421	Jul	334	Oct	570	Sep	342	Oct	
2007	60%	1	60%	892	Mar	248	Oct	8	388	Jun	342	Sep	712	Jun	506	Oct	
2008	80%	2	70%	835	Apr	161	Oct	6	383	Aug	344	Sep	764	Aug	559	Oct	
2009	79%	3	73%	770	Apr	216	Sep	4	341	Jul	304	Sep	590	Sep	563	Jul	
2010	116%	-	-	908	Jun	326	Oct	4	353	Sep	214	Oct	328	Sep	275	Oct	
2011	127%	-	-	963	Jul	407	Nov	6	219	Dec	122	Oct	314	Sep	183	Oct	
2012	78%	1	78%	845	May	197	Nov	6	231	Oct	165	Sep	649	Sep	424	Oct	
2013	76%	2	77%	748	Mar	170	Jan	9	376	May	284	Aug	734	Jul	454	Oct	
2014	40%	3	64%	574	Mar	88	Dec	7	333	Nov	207	Sep	522	Jul	454	Oct	
2015	71%	4	66%	610	Jan	108	Sep	10	288	Aug	224	Oct	501	Oct	408	Sep	
2016	96%	5	72%	864	May	84	Oct	4	325	Sep	186	Oct	516	Oct	400	Aug	
2017	194%	-	-	926	Mar	296	Oct	4	325	Jun	182	Oct	525	Sep	324	Aug	
Avg	98%	-	-	822	-	256	-	-	336	-	247	-	553	-	412	-	
Min	40%	-	-	574	-	84	-	-	128	-	122	-	300	-	115	-	
Max	194%	-	-	1,011	-	600	-	-	545	-	436	-	779	-	659	-	
	Drought period * Percent of average for WVs 1070-2017 CV calendar year																

gpm gallons per minute WY water year

Yield potentially diminished during drought.

Evaluation of North System Water Production During Drought

Table 5-2

	Assumed Distribution of Pumping Effects										
	Monthly										
	Ground-										
	water	Sa	n								
	Produc-	Lorenzo		Newell		Zavante		Bean		All or Other	
	tion ^a	River		Creek		Creek		Creek		Streams	
Wellfield	afm	%	afm	%	afm	%	afm	%	afm	%	afm
SLVWD Quail Hollow wells	23	25%	6	25%	6	50%	12	-		-	
SLVWD Olympia wells	34	-		-		33% 11		67%	23	-	
SLVWD Pasatiempo wells	32	-		-		-		100%	32	-	
Mt. Hermon Association wells	14	-		-		-		100%	14	-	
SVWD wells 9,10A,11A,11B	61	-		-		-		100%	61	-	
SVWD wells 3B, 7A	SVWD wells 3B, 7A 46			-		-		?		100%	46
		Minir	num	Percent of Drought							
		Drou	ight	Minimum Baseflow Remaining							
		Basef	Baseflows [□] as a Result of Pumping [□]								
Stream	af	m	SLV	WD	MH	IA	SVV	VD	Tot	al	
Newell Creek at San Lorenzo R		6	51	%	-		-		-		
Zayante Creek above Bean Creek			20	47	%	-		-		-	
Bean Creek at Zayante Creek	1	10	77%		94%		75%		46%		
Zayante Creek at SLR		1	30	73%		95%		78%		46%	
San Lorenzo River above Fall (Creek	1	50	93%		-		-		-	
San Lorenzo River at USGS ga	4	00	84%		98%		89% 71%		%		
^a Periods represented by average pumping: afm acre-feet per mont									nonth		
SLVWD: WYs 2000-2017 (derived from data presented in Table 3-1)											
SVWD: WYs 2010-2016 (derived from SVWD WY 2016 Annual Report Table 5)											
MHA: CYs 2008-2017 (data provided by MHA)											
^b Estimated from Tables 4-4 and 4-7 through 4-11, as presented in Figure 5-14.											
		•				•					1
^c Calculated as: 100 x {1 - [(pun	nping) ÷ (b	aseflov	v + pui	mping)]	}						

Table 5-3

Percent of Drought Minimum Baseflow Remaining as a Result of Assumed Distribution of Groundwater Pumping Effects



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afy acre-feet per year

ft msl elevation in feet above mean sea level

Figure 5-3 SLVWD Olympia Wells Groundwater Levels and Annual Pumping and Precipitation, 1980-2018















Figure 5-6 ipitation, CYs 1984-2018



SLVWD Pasatiempo Wells Groundwater Levels and Monthly Pumping and Precipitation, CYs 1984-2018





6 Conjunctive Use Scenarios

On the basis of the analyses of water demand, production capacity, and available resources documented in Sections 2 through 5, this section presents simulations of SLVWD monthly water supply and water use for a base-case and alternative conjunctive use scenarios. Each simulation assumes a repeat of the WY 1970–2017 climactic cycle under assumed 2045 water demand.

The simulated base case and alternative conjunctive use scenarios are defined and grouped as follows:

- Base case Calibrated to SLVWD's actual average, minimum, and maximum proportional use of surface water and groundwater sources during WYs 2000–2017; excludes the use of system interties.
- Scenario 1 Optimizes the use of currently available sources using system interties and potential capacity enhancements assuming varying degrees of compliance with existing water rights; achieves Pasatiempo area in-lieu recharge by substituting excess North and Felton diversions for groundwater pumping.
- Scenario 2 Scenario 1 plus use of SLVWD's allotment of water stored in Loch Lomond reservoir.
- Scenario 3 Scenario 2 plus operation of an Olympia ASR project supplied by excess available stream diversions.
- Scenario 4 Scenario 3 plus additional Scotts Valley in-lieu recharge by substituting excess available SLVWD surface water for SVWD groundwater pumping.

Scenarios 1, 2, and 3 include multiple alternatives. Table 6-1 summarizes the assumptions underlying 15 Scenario 1 alternatives, three alternatives each for Scenarios 2 and 3, and one alternative for Scenario 4.

6.1 Methods and Assumptions

Each conjunctive use alternative is simulated by calculating monthly water supply and use while assuming 2045 water demand and a repeat of the WY 1970–2017 climatic cycle. The evaluation of each alternative consists of the following steps:

- A model of WY 1970–2017 monthly water demand is created from the annual and monthly distribution of system demands characterized in Table 2-2 and Figure 2-5. Each alternative is evaluated using this same demand model.
- 2. For each SLVWD diversion, a synthetic record of monthly unimpaired flows and potentially divertible flows is created from a set of the wet and dry monthly flow duration curves for a sequence of years classified by water-year types A through N (Table 4-6), given assumed diversion capacities, bypass rates, and water rights limitations.
- Maximum groundwater pumping capacities are assumed for each of the three wellfields, with reduced capacities assumed for certain months during drought periods with heavy demand, as described in Section 5.1.
- 4. The monthly water supply and demand records created in the first three steps are used in a spreadsheet analysis that satisfies each system's monthly demand with available supplies according to assumed prioritization and limitations of use and then calculates the approximate percent of flow remaining downstream of each diversion.

Table 6-2 provides the water production and conveyance capacities assumed for each scenario. The assumed effective capacities were established through calibration of the base case and are generally somewhat lower than the highest monthly rates that occur during ideal but atypical circumstances (Table 3-2).

The left-hand columns of Table 6-3 list the water-year type assigned to each year of the 48-year WY 1970–2017 climatic cycle; letters A through N designate the driest to wettest years, respectively (Table 4-6).

For each system, the prioritization of use among available sources is from left to right across Table 6-2. To fulfill North service area monthly demand, each simulation uses available Foreman and Peavine diversions first, then draws on Clear and Sweetwater creeks, and finally groundwater pumping. Potential diversions from Fall Creek are used before diversions from Bull Creek. Potential stream diversions in excess of local monthly demand may be considered available for inter-system transfer or ASR.

Criteria for evaluating the results of the simulated alternatives include whether or not:

- The Felton system fulfills demand in compliance with water rights.
- The North system fulfills demand without potentially unsustainable groundwater pumping.
- In-lieu recharge is achieved in the South system and Scotts Valley areas.
- Stream baseflows increase with the potential to improve habitat.
- Potential surface water resources remain unused.

The percent of synthesized streamflow remaining downstream of SLVWD's simulated diversions is approximated as follows:

- The percent reduction in flow immediately downstream of each diversion is calculated as the simulated rate of diversion divided by the synthesized rate of unimpaired flow. Subtracting this fraction from 1 and multiplying by 100 gives the estimated percent of unimpaired flow remaining downstream of the diversion.
- Percent reductions in Boulder Creek and SLRBT flows are calculated as the simulated rate of upstream SLVWD diversions divided by the sum of the

synthesized impaired flow and the base-case rate of diversion. Subtracting this fraction from 1 and multiplying by 100 gives the estimated percent of flow remaining as a result of SLVWD diversions.

• As described in Section 5.2, the potential percent reduction in minimum monthly stream baseflow as a result of groundwater pumping is estimated separately as the average simulated pumping rate divided by the sum of the assumed rate of minimum impaired baseflow (Table 5-3) and the base-case pumping rate. Subtracting this fraction from 1 and multiplying by 100 percent gives the estimated percent of baseflow remaining as a result of SLVWD groundwater pumping.

Providing the simulation results in this manner is consistent with the highly approximate nature of the various flow estimates. These results reflect the effects of SLVWD stream diversions and groundwater pumping only, and are suitable for the intended planning-level evaluation of conjunctive use alternatives. Values of simulated monthly flow (e.g., expressed in units of afm, cfs, or gpm; tabulated in Appendix A) have limited precision and should not be used to evaluate compliance with specific regulatory, water-right, or habitat requirements.

In the following sections, water "imports" and "exports" refer to the transfer of water between SLVWD's three systems and between SLVWD and SVWD. The phrase "unused potential diversions" refers to potential diversions within permitted water rights and diversion capacities that exceed demand within the service area within which they are diverted, but which potentially could be transferred to another system or used for ASR.

6.2 Base Case

Exponent selected and adjusted the assumptions underlying the base case simulation of the WY 1970–2017 climactic cycle under 2045 water demand to represent SLVWD's recent and current production capacities and operational practices, with the exception of system interties. Because the use of system interties is only recent and relatively minor, their use is not included in the base case. Table 6-2 provides the assumed diversion, pumping, conveyance, and treatment capacities for the base case and other scenarios.

Table 6-3 presents an evaluation of how well the base case calibration reproduces SLVWD's actual average, minimum, and maximum proportional use of surface water and groundwater sources during WYs 2000–2017, a period representing "current and recent" conditions. On an average annual basis, the simulated base case matches the proportional contribution of each water source within 1 percent of total system production.

Figures 6-1, 6-2, and 6-3 illustrate a reasonably good fit between historical and simulated basecase hydrographs of monthly SLVWD water production, plotted both by system and by individual source. Figures 6-4 and 6-5 illustrate the results of the simulated base case on an annual and monthly basis, respectively.

Calibration of the base case requires assuming the Felton system diverts without fully complying with its permitted water rights, consistent with the system's reliance on its diversions as a sole water source (Table 4-4). Simulation of the base case results in non-compliant Felton diversions during all or portions of 23 percent of all 576 simulated months, of which 34 percent occur in October, 16 to 17 percent occur in September and November each, and 9 percent occur in May.

In the base case scenario, as well as in practice, groundwater pumping from the Olympia wells provides the final go-to source for the North system at times when the combined yields of other sources become insufficient. Pumping from the Quail Hollow wells is capped at an equivalent continuous rate of 500 gpm (~67 afm), which is assumed to decrease in up to three monthly steps to as little as 250 gpm during drought periods of heavy demand (Table 6-2; Section 5.1). Pumping from the Olympia wells is capped at an equivalent continuous rate of 780 gpm (~105 afm) based on historical maximum monthly production (Table 3-3) and is assumed to decrease in steps to as little as 475 gpm during drought periods of heavy demand. As a result of these imposed limits on pumping from groundwater storage, the base case simulates that North system total yield is insufficient to meet demand during 2.6 percent of all months, resulting in deficits of up to 30 afm during the months of July through October, and a water-year maximum deficit of 65 afy. The base case simulation assumes these deficits remain as unmet demand (Figure 6-5), whereas in practice additional groundwater would have been produced by

6-5

exceeding the limits imposed by the simulation, consistent with the slight downward trend in Olympia groundwater levels (Figure 5-3).

Table 6-4 includes the average annual results for the simulated base case and Table 6-5 presents a more detailed summary including simulated minimum and maximum annual rates. On average, the North system produces approximately 900 afy from stream diversions and 640 afy from wells. Simulated diversions range to more than 1,200 afy and maximum simulated groundwater pumping is greater than 1,000 afy. Unused potential diversions (i.e., diversions that are permitted and within diversion capacities but exceed North system monthly demand) average nearly 300 afy and range from 0 to more than 800 afy. Four afy of average annual North system demand remains unmet due to the imposed groundwater pumping limitations, as discussed in the preceding paragraph.

Felton diversions average 430 afy in the simulated base case, the system's sole water source. Unused potential diversions average about 400 afy and range between 300 and 600 afy, assuming non-compliance with permitted water rights. Unused potential diversions for the North and Felton systems combined average more than 700 afy and range between 300 and more than 1,300 afy. South system demand is fully met by pumping an average of 365 afy from the Pasatiempo wells, which have an assumed continuous pumping capacity of 450 gpm (Tables 6-2, 6-4, and 6-5).

The simulated base-case hydrographs provided in Figures 6-6 and 6-7 compare simulated rates of diversion to synthesized unimpaired flows and potentially divertible flows (i.e., within diversion capacities and water rights). In the case of Fall and Bennett creeks (Figure 6-7), unpermitted diversions are apparent during months when simulated diversions plot above potentially divertible flows.

Figures 6-8 and 6-9 are hydrographs of the percent of simulated monthly flow remaining downstream of North and Felton system diversions for the base case scenario, as defined in Section 6.1. This evaluation only considers the effects of SLVWD stream diversions. On average, 26 and 63 percent of the unimpaired monthly flows of Foreman and Peavine creeks are simulated to remain downstream of their respective diversions (Table 6-6), with monthly

minimums of 10 and 40 percent, respectively. These percentages are fairly constant for all of the evaluated conjunctive use alternatives because diversions in excess of North system demand mostly occur during high streamflow months when diversions compose only a small percentage of unimpaired flows. Base case simulated diversions represent an average of 14 percent of the flow of Boulder Creek, ranging monthly from 1 to 35 percent (i.e., an average of 86 percent of the flow remaining, ranging from 65 to 99 percent remaining).

On average, 83 and 64 percent of unimpaired flows remain downstream of the simulated Fall (including Bennett) and Bull creeks diversions, respectively, with a minimum of 32 percent remaining downstream of either diversion.

As defined in Section 6.1 and summarized in Table 6-6, the estimated percent of drought minimum baseflows remaining as a result of average base case groundwater pumping equals roughly 50 percent of potential Newell, Zayante, and Bean Creek baseflows. As calculated, average groundwater pumping by SLVWD, SVWD, and MHA accounts for 28 percent of SLRBT baseflow during drought minimum conditions. These values represent the effects of SLVWD groundwater pumping only, consistent with estimates derived from the historical record presented in Table 5-3.

Given the reasonably good match between the simulated base case and historical record (Table 6-3; Figures 6-1, 6-2, and 6-3), and the reasonable and well-documented underlying assumptions, the approach and method are suitable for evaluating qualitative differences between alternative conjunctive use scenarios.

6.3 Scenario 1: Optimize Use of Current Sources under Existing and Modified Conditions

As summarized in Table 6-1, the conjunctive use alternatives evaluated under Scenario 1 attempt to optimize currently available sources using system interties and potential capacity enhancements, assuming varying degrees of compliance with Felton water rights. Table 6-2 provides the assumed diversion, pumping, conveyance, and treatment capacities for each alternative.

The objectives of the Scenario 1 alternatives include: (a) reducing dry-season and drought Felton diversions in compliance with permitted water rights; (b) reduce the effect of groundwater pumping on stream baseflows during dry periods; (c) recover groundwater storage and sustainable groundwater production for the South system's Pasatiempo wells; and (d) produce groundwater sustainably from the Quail Hollow and Olympia wells.

The 15 conjunctive use alternatives evaluated under Scenario 1 are as follows (Table 6-1):

- Scenarios 1a and 1b evaluate full and partial compliance with the Felton system's permitted water rights.
- Scenarios 1c, 1d, and 1e evaluate the potential to increase stream diversions by increasing diversion capacities.
- Scenario 1f evaluates using the North-South system intertie to substitute North system unused potential stream diversions for South system groundwater pumping, thereby achieving "in-lieu recharge."
- Scenarios 1g1 through 1g4 evaluate transferring Felton system unused potential stream diversions to the South system as a substitute for groundwater pumping, thereby achieving in-lieu recharge.
- Scenarios 1h1 and 1h2 evaluate supplying the South system with unused potential stream diversions from both the North and Felton systems to reduce South system groundwater pumping.
- Scenario 1i evaluates reducing North system groundwater pumping by importing Felton system unused potential diversions.
- Scenarios 1j and 1k evaluate reducing North and South system groundwater pumping by importing unused potential diversions from the North and/or Felton systems.

6.3.1 Scenario 1a – Felton System Complies with Permitted Water Rights

Compared to the base case, Scenario 1a complies with Felton system permitted water rights by relying on water transfers using the existing system interties. As summarized in Tables 6-4 and 6-5, there are no unused North System potential diversions available during months when the Felton system requires a supplemental source to comply with water rights. Transfers of groundwater from the South system are not considered because of the nearly overdrawn conditions of the Pasatiempo area aquifer. In this case, Felton system diversions are simulated to average about 380 afy and demand remains unfulfilled by an average of 50 afy, ranging up to nearly 200 afy. Figure 6-5 illustrates the monthly distribution of unmet Felton demand for Scenario 1a during WYs 1970–2017. Additionally, average Felton unused potential diversions decrease by about 100 afy compared to the base case.

The simulated Scenario 1a hydrograph for the Felton system provided in Figure 6-10 shows that the simulated rates of diversion do not exceed the synthesized potentially divertible flows in compliance with water rights.

Figure 6-11 compares hydrographs of the percent of simulated monthly flow remaining downstream of the Felton system diversions (as defined in Section 6.1) for the base case and Scenario 1a. On average, 86 and 82 percent of simulated unimpaired monthly flows remain downstream of the Fall (including Bennett) and Bull creek diversions, respectively, with a minimum of about 40 to more than 50 percent of remaining downstream of either diversion (Table 6-6). As simulated, increases in minimum monthly flows are relatively minor for Fall Creek and more significant for Bull Creek compared to the base case.

6.3.2 Scenario 1b – Felton System Complies with Required Bypass Only

Scenario 1b assumes that the Felton system complies only with the flow bypass requirements of its permitted water rights, and not the SLRBT low-flow triggers that at times prevent all Felton diversions (Table 4-3). In this case, simulated Felton diversions average nearly 400 afy, about 5 percent higher than Scenario 1a, and are non-compliant during all or portions of 21 percent of all months (compared to 23 percent in the base case). Additionally, demand remains unfulfilled

by an average of 35 afy, ranging up to 85 afy, due to the lack of a supplemental source of water during deficit months. On average, 86 and 64 percent of simulated unimpaired monthly flows are calculated to remain downstream of the Fall (including Bennett) and Bull creek diversions, respectively, with a minimum of about 30 to 50 percent remaining downstream of either diversion (Table 6-6).

6.3.3 Scenarios 1c, 1d, and 1e – All Diversion Capacities Doubled

For Scenarios 1c, 1d, and 1e, the capacities of the North and Felton systems to divert, convey, and treat surface water are effectively doubled (Table 6-2). These scenarios evaluate the upper bounds of potential surface water production.

Scenarios 1c, 1d, and 1e are otherwise equivalent to Scenario 1a, the base case, and Scenario 1b, respectively, in terms of Felton water-rights compliance (Table 6-1). Like the base case, Felton system diversions occur without regard to permitted water rights in Scenario 1d, whereas Scenario 1c fully complies, and Scenario 1e complies only with required bypass flows.

For these scenarios, North system unused potential diversions approximately double to 600 afy, on average, and range up to 1,900 afy. Average Felton system unused potential diversions more than double, increasing from nearly 800 afy to more than 1,000 afy for these scenarios, compared to 300 to 420 afy for the base case and Scenarios 1a and 1b (Tables 6-4 and 6-5).

Because demand remains unchanged and no in-lieu recharge is attempted in Scenarios 1c, 1d, and 1e, the calculated percent of monthly flow remaining downstream of the North and Felton system diversions does not substantially differ from Scenario 1a, the base case, and Scenario 1b, respectively. However, reduced North system groundwater pumping as a result of increased diversion capacities results in a roughly 5 percent increase in the drought minimum baseflows remaining in lower Newell and Zayante creeks (Table 6-6).

The potential magnitude of diversions estimated in Scenarios 1c, 1d, and 1e is highly approximate and should not be used in quantitative estimates of potentially available water supplies. Rather, the conceptual gains in potential water production indicated by these scenarios are intended to help guide decisions regarding potential infrastructure modifications. The actual yield of modified infrastructure will depend on numerous factors beyond the scope of this analysis. Given the uncertainty associated with the likely performance of modified infrastructure, the alternative conjunctive use scenarios presented and discussed in the remainder of this report assume the base case water production capacities for which the simulation procedure is calibrated. This allows other factors, such as system intertie use for inlieu recharge, use of Loch Lomond, and ASR, to be evaluated on an apples-to-apples basis compared to the base case.

6.3.4 Scenario 1f – South System Imports North System Unused Potential Diversions

Scenario 1f is similar to Scenario 1a (i.e., base case but with Felton system complying with permitted water rights) with the exception that North system unused potential diversions are exported to the South system as a substitute for pumping the Pasatiempo wells (i.e., in-lieu recharge; Table 6-1). In this case, the South system imports an average and maximum of 115 afy and greater than 300 afy, respectively, as needed to fulfill demand during months when potential diversions exceed North system demand (Tables 6-4, 6-5, and 6-7). This results in an overall 32 percent reduction in South system groundwater pumping (Table 6-7). However, the conveyance capacity required for the maximum simulated monthly import, 337 gpm (on a continuous basis), slightly exceeds the North-South system intertie design capacity of 300 gpm (Tables 3-3, 6-2, and 6-7).

Figure 6-12 compares hydrographs of the percent of simulated monthly flow remaining downstream of the Felton system diversions (as defined in Section 6.1) for the base case and Scenario 1f. The percent of simulated monthly flow remaining downstream of North system diversions in Scenario 1f is only slightly less (≤1 percent) than the base case and Scenarios 1a and 1b. This is because diversions in excess of North system demand mostly occur during high streamflow months when diversions compose only a small percentage of unimpaired flows.

Reduced South system groundwater pumping as a result of importing North system unused potential diversions results in a slight increase (\leq 4 percent) in the drought minimum baseflows estimated to remain in lower Zayante and Bean creeks compared to the base case (Table 6-6).

The simulated export of unused potential stream diversions to the South system reduces North system average annual unused diversions to approximately 175 afy, compared to 290 afy for the base case (Table 6-4).

6.3.5 Scenarios 1g1 through 1g4 – South System Imports Felton System Unused Potential Diversions

Scenarios 1g1, 1g2, and 1g3 are equivalent to the base case and Scenarios 1a and 1b, respectively, except that Felton system unused potential diversions are exported to the South system as a substitute for pumping the Pasatiempo wells (i.e., in-lieu recharge; Table 6-1). In these cases, the South system imports an average of 200 to 280 afy, depending on water-rights compliance, and a maximum of nearly 320 afy, as needed to fulfill demand during months when potential diversions exceed Felton system demand (Tables 6-4, 6-5, and 6-7). This results in an overall reduction in South system groundwater pumping of 54 to 77 percent (Table 6-7). However, the conveyance capacity required for the maximum monthly simulated import, 290 gpm (continuous), exceeds the existing Felton-South (via North) system intertie capacity of 150 gpm (Tables 3-3, 6-2, and 6-7). A more direct intertie between the Felton and South systems would likely have greater capacity than the existing intertie via the North system.

Figure 6-13 compares hydrographs of the percent of simulated monthly flow remaining downstream of the Felton system diversions for Scenarios 1a and 1g2. In the case of Scenario 1g2, the percent of unimpaired monthly flows estimated to remain downstream of the Felton system diversions averages 82 and 64 percent for the Fall (including Bennett) and Bull creek diversions, respectively, with minimums of about 25 to 40 percent (Table 6-6). Figure 6-13 shows that increased diversions for in-lieu recharge occur during wet periods and do not lower minimum monthly flows downstream of the diversions. Reduced South system groundwater pumping as a result of importing Felton system unused potential diversions results in a 6 percent

increase in the drought minimum baseflows estimated to remain in lower Zayante and Bean creeks compared to the base case (Table 6-6).

Scenario 1g4 is identical to Scenario 1g2 (i.e., Felton system complies with permitted water rights) except that the simulated Felton-South intertie capacity is limited to 150 gpm (Tables 6-1 and 6-2). In this case, the South system imports an average and maximum of 165 and 225 afy, respectively, as needed to fulfill demand during months when potential diversions exceed Felton demand (Tables 6-4, 6-5, and 6-7). This results in an overall 45 percent reduction in South system groundwater pumping (Table 6-7). The percent of unimpaired monthly flows remaining downstream of the diversions averages 82 and 68 percent for the Fall (including Bennett) and Bull creek diversions, respectively, with minimums of about 35 to 40 percent (Table 6-6). Reduced South system groundwater pumping results in an estimated 5 percent increase in drought minimum baseflows remaining in lower Zayante and Bean creeks compared to the base case (Table 6-6). The Felton system's remaining average annual unused potential diversions decrease to approximately 140 afy compared to about 300 afy for Scenario 1a (Table 6-4).

6.3.6 Scenario 1h1 and 1h2 – South System Imports North and Felton System Unused Potential Diversions

Scenario 1h1 and 1h2 assume that the South system imports both North and Felton system unused potential diversions (Table 6-1). Scenario 1h1 assumes that Felton diversions are unrestricted, whereas Scenario 1h2 assumes the Felton system complies with permitted water rights. Figure 6-5 includes a plot of the monthly results for Scenario 1h2.

In these cases, the South system imports an average of 115 afy from the North system, similar to Scenario 1f, and an average of 90 to 290 afy from the Felton system, depending on water-rights compliance, as needed to fulfill remaining demand (Tables 6-4, 6-5, and 6-7). This results in an overall reduction in South system groundwater pumping of 56 to 79 percent (Table 6-7), and as much as a 7 percent increase in lower Zayante and Bean Creek drought minimum baseflows (Table 6-6). However, the conveyance capacity required for the maximum monthly simulated import from the Felton system, about 290 gpm (on a continuous basis), exceeds the Felton-South (via North) system existing intertie capacity of 150 gpm (Tables 3-3, 6-2, and 6-7).

For Scenario 1h2, the percent of unimpaired monthly flows remaining downstream averages 72 and 63 percent for the Fall (including Bennett) and Bull creek diversions, respectively, with minimums of about 30 to 40 percent (Table 6-6). Reduced South system groundwater pumping results in an estimated 6 to 7 percent increase in drought minimum baseflows remaining in lower Zayante and Bean creeks compared to the base case (Table 6-6).

Similar to Scenario 1f, North system average annual remaining unused diversions decrease to approximately 175 afy, compared to 290 afy for the base case (Table 6-4). The Felton system's remaining average annual unused potential diversions decrease to approximately 100 to 135 afy, compared to about 300 afy for Scenario 1a. The average annual export of Felton diversions to the South system in Scenario 1h2 (90 afy) is less than half that of Scenario 1g2 (200 afy), which results from supplying the South system first with unused North system diversions. Among all of the evaluated Scenario 1 alternatives, Scenario 1h2 achieves the greatest use of North and Felton system potential diversions, resulting in 275 afy of potential diversions remaining unused, on average, compared to about 600 afy for Scenario 1a.

6.3.7 Scenario 1i – North System Imports Felton System Unused Potential Diversions

Scenario 1i assumes that the North system imports unused potential diversions from the Felton system, in compliance with water rights, to reduce North system groundwater pumping (Table 6-1). In this case, the North system imports an average and maximum of 130 afy and 265 afy, respectively, as needed to fulfill demand during months when North system diversions are insufficient and Felton potential diversions exceed Felton demand (Table 6-7). This results in an overall reduction in North system groundwater pumping of 20 percent. However, the conveyance capacity required for the maximum monthly simulated import from the Felton system, about 355 gpm, exceeds the Felton-North system intertie capacity of 150 gpm (Tables 3-3, 6-2, and 6-7). As such, total imports limited by the existing intertie capacity would be somewhat less, as is demonstrated by comparing the results for Scenarios 1j and 1k in Section 6.3.8. The Felton system's remaining average annual unused potential diversions decrease to approximately 180 afy, compared to about 300 afy for Scenario 1a.

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6.3.8 Scenarios 1j and 1k – North System Imports Felton System Unused Potential Diversions and South System Imports Remaining Unused Potential Diversions

Scenarios 1j and 1k assume that the North system imports Felton system unused potential diversions to reduce North system groundwater pumping, while the South system imports any remaining unused potential diversions from the North and Felton systems to reduce South system groundwater pumping (Table 6-1). Scenario 1j assumes unlimited intertie capacities whereas Scenario 1k assumes the design intertie capacities (Tables 3-3 and 6-7). Figure 6-5 includes a plot of the monthly results for Scenario 1j.

North system exports to the South system average approximately 115 afy in both cases (similar to Scenarios 1f, 1h1, and 1h2), whereas Felton system exports to the North and South systems average 144 afy and 133 afy for Scenarios 1j and 1k, respectively. The remaining unused potential diversions average between 330 and 350 afy, compared to 600 afy for Scenario 1a (Table 6-4).

The average percentages of unimpaired monthly flows remaining downstream of the North and Felton system diversions are within the range of the other evaluated alternatives (Table 6-6). Simulated reductions in North and South system groundwater pumping are 20 percent and 36 percent, respectively, for Scenario 1j, and 17 and 39 percent for Scenario 1k (Table 6-7). Reduced North and South system groundwater pumping results in an estimated 6 to 10 percent increase in drought minimum baseflows remaining in lower Newell, Zayante, and Bean creeks compared to the base case (Table 6-6).

6.4 Scenario 2: Import from Loch Lomond

Scenario 2 evaluates SLVWD's use of its Loch Lomond reservoir annual allotment of 313 afy. The three conjunctive use alternatives evaluated under Scenario 2 are (Table 6-1):

• Scenario 2a – North and Felton systems import from Loch Lomond to satisfy demand that remained unmet in Scenario 1a.
- Scenario 2b Scenario 2a plus the South system imports water from Loch Lomond for in-lieu recharge.
- Scenario 2c Scenario 2b plus the South system also imports unused potential diversions from the North system, and the North system imports unused potential diversions from the Felton system.

6.4.1 Scenario 2a – North and Felton Systems Use Loch Lomond to Fulfill Unmet Demand

As simulated for Scenario 2a, the North system imports an average and maximum of 4 and 65 afy (Tables 6-8 and 6-9), respectively, from Loch Lomond to fulfill demand unfulfilled in the base case because of limits imposed on groundwater pumping (Section 6.2). Additionally, the Felton system imports an average and maximum of 50 and 185 afy, respectively, from Loch Lomond to comply with its permitted water rights. Loch Lomond is the only supplemental source considered in this analysis that allows the Felton system to comply with its permitted water rights.

The maximum monthly rates of import would require conveyance capacities in excess of 200 and 300 gpm (continuous) for the North and South systems, respectively (Table 6-10). These imports only use about 16 percent of SLVWD's annual 313 afy Loch Lomond allotment, on average, but use up to 60 percent of the allotment some years (Table 6-10).

6.4.2 Scenario 2b – South System Imports from Loch Lomond for In-Lieu Recharge

In addition to the use of Loch Lomond as simulated in Scenario 2a, Scenario 2b assumes that the South system imports an average of 245 afy from Loch Lomond, ranging between 120 and 290 afy, as a substitute for pumping the Pasatiempo wells. In this case, SLVWD uses nearly 95 percent of its Loch Lomond annual allotment on average, ranging from 87 to 100 percent per year. The maximum monthly import requires a conveyance capacity of nearly 200 gpm (continuous) (Table 6-10).

The South system's use of Loch Lomond results in an overall 67 percent reduction in groundwater pumping (Table 6-10), which results in an estimated 7 to 8 percent increase in drought minimum baseflows remaining in lower Zayante and Bean creeks compared to the base case (Table 6-11).

6.4.3 Scenario 2c –South System Imports from Loch Lomond and North and South Systems Import Unused Potential Diversions

In addition to the use of Loch Lomond as simulated in Scenario 2b, Scenario 2c assumes that the North and South systems import unused potential diversions. Figure 6-14 includes a plot of the monthly results for Scenario 2c. In this case, the South system imports an average of 20 afy from the North system and the North system imports an average of 130 afy from the Felton system in response to seasonal differences in each system's supply and demand. Combined with South system groundwater pumping and 73 percent reduction in South system groundwater pumping (Table 6-10). Reduced North and South system groundwater pumping results in an estimated 5 to 11 percent increase in drought minimum baseflows remaining in lower Newell, Zayante, and Bean creeks compared to the base case (Table 6-11). The percentages of monthly flow remaining downstream of the North and Felton system diversions are within the respective ranges estimated for the other conjunctive use alternatives. The remaining unused North and Felton system potential diversions average nearly 450 afy, compared to 600 afy for Scenario 1a (Tables 6-4 and 6-8).

6.5 Scenario 3: Operate Olympia Area ASR Project

Scenario 3 evaluates the operation of a North system ASR project in addition to SLVWD's use of its Loch Lomond allotment. The three conjunctive use alternatives evaluated under Scenario 3 are (Table 6-1):

- Scenario 3a ASR project uses North system unused potential diversions.
- Scenario 3b ASR project uses Felton system unused potential diversions.

Scenario 3c – ASR project uses North and Felton system unused potential diversions.

These alternatives assume an injection capacity of 400 gpm from December through May, extraction capacities ranging from 250 to 585 gpm from June through November (Table 6-2), and a 100 percent extraction efficiency. In each case, the percentages of monthly flow estimated to remain downstream of the North and Felton system diversions are within the ranges estimated for the other conjunctive use alternatives.

6.5.1 Scenario 3a – North System Operates ASR Project Using North System Unused Potential Diversions

In addition to the use of Loch Lomond as in Scenario 2b, Scenario 3a assumes storing unused North system potential diversions by operating an ASR project, and withdrawing this water to help meet North system demand during dry periods. In this case, an average of approximately 190 afy is injected and extracted, effectively reducing North system groundwater production by 30 percent, and increasing drought minimum baseflows in lower Newell, Zayante, and Bean creeks by 11 to 15 percent compared to the base case (Tables 6-10 and 6-11). The remaining unused North system potential diversions average 100 afy, compared to 290 afy for the base case (Tables 6-4 and 6-8).

6.5.2 Scenario 3b – North System Operates ASR Project Using Felton System Unused Potential Diversions

Scenario 3b assumes storing unused Felton system potential diversions by operating an ASR project and withdrawing this water to help meet North system demand during dry periods. In this case, an average of approximately 220 afy is injected and extracted, effectively reducing North system groundwater production by 34 percent, and increasing drought minimum baseflows in lower Newell, Zayante, and Bean creeks by 11 to 17 percent compared to the base case (Tables 6-10 and 6-11). The remaining unused Felton system potential diversions average 85 afy, compared to 300 afy for Scenario 1a (Tables 6-4 and 6-8).

6.5.3 Scenario 3c – North System Operates ASR Project Using North and Felton System Unused Potential Diversions

Scenario 3c assumes storing unused North and Felton system potential diversions by operating an ASR project and withdrawing this water to help meet North system demand during dry periods. Figure 6-14 includes a plot of the monthly results for Scenario 3c. In this case, an average of approximately 410 afy is injected and extracted, effectively reducing North system groundwater production by 64 percent and increasing drought minimum baseflows in lower Newell, Zayante, and Bean creeks by 14 to 33 percent compared to the base case (Tables 6-10 and 6-11). The remaining unused North and Felton system potential diversions average 185 afy, compared to 600 afy for Scenario 1a (Tables 6-4 and 6-8). Figures 6-15 and 6-16 provide hydrographs of the percentages of simulated monthly unimpaired flow remaining downstream of the North and Felton system diversions compared to the base case and Scenario 1a. Figures 6-15 and 6-16 show that increased diversions for in-lieu recharge occur during wet periods do not lower minimum monthly flows remaining downstream of the diversions.

6.6 Scenario 4: Further Contribute to Scotts Valley Area In-Lieu Recharge

Scenario 4 is the same as Scenario 3c except that North and Felton system unused potential diversions are provided to SVWD as a substitute for SVWD groundwater pumping in the Scotts Valley area (Table 6-1). Assuming the design 350 gpm (continuous) capacity of the SLVWD-SVWD intertie, an average of approximately 165 afy of unused potential diversions are provided to SVWD, ranging from 20 to 500 afy (Tables 6-8 and 6-9). Reduced SVWD pumping may help increase Bean Creek baseflows but is not estimated as part of this analysis. The remaining unused North and Felton system unused potential diversions average 17 afy, with a maximum of 200 afy.

		64		Felto	on Systen	n Water		Strea	ım Dive	rsion Ex	oprts		Impo	ort from	Loch	Scotts V	Item
		Div	ream ersion	<u> </u>	Rights		<u> </u>	Usi	ng Syst	em Inte	rties		<u> </u>	Lomon	d I	with E	scharge xported
		Сар	acities	-		Comply	Nor	th Syste	m to	Felt	on Syste	em to	to	to	to	Diver	sions
No.	Base Case and Alternative Conjunctive Use Scenarios	Exist- ina	Doubled		Not Comply	Bypass Only	Sys- tem	South Sys- tem	pia ASR	South Sys- tem	North Sys- tem	pia ASR	Sys- tem	Feiton Sys- tem	South Sys- tem	North Svstem	Felton Svstem
	Historical Record, WYs 2000-2017 (from Table 3-3)	•		<u> </u>	•	0	*	*									
	Synthesized Records, WYs 1970-2017:			·								1					
1	Base case Simulated historical record (calibrated to WYs 2000-2017) ^a	•			•												
	Scenario 1 Alternatives Using Existing and Modified Infrastructure and Water Rights Variations				-	-			-		-	-			-		-
2	1a. Felton system complies with water rights.	•		0													
3	1b. Felton system complies with required bypass flows, but not SLRBT low-flow no-diversion requirements.	•				0											
4	1c. All diversion capacities doubled; Felton system complies with water rights.		•	0													
5	1d. All diversion capacities doubled; Felton system diverts without regard to water rights.		•		•												
6	1e. All diversion capacities doubled; Felton system complies with required bypass flows only.		•			0											
7	1f. South system imports North system unused potential diversions for in-lieu recharge; Felton system complies with water rights.	•		0			×	•									
8	1g1. South system imports Felton system unused potential diversions for in-lieu recharge; Felton system diverts without regard to water rights.	•			•		×			•							
9	1g2. Scenario 1g1 except Felton system complies with water rights.	•		0			×			•							
10	1g3. Scenario 1g1 except Felton system complies with required bypass flows only.	•				0	×			•							
11	1g4. Scenario 1g2 except intertie capacities limited.	•		0			×										
12	South system imports unused potential diversion from North and Felton systems for in-lieu recharge;Felton system diverts without regard to water rights.	•			•		×	•		•							
13	1h2. Scenario 1h1 except Felton system comples with water rights.	•		0			×	•		•							
14	1i. North system imports Felton system unused potential diversions for in-lieu recharge; Felton system complies with water rights.	•		0			×				•						
15	1j. Scenario 1i plus South system imports unused potential diversion from North and Felton systems.	•		0			×	•		•	•						
16	1k. Scenario 1j except intertie capacities limited.	•		0			×	•									
	Scenario 2 – Import from Loch Lomond					1		1				1					
17	2a. North and Felton systems import from Loch Lomond to satisfy unmet demand in Scenario 1a.	•		•			×						•	•			
18	2b. Scenario 2a plus South system imports from Loch Lomond for in-lieu recharge.	•		•			×						•	•	•		
19	2c. Scenario 2b plus South system also imports North system unused diversions, and North system imports unused Felton system diversions.	•		•			×	•			•		•	•	•		
	Scenario 3 – Import from Loch Lomond and Operate Olympia Aquifer Storage and Recovery (ASR)		_ I			1											
20	3a. Scenario 2b plus North system operates Olympia area ASR using North system unused diversions.	•		•			×		۲					٠	•		
21	3b. Scenario 2b plus North system operates Olympia area ASR using Felton system unused diversions.	•		•			×					•		•	•		
22	3c. Scenarios 3a and 3b combined.	•		•			×		۲			•		•	•		
	Scenario 4 – Contribute to Scotts Valley In-Lieu Recharge while Operating Olympia ASR and Importing 1	from Lo	ch Lomo	nd	•	•			<u> </u>		<u> </u>				<u> </u>	·	<u> </u>
23	4. Scenario 3c plus SVWD imports North and Felton system remaining unused potential diversions.	•		•			×		۲			•		•	•	•	•
•	Base case condition or scenario assumption. × North system has no unused diversion	s when	needed by	y Felton.	•	All scena	rios assi	ime esti	mated 2	- 045 den	nand an	d repeat	of WY1	970-20	17 clima	tic cvcle	l
*	Minor use since 2016.	es (Table	e 3-3).			See Table	e 6-2 for	assume	ed divers	sion, con	iveyance	e, and tr	eatmen	capaci	ties.	· , =	

O Water rights compliance results in unmet demand some years.

• Diversions exported to Olympia ASR imported back to North system.

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^a Simulated base case does not reflect minor use of system interties in actual use since 2016.

Table 6-1 Summary of Conjunctive Use Scenario Alternative Assumptions

		Stream	North Diversio	System ^a ns	W	ells	Felton Dive	System ^a rsions	South Svstem			Intertie	es		ASR of Diver	Unused sions ^c
			Clear &				Fall &								Sou	urce:
	Fore-	Pea-	Sweet-	Convey	-		Ben-		Pasa-					Loch		
Page Case and Alternative Conjunctive Use Segnetice	man	vine	water	ance to	Quail	Olym-	nett	Bull	tiempo	North-	Felton-	Felton-	SLVWD-	Lo-	North	Felton
Base Case and Alternative Conjunctive Use Scenarios	Cleek	Cleek	CKS	VVIP	HOIIOW	ріа	gallons	s per min	ute (apm	contini	Jous)	NOTUT	3000	monu	System	System
Historical Record, WYs 2000-2017 (from Table 3-3)	9	26	560	1,030	545	780	4	60	435	300	150	150	350	-	-	-
Base case Simulated historical record (calibrated to WYs 2000-2017)	800	200	515	800	500 250	780 475	440	166	450	-	-	-	-	-	-	-
Scenario 1 Alternatives Using Existing and Modified Infrastructure and Water Rights Variations			•										-			
1a. Felton system complies with water rights.	000	200	515	000			140	166	450	-	-	-	-	-	-	-
1b. Felton system complies with required bypass flows, but not SLRBT low-flow no-diversion requirements.	000	200	515	800			440	100	450	-	-	-	-	-	-	-
1c. All diversion capacities doubled; Felton system complies with water rights.										-	-	-	-	-	-	-
1d. All diversion capacities doubled; Felton system diverts without regard to water rights.	1,600	400	1,030	1,600			880	332	450	-	-	-	-	-	-	-
1e. All diversion capacities doubled; Felton system complies with required bypass flows only.										-	-	-	-	-	-	-
1f. South system imports North system unused potential diversions for in-lieu recharge; Felton system complies with water rights.										*	-	-	-	-	-	-
1g1. South system imports Felton system unused potential diversions for in-lieu recharge; Felton system diverts without regard to water rights.										-	*	-	-	-	-	-
1g2. Scenario 1g1 except Felton system complies with water rights.	1				500 250	780 475				-	*	-	-	-	-	-
1g3. Scenario 1g1 except Felton system complies with required bypass flows only.	1				200	110				-	*	-	-	-	-	-
1g4. Scenario 1g2 except intertie capacities limited.								100	450	-	150	-	-	-	-	-
1h1. South system imports unused potential diversion from North and Felton systems for in-lieu recharge; Felton system diverts without regard to water rights.	- 800	200	515	800			440	166	450	*	*	*	-	-	-	-
1h2. Scenario 1h1 except Felton system comples with water rights.	1									*	*	*	-	-	-	-
1i. North system imports Felton system unused potential diversions for in-lieu recharge; Felton system complies with water rights.										*	*	*	-	-	-	-
1j. Scenario 1i plus South system imports unused potential diversion from North and Felton systems.	1									*	*	*	-	-	-	-
1k. Scenario 1j except intertie capacities limited.	1									300	150	150	-	-	-	-
Scenario 2 – Import from Loch Lomond				-				-								-
2a. North and Felton systems import from Loch Lomond to satisfy unmet demand in Scenario 1a.										-	-	-	-	*	-	-
2b. Scenario 2a plus South system imports from Loch Lomond for in-lieu recharge.	800	200	515	800	500	780	440	166	450	-	-	-	-	*	-	-
2c. Scenario 2b plus South system also imports North system unused diversions, and North system imports unused Felton system diversions.					250	475				*	-	*	-	*	-	-
Scenario 3 – Import from Loch Lomond and Operate Olympia Aquifer Storage and Recovery				-				-								-
3a. Scenario 2b plus North system operates Olympia area ASR using North system unused diversions.										-	-	-	-	*	400 250	-
3b. Scenario 2b plus North system operates Olympia area ASR using Felton system unused diversions.	800	200	515	800	500 250	780 475	440	166	450	-	-	*	-	*	-	400 285
3c. Scenarios 3a and 3b combined.										-	-	*	-	*	400	400 85
Scenario 4 – Contribute to Scotts Valley In-Lieu Recharge while Operating Olympia ASR and Importing from	om Loci	h Lomo	ond													
4. Scenario 3c plus SVWD imports North and Felton system remaining unused potential diversions.	800	200	515	800	500 250	780 475	440	166	450	-	-	*	350	*	400 5	400 85

^a Assumed prioritization of use from left to right.

^b Well pumping capacities decline in three steps to minimum rate (*bottom value*) during critical drought periods..

^cDecember-May injection capacity (top value) and June-November extraction capacity (bottom values) adjusted to inject/extract equal amounts during synthesized record. Assumed Wa

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* Not limited during simulation.

 Table 6-2

 Assumed Water Production and Conveyance Capacities

Synt	hesized Climac	tic Cycle
WY	SLRBT % avg	Type ^a
1970	130%	G
1971	70%	D
1972	26%	В
1973	178%	
1974	150%	Н
1975	84%	E
1976	15%	А
1977	10%	A
1978	160%	
1979	66%	D (A C F)
1980	148%	н Н
1981	40%	B (C)
1982	246%	 M
1083	308%	N
1984	87%	F
1025	18%	
1900	40%	С(В)
1900	104%	J
1907	20%	В
1988	22%	В
1989	27%	В
1990	21%	B
1991	33%	B (A,F)
1992	53%	С (В)
1993	121%	G
1994	31%	В
1995	193%	J
1996	137%	G
1997	155%	Н
1998	222%	L
1999	95%	E
2000	122%	G (B,H)
2001	53%	C (B,D)
2002	74%	D
2003	84%	E
2004	92%	E
2005	135%	G
2006	216%	K
2007	31%	В
2008	58%	C (B,E)
2009	50%	C (A.B.E)
2010	103%	F
2011	134%	G
2012	51%	C (A R F F)
2012	60%	С. (т, в, с, г.)
2013	15%	Δ
2014	2/10/	
2013	04 /0 820/	
2010	00%	
2017	.519%	IN

							St	ream Dive	rsions									Export		Un-		Unused
			Peavine	e Creek	Forema	n Creek		Clear 8	Sweetwa	ater Cks		Total		Gro	undwater V	Vells		Unused	Total	met	Total	Potential
		De-	Poten-	Divert-	Poten-	Divert-	Unused	Poten-	Divert-	Unused	Poten-	Divert-	Unused	Quail				Diver-	System	De-	Diver-	Diver-
North Syster	m	mand	tial ^b	ed	tial ^b	ed	Potential	tial ^b	ed	Potential	tial ^b	ed	Potential	Hollow	Olympia	Total	Import	sions	Use	$mand^c$	sions	sions
											acre-f	eet per ye	ear (afy)									
Historical	avg	1,541	-	110	-	500	-	-	255	-	-	866	-	276	405	681	1	6	1,541	-	-	-
	%	-	-	7%	-	32%	-	-	17%	-	-	56%	-	18%	26%	44%	-	-	100%	-	-	-
2000-2017	min	1,164	-	47	-	203	-	-	37	-	-	421	-	146	129	275	0	0	1,164	-	-	-
2000 2011	max	1,800	-	224	-	928	-	-	380	-	-	1,128	-	461	572	1,015	10	103	1,800	-	-	-
Base Case – S	Simulat	ed Histo	orical Re	cord																		
Colibration	avg	1,564	135	110	517	507	35	492	263	229	1,144	880	264	274	403	678	0	0	1,558	6	880	264
	%	-	-	7%	-	32%	-	-	17%	-	-	56%	-	18%	26%	43%	-	-	100%	0.4%	-	-
2000-2017	min	1,235	35	35	197	197	0	197	197	0	429	429	0	160	230	390	0	0	1,235	0	429	0
2000-2017	2000-2017 max 1,776				860	854	134	732	318	498	1,822	1,228	594	423	608	1,031	0	0	1,776	65	1,228	594
Simulation	avg	1,545	141	112	543	528	44	509	264	245	1,192	904	289	259	378	638	0	0	1,541	4	904	289
period, WYs	min	1,235	35	35	197	197	0	197	139	0	429	429	0	113	162	275	0	0	1,235	0	429	0
1970-2017	max	1,776	257	154	1,008	937	174	802	325	663	2,067	1,231	836	425	612	1,038	0	0	1,776	65	1,231	836

																-
						S	tream Dive	rsions							Unused	
			Fall	& Bennet	tt Cks		Bull Cree	k		Total			Total	Total	Potential	
		De-	Poten-	Divert-	Unused	Poten-		Unused	Poten-		Unused		System	Diver-	Diver-	S
Felton Syste	m	mand	tial ^b	ed	Potential	tial ^b	Diverted	Potential	tial ^b	Diverted	Potential	Import	Use	sions	sions	
-			-													
Llisterias	avg	419	-	325	-	-	90	-	-	414	-	1	414	-	-	
HISTOFICAI	%	-	-	78%	-	-	22%	-	-	100%	-	-	100%	-	-	
2000 2017	min	317	-	225	-	-	17	-	-	317	-	0	317	-	-	
2000-2017	max	498	-	406	-	-	128	-	-	489	-	20	489	-	-	
Base Case – S	Simulat	ed Histo	orical Re	cord												
Outheatheat	avg	436	706	346	361	145	90	55	852	436	416	0	436	436	416	
	%	-	-	79%	-	-	21%	-	-	100%	-	-	100%	-	-	
2000 2017	min	346	695	266	302	68	53	15	762	346	337	0	346	346	337	
2000-2017	max	492	710	407	436	225	120	124	926	492	560	0	492	492	560	
Simulation	avg	430	705	340	366	147	90	57	852	430	422	0	430	430	422	
period, WYs	min	335	695	266	292	68	49	15	762	335	316	0	335	335	316	
1970-2017	max	492	710	409	436	225	120	124	926	492	560	0	492	492	560	

South Syste	m	De- mand	Pumped Groundwater acre-feet p	Import ber year (a	Export afy)	Total System Use	SLVWD Total	Unused North & Felton System Diversions acre-feet pe	Total SLVWD Production er year (afy)
Historical	avg	387	384	5	1	384		-	2,345
record, WYs	min	259	237	0	0	237		-	1,793
2000-2017	max	447	447	82	10	447		-	2,658
Base Case – S	Simulat	ed Histo	rical Record						
Calibration	avg	375	374	0	0	374		680	2,368
period, WYs	min	297	297	0	0	297		352	1,878
2000-2017	max	432	432	0	0	432		1,145	2,642
Simulation	avg	365	365	0	0	365		711	2,336
period, WYs	min	297	297	0	0	297		333	1,878
1970-2017	max	441	441	0	0	441		1,354	2,642

nulated Base Case: Calculated on a monthly timestep using daily flow duration curves. Assumes 2045 demand and repeat of WY1970-2017 climatic cycle. boes not reflect minor use of system interties in actual use since 2016. See Table 6-2 for assumed diversion, conveyance, and treatment capacities. elton system diversions non-compliant with water rights 23% of all 576 months.

afy acre-feet per year

avg average min minimum max maximum

SLRBT % avg percent of average annual SLRBT flow

selected months given parenthetically.

^b Within diversion capacity and water rights.

production.

% percent of historical and simulated system production (South system is 100% groundwater).

^a Water year type as defined in Tables 4-5 and 4-6; alternate types assigned to

^c Unmet North system demand results from assumed limits on groundwater

Table 6-3 **Results of Simulated Base Case In Comparison to Historical Record**

							stem								Feltor	n Syste	m						Sou	th Syst	em			
		Stro	am Diver	sions			Export			Total	Unional		Stra	am Diver	reione		Euro art			Total	United						Unused	
		out		Un-			Poten-			sions	Poten-		ourc		Un-		Unused			sions	Poten-						Felton	
Base Case and Scenario 1 Alternatives	De-	Poten-	- Divert- Poten- water ed tial Wells p		lm-	tial Diver-	Total Svstem	Unmet De-	Includ- ina for	tial Diver-	De-	Poten-	Divert-	used Poten-	lm-	Poten- tial Diver	Total Svstem	Unmet De-	Includ- ina for	tial Diver-	De-	Pumped Ground-	lm-	Ex-	Total Svstem	System Diver-	SLVWD	
(existing and modified infrastructure	mand	tial ^a	ed	tial	Wells	ports	sions	Use	mand b	Export	sions	mand	tial ^a	ed	tial	ports	sions	Use	mand $^{\rm c}$	Export	sions	mand	water	ports	ports	Use	sions	Total
and water rights variations)														acre-teet	t per year	r (afy)												
(calibrated to WYs 2000-2017)	1,545	1,192	904	289	638	0	0	1,541	4	904	289	430	852	430	422	0	0	430	0	430	422	365	365	0	0	365	711	2,336
1a. Felton system complies with water rights.	1,545	1,192	904	289	638	0	0	1,541	4	904	289	430	685	378	307	0	0	378	51	378	307	365	365	0	0	365	596	2,285
1b. Felton system complies with required bypass flows, but not SLRBT low-flow no-diversion requirements.	1,545	1,192	904	289	638	0	0	1,541	4	904	289	430	775	395	381	0	0	395	35	395	381	365	365	0	0	365	669	2,301
1c. All diversion capacities doubled; Felton system complies with water rights.	1,545	1,569	966	603	575	0	0	1,541	4	966	603	430	1,175	390	785	0	0	390	40	390	785	365	365	0	0	365	1,388	2,300
1d. All diversion capacities doubled; Felton system diverts without regard to water rights.	1,545	1,569	966	603	575	0	0	1,541	4	966	603	430	1,493	430	1,064	0	0	430	0	430	1,064	365	365	0	0	365	1,667	2,336
1e. All diversion capacities doubled; Felton system complies with required bypass flows only.	1,545	1,569	966	603	575	0	0	1,541	4	966	603	430	1,290	396	893	0	0	396	33	396	893	365	365	0	0	365	1,496	2,303
South system imports North system unused potential 1f. diversions for in-lieu recharge; Felton system complies with water rights.	1,545	1,192	904	289	638	0	115	1,541	4	1,019	174	430	685	378	307	0	0	378	51	378	307	365	250	115	0	365	480	2,285
South system imports Felton system unused potential 1g1. diversions for in-lieu recharge; Felton system diverts without regard to water rights.	1,545	1,192	904	289	638	0	0	1,541	4	904	289	430	852	430	422	0	281	430	0	710	142	365	84	281	0	365	431	2,336
1g2. Scenario 1g1 except Felton system complies with water rights.	1,545	1,192	904	289	638	0	0	1,541	4	904	289	430	685	378	307	0	198	378	51	577	109	365	167	198	0	365	398	2,285
1g3. Scenario 1g1 except Felton system complies with required bypass flows only.	1,545	1,192	904	289	638	0	0	1,541	4	904	289	430	775	360	381	0	252	360	35	611	129	365	113	252	0	365	418	2,266
1g4. Scenario 1g2 except intertie capacities limited.	1,545	1,192	904	289	638	0	0	1,541	4	904	289	430	685	378	307	0	165	378	51	543	142	365	200	165	0	365	431	2,285
South system imports unused potential diversion from 1h1. North and Felton systems for in-lieu recharge; Felton system diverts without regard to water rights.	1,545	1,192	904	289	638	0	115	1,541	4	1,022	174	430	852	430	422	0	287	430	0	601	136	365	78	287	0	365	309	2,336
1h2. Scenario 1h1 except Felton system comples with water rights.	1,545	1,192	904	289	638	0	115	1,541	4	1,019	174	430	685	378	307	0	89	378	51	468	102	365	160	205	0	365	276	2,285
 North system imports Felton system unused potential 1i. diversions for in-lieu recharge; Felton system complies with water rights. 	1,545	1,192	904	289	511	128	0	1,542	0	904	289	430	685	378	307	0	128	378	51	506	179	365	365	0	0	365	468	2,286
1j. Scenario 1i plus South system imports unused potential diversion from North and Felton systems.	1,545	1,192	904	289	511	128	115	1,542	0	1,019	174	430	685	378	307	0	144	378	51	522	163	365	234	131	0	365	337	2,286
1k. Scenario 1j except intertie capacities limited.	1,545	1,192	904	289	533	105	115	1,542	0	1,019	174	430	685	378	307	0	133	378	51	512	174	365	222	143	0	365	347	2,286

Color shading relative to compliance with Felton system water rights: Not compliant.

All scenarios assume estimated 2045 demand and repeat of WY1970-2017 climatic cycle. See Table 6-2 for overall summary of scenario alternative assumptions.

Compliant with Fall Creek required bypass flows.

f βββ compliant with SLRBT low-flow diversion thresholds.

See Table 6-3 for assumed diversion, conveyance, and treatment capacities.

See Table 6-6 for more detailed results.

^a Within diversion capacity and water rights

^b Unmet North system demand results from assumed limits on groundwater production.

^c Unmet Felton system demand results from water rights compliance.

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Table 6-4

Summary of Simulated Base Case and Scenario 1 Conjunctive Use Alternatives, Annual Averages, WYs 1970–2017

									North Svs	tem							_					Felton	Svstem							1	South	1 Svst	em		
					St	tream Div	versions								Total						Stream Div	versions						То	tal Un-					Un-	
		Peavine	Creek	Foreman C	Creek	Cle	ear & Sweetw	/ater	Total		Groundwater Wells	s Im-	Ex-poi	rt/	Diver-			Fall & E	Bennett Ck	S	Bull Cr	reek	Tota		Im- Ex-	-port/		Div	ver- used					used S	Scotts
					Un	-		Un-		Un-		port/	/ Injec	t	sions	Unuse	ed		U	n-		Un-		Un-	port/ In	ject		sio	ons Poten-					North & \	/alley
	D-	Deter	Divert	Datas Di	use	ed Deter		used Datas Po	ton Divert	used	Quail Ohm	ASR	R Unuse	ed Total Un-m	iet Includ-	Poten	1- D-	Datas	US	ed D	atar Dive	used	Poton Diver	used	ASR Un	used To	tal Un	n-met Incl	ud- tial	D .	Pumped	l an	Total	Feiton II Divser-	Re- SI VWD
Scenario	De- mand	Poten- tial*	-Divert ed	tial*	ed tial	en-Poter	n- Divert- F	tial tia	al ^a ed	tial	Quali Olym- Hollow pia Tot	EX-	t Div	Sys-tem De	^b Export	sions	er- De-	Poten- L tial*	ed ti	al t	tial*	d tial	tial ^a ed	t- Poten-	EX- F	ot. Sys		and ^c Evr	for Diver-	De- mand	Ground- water	IM-	Dort Use	sions c	charge Total
	mana	liai	ou	uu		i titai	04	uui u	u 00	tion				030 man		510115	acre-	feet per ve	ear (afy)					tici		. 0.			5011 510115	India	Water	port	000		
	avg 1,545	141	112	543	528	44 50	09 264	245 1	192 904	289	259 378 6	638 (0	0 1,541	4 904	4 289	430	705	340	366	147	90 57	852 43	0 422	0	0	430	0	430 422	365	365	0	0 365	711	0 2,336
Base Simulated historical record	min 1.235	35	35	197	197	0 19	97 139	0	429 429	0	113 162 2	275 (0	0 1.235	0 429	9 0	335	695	266	292	68	49 15	762 33	5 316	0	0	335	0	335 316	297	297	0	0 297	333	0 1.878
Case (calibrated to WYS 2000-2017)	max 1,776	257	154	1,008	937 1	74 80	02 325	663 2	.067 1.231	836	425 612 1.0)38 (0	0 1,776	65 1,23	1 836	492	710	409	436	225 1	20 124	926 49	2 560	0	0	492	0	492 560	441	441	0	0 441	1,354	0 2,642
											Scenario 1 – A	Iternati	ives us	ing existing a	nd modifie	ed infra	structure	e and var	riations i	n wate	er rights														i
1a. Felton system complies with water	avg 1,545	141	112	543	528	44 50	09 264	245 1	192 904	289	259 378 6	638 (0	0 1,541	4 904	4 289	430	547	338	208	139	40 99	685 37	8 307	0	0	378	51	378 307	365	365	0	0 365	596	0 2,285
rights.	min 1,235	35	35	197	197	0 19	97 139	0	429 429	0	113 162 2	275 (0	0 1,235	0 429	9 0	335	209	158	23	29	28 0	237 18	6 23	0	0	186	0	186 23	297	297	0	0 297	23	0 1,757
	max 1,776	257	154	1,008	937 1	74 80	02 325	663 2	,067 1,231	836	425 612 1,0)38 (0	0 1,776	65 1,23 ⁻	1 836	492	678	408	348	222	50 186	900 45	5 534	0	0	455	187	455 534	441	441	0	0 441	1,328	0 2,636
1b. Felton system complies with required	avg 1,545	141	112	543	528	44 50	09 264	245 1	192 904	289	259 378 6	638 (0	0 1,541	4 904	4 289	430	628	304	324	147	90 57	775 39	5 381	0	0	395	35	395 381	365	365	0	0 365	669	0 2,301
bypass flows, but not SLRBT low-flow no	min 1,235	35	35	197	197	0 19	97 139	0	429 429	0	113 162 2	275 (0	0 1,235	0 429	9 0	335	505	219	207	68	49 15	572 26	8 231	0	0	268	0	268 231	297	297	0	0 297	247	0 1,826
diversion requirements.	max 1,776	257	154	1,008	937 1	74 80	02 325	663 2	,067 1,231	836	425 612 1,0)38 (0	0 1,776	65 1,23 ⁻	1 836	492	706	350	436	225 1	20 124	926 45	7 560	0	0	457	85	457 560	441	441	0	0 441	1,354	0 2,635
1c. All diversion capacities doubled; Felton	avg 1,545	207	127	654	549 1	85 70	08 290	418 1	569 966	603	234 342 5	575 (0	0 1,541	4 966	6 603	430	989	352	638	186	38 147	1,175 39	0 785	0	0	390	40	390 785	365	365	0	0 365	1,388	0 2,300
system complies with water rights.	min 1,235	36	36	198	198	0 20	00 200	0	433 433	0	23 32	55 (0	0 1,235	0 433	3 0	335	279	200	51	34	21 11	313 22	1 62	0	0	221	0	221 62	297	297	0	0 297	62	0 1,792
	max 1,776	453	202	1,529	976 8	04 1,36	67 336	1,094 3	,349 1,451	1,898	424 610 1,0)34 (0	0 1,776	64 1,45 ⁻	1 1,898	492	1,355	415 1,	025	338	47 301	1,694 46	1 1,327	0	0	461	147	461 1,327	441	441	0	0 441	3,183	0 2,642
1d. All diversion capacities doubled; Felton	avg 1,545	207	127	654	549 1	85 70	08 290	418 1	569 966	603	234 342 5	575 (0	0 1,541	4 966	6 603	430	1,300	339	961	194	91 103	1,493 43	0 1,064	0	0	430	0	430 1,064	365	365	0	0 365	1,667	0 2,336
system diverts without regard to water	min 1,235	36	36	198	198	0 20	00 200	0	433 433	0	23 32	55 (0	0 1,235	0 433	3 0	335	1,092	266	745	73	49 20	1,166 33	5 768	0	0	335	0	335 768	297	297	0	0 297	768	0 1,878
rights.	max 1,776	453	202	1,529	976 8	04 1,36	67 336	1,094 3	,349 1,451	1,898	424 610 1,0)34 (0	0 1,776	64 1,45 ⁻	1 1,898	492	1,412	408 1,	138	340 1	20 239	1,744 49	2 1,377	0	0	492	0	492 1,377	441	441	0	0 441	3,233	0 2,642
1e. All diversion capacities doubled; Felton	avg 1,545	207	127	654	549 1	85 70	08 290	418 1	569 966	603	234 342 5	575 (0	0 1,541	4 966	6 603	430	1,096	306	781	194	91 103	1,290 39	6 893	0	0	396	33	396 893	365	365	0	0 365	1,496	0 2,303
system complies with required bypass	min 1,235	36	36	198	198	0 20	00 200	0	433 433	0	23 32	55 (0	0 1,235	0 433	3 0	335	741	221	90	73	49 20	814 27	0 497	0	0	270	0	270 497	297	297	0	0 297	497	0 1,826
flows only.	max 1,776	453	202	1,529	976 8	04 1,36	67 336	1,094 3	,349 1,451	1,898	424 610 1,0)34 (0	0 1,776	64 1,45 ⁻	1 1,898	492	1,401	353 1,	135	340 1	20 239	1,742 45	7 1,375	0	0	457	82	457 1,375	441	441	0	0 441	3,231	0 2,635
1f. South system imports North system	avg 1,545	141	112	543	528	44 50	09 264	245 1	192 904	289	259 378 6	638 (0 11	5 1,541	4 1,019	9 174	430	547	338	208	139	40 99	685 37	8 307	0	0	378	51	378 307	365	250	115	0 365	480	0 2,285
unused potential diversions for in-lieu	min 1,235	35	35	197	197	0 19	97 139	0	429 429	0	113 162 2	275 (0	0 1,235	0 429	9 0	335	209	158	23	29	28 0	237 18	6 23	0	0	186	0	186 23	297	13	0	0 297	23	0 1,757
recharge; Felton system complies with	max 1,776	257	154	1,008	937 1	74 80	02 325	663 2	,067 1,231	836	425 612 1,0)38 (0 32	9 1,776	65 1,559	9 507	492	678	408	348	222	50 186	900 45	5 534	0	0	455	187	455 534	441	417	329	0 441	999	0 2,636
water rights.															_		_																		
1g1. South system imports Felton system	avg 1,545	141	112	543	528	44 50	09 264	245 1	,192 904	289	259 378 6	638 (0	0 1,541	4 904	4 289	430	705	340	366	147	90 57	852 43	0 422	0	281	430	0	710 142	365	84	281	0 365	431	0 2,336
recharge: Felton system diverts without	min 1,235	35	35	197	197	0 19	97 139	0	429 429	0	113 162 2	275 (0	0 1,235	0 429	9 0	335	695	266	292	68	49 15	762 33	5 316	0	230	335	0	616 77	297	1	230	0 297	96	0 1,878
regard to water rights.	max 1,776	257	154	1,008	937 1	74 80	02 325	663 2	,067 1,231	836	425 612 1,0)38 (0	0 1,776	65 1,23 ⁻	1 836	492	710	409	436	225 1	20 124	926 49	2 560	0	323	492	0	778 237	441	182	323	0 441	1,033	0 2,642
1g2 Scenario 1g1 except Felton system	avg 15/5	1/1	112	5/3	528	11 50	09 264	2/15 1	102 004	280	259 378 6	38 (0	0 1541	4 90/	1 280	/130	547	338	208	130	10 99	685 37	8 307	0	108	378	51	577 109	365	167	108	0 365	308	0 2 285
complies with water rights.	min 1 235	35	35	107	107	0 10	07 130	0	12 12	203	113 162 2	000 (000 (000 (000 (000 (000 (000 (000	0	0 1,341		a n	335	209	158	200	20	-10 00 28 0	237 18	6 23	0	23	186	0	236 0	207	13	23	0 207	0.00	0 1 757
	max 1 776	257	15/	1 008	037 1	7/ 80	02 325	663 2	423 423	836	425 612 1.0	138 (0	0 1,233	65 1 23	1 836	/192	678	108	3/8	23	50 186	Q00 /5	5 53/	0	20	100	187	7/1 223	1/1	310	20	0 237	1 024	0 2.636
1a3. Scenario 1a1 except Felton system	avg 15/5	1/1	112	5/3	528	14 50	02 323	2/5 1	102 001	289	259 378 6	38 (n	0 1541	1 90/	1 289	430	628	30/	324	1/7	90 57	775 36	0 381	0	252	360	35	611 120	365	113	252	0 365	/18	0 2,000
complies with required bypass flows	min 1 235	35	35	107	107	0 10	07 130	0	132 304	203	113 162 2	075 (0	0 1,341		a n	335	505	210	207	68	<u>10</u> 15	572 20	1 231	0	167	201	0	308 60	207	1	167	0 207	75	0 1 772
only.	max 1.776	257	154	1 008	937 1	74 80	02 325	663 2	067 1 231	836	425 612 1 0	138 (0	0 1,235	65 1 23	1 836	492	706	350	436	225 1	20 124	926 44	7 560	0	328	447	85	770 237	441	247	328	0 441	1 033	0 2.627
1g4 . Scenario 1g2 except intertie capacities	avg 1.545	141	112	543	528	44 50	09 264	245 1	192 904	289	259 378 6	38 (0	0 1 541	4 904	1 289	430	547	338	208	139	40 99	685 37	8 307	0	165	378	51	543 142	365	200	165	0 365	431	0 2,027
limited.	min 1 235	35	35	197	197	0 19	97 139	0	429 429	200	113 162 2	275 (0	0 1,041	0 429	9 0	335	209	158	23	29	28 0	237 18	6 23	0	23	186	0	229 0	297	99	23	0 297	0	0 1 757
	max 1 776	257	154	1 008	937 1	74 80	02 325	663 2	067 1 231	836	425 612 1 0	038 (0	0 1 776	65 1 23	1 836	492	678	408	348	222	50 186	900 45	5 534	0	226	455	187	676 308	441	328	226	0 441	1 102	0 2 636
1h1. South system imports unused potential	avg 1.545	141	112	543	528	44 50	09 264	245 1	192 904	289	259 378 6	638 (0 11	5 1 541	4 1.02	2 174	430	705	340	366	147	90 57	852 43	0 422	0	287	430	0	601 136	365	78	287	0 365	309	0 2,336
diversion from North and Felton systems	min 1 235	35	35	197	197	0 10	97 139	0	429 429	0	113 162 2	275 (0	0 1 235	0 429	9 0	335	695	266	292	68	49 15	762 33	5 316	0	230	335	0	421 77	297	0	230	0 297	80	0 1.878
for in-lieu recharge; Felton system	max 1,776	257	154	1.008	937 1	74 80	02 325	663 2	.067 1.231	836	425 612 1.0)38 (0 32	9 1.776	65 1.559	9 507	492	710	409	436	225 1	20 124	926 49	2 560	0	362	492	0	702 236	441	182	362	0 441	683	0 2.642
diverts without regard to water rights.				.,					,		,.		-	.,	.,										-			-							_,•
1h2. Scenario 1h1 except Felton system	avg 1,545	141	112	543	528	44 50	09 264	245 1,	192 904	289	259 378 6	638 (0 11	5 1,541	4 1,019	9 174	283	547	338	208	139	40 99	685 37	8 307	0	89	378	51	468 102	365	160	205	0 365	276	0 2,285
comples with water rights.	min 1,235	35	35	197	197	0 19	97 139	0	429 429	0	113 162 2	275 (0	0 1,235	0 429	9 0	0	209	158	23	29	28 0	237 18	6 23	0	13	186	0	236 0	297	0	23	0 297	0	0 1,757
	max 1,776	257	154	1,008	937 1	74 80	02 325	663 2	,067 1,231	836	425 612 1,0)38 (0 32	9 1,776	65 1,559	9 507	815	678	408	348	222	50 186	900 45	5 534	0	155	455	187	533 222	441	319	344	0 441	657	0 2,636
1i. North system imports Felton system	avg 1,545	141	112	543	528	44 50	09 264	245 1,	192 904	289	209 302 5	511 128	8	0 1,542	0 904	4 289	430	547	338	208	139	40 99	685 37	8 307	0	128	378	51	506 179	365	365	0	0 365	468	0 2,286
unused potential diversions for in-lieu	min 1,235	35	35	197	197	0 19	97 139	0	429 429	0	39 52	91 23	3	0 1,235	0 429	9 0	335	209	158	23	29	28 0	237 18	6 23	0	23	186	0	237 0	297	297	0	0 297	0	0 1,757
recharge; Felton system complies with	max 1,776	257	154	1,008	937 1	74 80	02 325	663 2	,067 1,231	836	416 598 1,0	014 266	6	0 1,776	0 1,23	1 836	492	678	408	348	222	50 186	900 45	5 534	0	266	455	187	677 308	441	441	0	0 441	1,144	0 2,636
water rights.									100		000										102	10	0.00				070								
1J. Scenario 1) plus South system imports	avg 1,545	141	112	543	528	44 50	09 264	245 1,	192 904	289	209 302 5	11 128	8 11	5 1,542	0 1,019	9 174	430	547	338	208	139	40 99	685 37	8 307	0	144	378	51	522 163	365	234	131	0 365	337	0 2,286
and Felton systems	min 1,235	35	35	197	197	0 19	97 139	0	429 429	0	39 52	91 23	3	0 1,235	0 429	9 0	335	209	158	23	29	28 0	237 18	6 23	0	23	186	0	237 0	297	13	0	0 297	0	0 1,757
	max 1,776	257	154	1,008	93/ 1	/4 80	02 325	663 2	067 1,231	836	416 598 1,0	266	o 32	9 1,776	0 1,559	9 507	492	678	408	348	222	50 186	900 45	5 534	U	340	455	18/	6// 308	441	382	402	0 441	815	0 2,636
1K. Scenario 1J except intertie capacities	avg 1,545	141	112	543	528	44 50	09 264	245 1,	192 904	289	218 315 5	533 105	5 11	5 1,542	0 1,019	9 174	430	547	338	208	139	40 99	685 37	8 307	0	133	378	51	512 174	365	222	143	0 365	347	0 2,286
innited.	min 1,235	35	35	197	197	0 19	97 139	0	429 429	0	65 90 1	155 23	3	0 1,235	0 429	9 0	335	209	158	23	29	28 0	237 18	6 23	0	23	186	0	237 0	297	0	0	0 297	0	0 1,757
	max 1,776	257	154	1,008	937 1	74 80	02 325	663 2	,067 1,231	836	416 598 1,0	014 176	6 32	8 1,776	0 1,558	B 509	492	678	408	348	222	50 186	900 45	5 534	0	233	455	187	645 357	441	372	412	0 441	866	0 2,636

Color shading relative to Not compliant. compliance with Felton Compliant with Fall Creek required bypass flows.

All scenarios assume estimated 2045 demand and repeat of WY1970-2017 climatic cycle.

^a Within Diversion Capacity and Water Rights

^b Unmet North system demand results from assumed limits on groundwater production. ^c Unmet Felton system demand results from water rights compliance.

system water rights: Fully compliant with SLRBT low-flow diversion thresholds. See Table 6-2 for assumed diversion, conveyance, and treatment capacities.

See Table 6-1 for overall summary of scenario alternative assumptions.

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avg average

min minimum

max maximum

Table 6-5

Results of Base Case and Scenario 1 Conjunctive Use Simulations, WYs 1970–2017

				Perc	cent of Mo	onthly Flo	w Remain	ning		Perc	ent of Dro	ught Minin	num Base	flow Rema	ining	Dement	
					Downsu	Clear &	100131011		San		as a nes	Bean Ck		San	San	of Months	
	Secondia		Poovino	Fore-	Pouldor	Sweet-	Fall &	Dull	Lorenzo	Newell	Zayante	at	Zayante	Lorenzo	Lorenzo	Felton	
	Scenario		Creek ^a	Creek ^a	Creek ^b	Creeks ^a	Creeks ^a	Creek ^a	Trees ^b	Creek at SI R	Ck above Bean Ck	Zayante Ck	Ck at SI R	R above Fall Ck	R at Big Trees	Non- compliant	
		avg	63	26	86	51	83	64	95	53	49	47	47	93	72	23	
Base Case	Simulated historical record (calibrated to WYs 2000-2017)	min	40	10	65	19	32	32	86								
		max	96	81	99	100	99	94	100								
O	1a. Felton system complies with water rights.	avg	63	26	86	51	86	82	96	53	49	47	47	93	72	0	
Scenario 1 Alternatives		min	40	10	65	19	42	53	87								
Using Existing	1b Ealton overlam complice with required hyperce flows but	max	96	81	99	100	99	99	100		10	47	47		70	04	
and Modified	not SLRBT low-flow no-diversion requirements.	avg	63	26	86	51	86	64	95	53	49	47	47	93	72	21	
Infrastructure		min	40 96	81	00	19	49	32 94	100								
Rights	1c. All diversion capacities doubled: Felton system complies	ava	59	24	85	47	85	83	95	57	54	47	48	94	73	0	
Variations	with water rights.	min	33	8	64	17	42	53	87	01	04	17	-10	54	10	Ū	
		max	95	81	99	100	99	99	100								
	1d. All diversion capacities doubled; Felton system diverts	avg	59	24	85	47	83	64	95	57	54	47	48	94	73	16	S
	without regard to water rights.	min	33	8	64	17	32	32	86								SLF
		max	95	81	99	100	99	94	100								
	1e. All diversion capacities doubled; Felton system complies	avg	59	24	85	47	86	64	95	57	54	47	48	94	73	14	
	with required bypass flows only.	min	33	8	64	17	49	32	89								
	45 Cauth sustant intersta Nauth sustant unused a startic	max	95	81	99	100	99	94	100							-	r
	 South system imports North system unused potential diversions for in-lieu recharge: Felton system complies 	avg	62	25	86	43	86	82	95	53	49	51	50	93	73	0	а
	with water rights.	min	40	10	65 00	17 07	42	53	8/ 100								u
	1g1. South system imports Felton system unused potential	ava	94 63	26	86	51		58	Q/	53	19	56	55	03	76	23	
	diversions for in-lieu recharge; Felton system diverts	min	40	10	65	19	16	27	83	55	40	50	55	55	10	20	b
	without regard to water rights.	max	96	81	99	100	99	90	100								
	1g2. Scenario 1g1 except Felton system complies with water	avg	63	26	86	51	82	64	95	53	49	53	53	93	75	0	
	rights.	min	40	10	65	19	40	27	85								
		max	96	81	99	100	99	99	100								
	1g3. Scenario 1g1 except Felton system complies with	avg	63	26	86	51	78	58	94	53	49	55	54	93	75	15	С
	required bypass nows only.	min	40	10	65	19	39	27	86								
	1nd Secondria 1n2 execut intertia conduities limited	max	96	81	99	100	99	90	100	50	40	50	50		74	0	
	197. Ocenano 192 except interne capacities infilted.	avg	63	26	65 65	51	82	60	95	53	49	52	52	93	74	U	
		max	40 96	81	00	19	40 99	94 99	100								
	1h1. South system imports unused potential diversion from	ava	62	25	86	43	73	63	94	53	49	57	55	93	76	23	ſ
	North and Felton systems for in-lieu recharge; Felton	min	40	10	65	17	16	28	83								L
	system diverts without regard to water rights.	max	94	80	99	97	99	94	100								Γ
	1h2. Scenario 1h1 except Felton system comples with water	avg	62	25	86	43	83	73	95	53	49	54	53	93	75	0	
	rights.	min	40	10	65	17	40	28	85								l
		max	94	80	99	97	99	99	100								
	1. North system imports Felton system unused potential diversions for in-lieu recharge: Felton system complies	avg	63	26	86	51	83	69	95	62	59	48	50	95	74	0	
	with water rights.	min	40	10	65	19	40	27	85								
	1i. Scenario 1i nlus South system imports unused actential	max	90	01	33	100	33	99	00	00	50	50	54	05	75	0	
	diversion from North and Felton systems.	avg	62	25	65 65	43	82	0/	95	62	59	53	54	95	75	U	
		max	94	80	99	97	40 99	99	100								
	1k. Scenario 1j except intertie capacities limited.	avo	63	25	86	43	82	68	95	60	57	53	54	94	75	0	
		min	40	10	65	17	40	27	85				•	•		Ţ	
		max	96	80	99	97	99	99	100								

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Ck creek R river SLR San Lorenzo River RBT San Lorenzo River at Big Trees

avg average min minimum max maximum

Calculated monthly as: 100 x {1 - [(diversions) ÷ (unimpaired flow)]}

Calculated monthly as: 100 x [1 - [(diversions) ÷ (impaired flow + base case diversions)].

Only considers effects of SLVWD stream diversions.

Calculated using method presented in Table 5-3. Only considers effects of SLVWD, SVWD, and MHA groundwater pumping.

Color shading relative to compliance with Felton system water rights:

Not compliant.

Compliant with Fall Creek required bypass flows.

Fully compliant with SLRBT low-flow diversion thresholds.

Table 6-6Base Case and Scenario 1 SimulatedPercent of Downstream Flow Remaining

			Sim	ulated	Intertie	Use		Ave	erage \$	Simul	ated
		North S South	ystem to System	Felton S South	ystem to System	Felton S North S	ystem to System		Reduc Pum	tion i ping ^b	n
			Max.		Max.		Max.	No	orth	So	uth
Scenario		Annual	Rate ^a	Annual	Rate ^a	Annual	Rate ^a	Sys	tem ^c	Sys	stem
		afy	gpm	afy	gpm	afy	gpm	afm	%	afm	%
1f. South system imports North system unused	avg	115	337	0	0	0	0	0.0	0.0%	10	32%
potential diversions for in-lieu recharge; Feiton system complies with water rights	min	0									
	max	329									
1g1. South system imports Felton system unused	avg	0	0	281	292	0	0	0.3	0.6%	23	77%
system diversions for in-lieu recharge; Felton	min			230							
	max			323							
1g2. Scenario 1g1 except Felton system complies with	avg	0	0	198	292	0	0	0.3	0.6%	17	54%
water rights.	min			23							
	max			311							
1g3. Scenario 1g1 except Felton system complies with	avg	0	0	252	292	0	0	0.3	0.6%	21	69%
required bypass nows only.	min			167							
	max			328							
1g4. Scenario 1g2 except intertie capacities limited.	avg	0	0	165	153	0	0	0.3	0.6%	14	45%
	min			23							
	max			226							
1h1. South system imports unused potential diversion	avg	115	337	287	340	0	0	0.3	0.6%	24	79%
Felton system diverts without regard to water rights	min	0		230							
	max	329		362							
1h2. Scenario 1h1 except Felton system comples with	avg	115	337	89	241	0	0	0.3	0.6%	17	56%
water rights.	min	0		13							
	max	329		155							
1i. North system imports Felton system unused	avg	0	0	0	0	128	355	11	20%	0	0%
potential diversions for in-lieu recharge; Feiton	min					23					
system complies with water rights.	max					266					
1j. Scenario 1i plus South system imports unused	avg	115	337	16	181	144	355	11	20%	11	36%
potential diversion from North and Felton systems.	min	0		0		23					
	max	329		73		340					
1k. Scenario 1j except intertie capacities limited.	avg	115	306	28	153	105	173	9	17%	12	39%
	min	0		0		23					
	max	328		8/		176					

^a Equivalent continuous rate for simulated maximum monthly rate.

^b Compared to the base case; expressed in acre-feet per month for comparison to minimum monthly baseflows.

^c Small reduction from imports needed to offset base-case unmet demand when well production insufficient.

Color shading relative to compliance with N Felton system water rights:

Not compliant.

Compliant with Fall Creek required bypass flows.

Fully compliant with SLRBT low-flow diversion thresholds.

afm acre-feet per month afy acre-feet per year gpm gallons per minute avg average

min minimum max maximum

max maximu

Table 6-7

Scenario 1 Simulated Use of System Interties and Resulting Reductions in Groundwater Pumping

					١	North Sy	stem								Felto	on Syst	em						Sout	th Syst	em				
		Stre	eam Dive	rsions Un- used	Ground-	Imports / ASR	Exports / Inject Unused Potential	Total	Unmet	Total Diver- sions Includ-	Unused Poten- tial		Stre	am Diver	rsions Un- used		Exports / Inject Unused Potential	Total	Unmet	Total Diver- sions Includ-	Unused Poten- tial		Pumped			Total	Scotts Vallev In	Unused North & Felton System	
	De-	Poten-	Divert-	Poten-	water Welle ^b	Extrac-	Diver-	System	De-	ing for	Diver-	De-	Poten-	Divert-	Poten-	lm-	Diver-	System	De-	ing for	Diver-	De-	Ground-	lm-	Ex-	System	Lieu Re-	Diver-	SLVWD
Scenario	manu	liai	eu	tiai	Wells	tions	510115	056	manu	Export	510115	manu	liai	acre	e-feet per	year (a	fy)	USe	manu	Export	SIONS	manu	Waler	ports	ports	USE	charge	510115	Total
Base caseSynthesized historical record	mand tial Wells ^b tions sions Use mand ^c Export sions 1,545 1,192 904 289 638 0 0 1,541 4 904 28 Scenario 1 – Select 1,545 1,192 904 289 638 0 0 1,541 4 904 28 1,545 1,192 904 289 638 0 0 1,541 4 904 28 1,545 1,192 904 289 638 0 0 1,541 4 904 28 1,545 1,192 904 289 638 0 0 1,541 4 904 28										289	430	852	430	422	0	0	430	0	430	422	365	365	0	0	365	0	711	2,336
	1							1	Sce	nario 1 – S	Selected	Result	s (from	Table 6-4	4)	1			•		1							1	
1a. Felton system complies with water rights.	1,545	1,192	904	289	638	0	0	1,541	4	904	289	430	685	378	307	0	0	378	51	378	307	365	365	0	0	365	0	596	2,285
 North system imports Felton system unused potential diversions for in-lieu recharge (Scenario 1i) plus South system imports unused potential diversion from North and Felton systems. 	1,545	1,192	904	289	511	128	115	1,542	0	1,019	174	430	685	378	307	0	144	378	51	522	163	365	234	131	0	365	0	337	2,286
	4					1	I		S	cenario 2	2 – Impor	t from	Loch Lo	omond										•				1	
2a. North and Felton systems import from Loch Lomond to satisfy unmet demand in Scenario 1a.	1,545	1,192	904	289	638	4	0	1,545	0	904	289	430	685	378	307	51	0	430	0	378	307	365	365	0	0	365	0	596	2,340
2b. Scenario 2a plus South system imports from Loch Lomond for in-lieu recharge.	1,545	1,192	904	289	638	4	0	1,545	0	904	289	430	685	378	307	51	0	430	0	378	307	365	119	246	0	365	0	596	2,340
Scenario 2b plus South system also imports North 2c. system unused diversions, and North system imports unused Felton system diversions.	1,545	1,192	904	289	510	132	21	1,545	0	925	268	430	685	378	307	51	128	430	0	506	179	365	98	267	0	365	0	447	2,340
	1			1		ľ	Scenario 3	3 – Impor	t from Lo	och Lomo	nd and (Operate	Olymp	ia Aquif	er Stora	ge and	Recovery	1	1	1	1		1	1				1	
3a. Scenario 2b plus North system operates Olympia area ASR using North system unused diversions.	1,545	1,192	904	99	448	194	190	1,545	0	1,093	99	430	685	378	307	51	0	430	0	378	307	365	116	249	0	365	0	406	2,340
3b. Scenario 2b plus North system operates Olympia area ASR using Felton system unused diversions.	1,545	1,192	904	289	422	220	0	1,545	0	904	289	430	685	378	85	51	222	430	0	600	85	365	116	249	0	365	0	374	2,340
3c. Scenarios 3a and 3b combined.	1,545	1,192	904	99	229	412	190	1,545	0	1,093	99	430	685	378	85	51	222	430	0	600	85	365	116	249	0	365	0	185	2,340
					Scenar	rio 4 – Co	ontribute to	o Scotts	Valley In	Lieu Rec	harge w	nile Op	erating	Olympia	a ASR ar	nd Impo	orting fror	n Loch Lo	mond									1	
 Scenario 3c plus SVWD imports North and Felton system remaining unused potential diversions. 	1,545	1,192	904	99	229	412	190	1,545	0	1,093	9	430	685	378	85	51	222	430	0	600	8	365	116	249	0	365	167	17	2,340

All scenarios assume estimated 2045 demand and repeat of WY1970-2017 climatic cycle

Felton system diversions as currently permitted, all scenarios.

See Table 6-2 for overall summary of scenario alternative assumptions.

See Table 6-3 for assumed diversion, conveyance, and treatment capacities.

See Table 6-7 for more detailed results.

^a Within diversion capacity and water rights

^b Does not include ASR extractions.

^c Unmet North system demand results from assumed limits on groundwater production.

^d Unmet Felton system demand results from water rights compliance.

Table 6-8

Summary of Simulated Scenario 2, 3, and 4 Conjunctive Use Alternatives, Annual Averages, WYs 1970–2017

											No	orth Sys	stem																Felton S	System										South	n Syste	m		, <u> </u>	[
	-						Strea	am Divers	sions									Fx-			Total						Strea	am Divers	sions	•							Total	Unuse							1
		F	eavine	Creek	Foremar	n Creek		Clear 8	& Sweet	twater		Total		Ground	water W	/ells	Im- I	port/			Diver-			Fall 8	& Bennet	t Cks	E	Bull Creel	(Total		Im- Ex-r	port/			Diver-	d					Unused	Scotts	1
							Un-			Un-			Un-				port/ I	nject			sions	Unused	d			Un-			Un-			Un- p	ort/ Inj	ect			sions	Poten-					N Sys	Valley	1
							used			used			used				ASR U	nused	Total	Un-met	Includ-	Poten-				used			used			used A	ASR Unu	used T	otal Un	-met I	nclud-	tial		Pumped		Total	&	In-Lieu	1
C		De- F	oten-	Divert-	Poten-	Divert-	Poten-	Poten- [Divert-	Poten-	Poten-	Divert- F	Poten-	Quail	Olym-		Ex-	Pot. S	Sys-tem	De-	ing for	tial Dive	er De-	Poten-	Divert-	Poten-	Poten-	Divert-	Poten-	Poten-	Divert-	Poten-	Ex- Po	ot. Sy	stem [De- i	ng for	Diver-	De-	Ground-	lm- E	Ex- Systen	1 Felton	Re-	SLVWD
Scenario	1	nand	tial ^b	ed	tial ^b	ed	tial	tial ^b	ed	tial	tial ^b	ed	tial H	Hollow	pia	Total	tract	Div.	Use	mand $^{\rm c}$	Export	sions	mand	tial ^b	ed	tial	tial ^b	ed	tial	tial ^b	ed	tial t	ract Di	iv. L	Jse ma	and ^d E	Export	sions	mand	water	port p	ort Use	divs	charge	Total
		•		·															•	•			acre-	feet per	year (af	y)	•										•				•			· · · · ·	
	avg	,545	141	112	543	528	44	509	264	245	1,192	904	289	259	378	638	0	0	1,541	4	904	289	430	705	340	366	147	7 90	57	852	430	422	0	0	430	0	430	422	365	365	0	0 365	71	0	2,336
Base Simulated historical record	min	,235	35	35	197	197	0	197	139	0	429	429	0	113	162	275	0	0	1,235	0	429	0	335	695	266	292	68	8 49	15	762	335	316	0	0	335	0	335	316	297	297	0	0 297	333	0	1,878
Case (calibrated to WYs 2000-2017)	max	,776	257	154	1,008	937	174	802	325	663	2,067	1,231	836	425	612	1,038	0	0	1,776	65	1,231	836	492	710	409	436	225	5 120	124	926	492	560	0	0	492	0	492	560	441	441	0	0 441	1,354	. 0	2,642
																		50	onario	1 - Sol	acted P	oculte /	/from Tr	blo 6-6	5)																				·
1. Ealtan avatam complian with water			4.4.4	440	E 40	500	4.4	500	004	045	1 100	004	000	050	270	620	0	0				000			0)	000	400	0 40	00	005	270	207	0	0	270	E 4	070	207	205	205		0 205	500	<u>, </u>	0.005
righto	avg	1,545	141	TIZ	543	528	44	509	264	245	1,192	904	289	259	3/8	638	0	U	1,541	4	904	289	430	547	338	208	135	9 40	99	685	3/8	307	0	0	3/8	51	3/8	307	305	305	U	0 365	596	U	2,285
ignis.	min	,235	35	35	197	197	0	197	139	0	429	429	0	113	162	275	0	0	1,235	0	429	0	335	209	158	23	29	9 28	0	237	186	23	0	0	186	0	186	23	297	297	0	0 297	23	, 0	1,757
r	max	,776	257	154	1,008	937	174	802	325	663	2,067	1,231	836	425	612	1,038	0	0	1,776	65	1,231	836	492	678	408	348	222	2 50	186	900	455	534	0	0	455	187	455	534	441	441	0	0 441	1,328	, 0	2,636
1i. North system imports Felton	ava	545	141	112	543	528	44	509	264	245	1 192	904	289	209	302	511	128	115	1 542	0	1 0 1 9	174	430	547	338	208	130	9 40	99	685	378	307	0	144	378	51	522	163	365	234	131	0 365	337	/ 0	2 286
system unused potential	uvg min i	1,040	25	25	107	107		107	1204	240	400	400	200	200	E0	01	220	0	1,042	0	400	0	225	200	150	200	00	0 00	0	000	100	007	0	02	100	01	022	00	207	10		0 007	001		1 757
diversions for in-lieu recharge		1,230	057	30	197	197	474	197	139	0	429	429	000	39	500	91	23	200	1,235	0	429	507	335	209	100	23	28	9 20	100	237	100	23	0	23	100	407	237	200	291	10	400	0 297	04/	0	1,757
(Scenario 1i) plus South system	max	,//b	257	154	1,008	937	174	802	325	663	2,067	1,231	836	416	598	1,014	266	329	1,776	0	1,559	507	492	6/8	408	348	222	2 50	186	900	455	534	0	340	455	187	677	308	441	382	402	0 441	818	. 0	2,636
imports unused potential diversion																																													1
from North and Felton systems.																																													1
																			Scona	rio 2	Import	romla	och Lon	ond																			-	4	·
Image Image <th< td=""><td></td><td>2 240</td></th<>															2 240																														
za. North and Fenori systems import	avy min i	1,040	141	25	107	020 107	44	107	120	245	1,192	904	209	209	160	030	4	0	1,040	0	904	209	430	200	330	200	135	9 40	99	000	106	307	0	0	430	0	106	307	202	202	0	0 303	090		2,340
upmet demond in Secondria 1a		1,230	257	154	1 0 0 9	197	174	197	139	662	429	429	026	113	612	1 020	65	0	1,235	0	429	026	402	209	100	23	25	9 20	196	237	100	23 524	107	0	402	0	100	Z3 524	291	297	0	0 297	1 2 2		1,070
	Пах	,770	251	134	1,000	937	174	002	525	005	2,007	1,231	030	425	012	1,030	05	0	1,770	0	1,231	030	492	070	400	540		2 30	100	900	455	554	107	0	492	0	455	554	441	441	U	0 441	1,520	0	2,042
2b. Scenario 2a plus South system	avg	,545	141	112	543	528	44	509	264	245	1,192	904	289	259	378	638	4	0	1,545	0	904	289	430	547	338	208	139	9 40	99	685	378	307	51	0	430	0	378	307	365	119	246	0 365	596	, 0	2,340
imports from Loch Lomond for in-	min	,235	35	35	197	197	0	197	139	0	429	429	0	113	162	275	0	0	1,235	0	429	0	335	209	158	23	29	9 28	0	237	186	23	0	0	335	0	186	23	297	50	121	0 297	23	, 0	1,878
lieu recharge. r	max	,776	257	154	1,008	937	174	802	325	663	2,067	1,231	836	425	612	1,038	65	0	1,776	0	1,231	836	492	678	408	348	222	2 50	186	900	455	534	187	0	492	0	455	534	441	225	292	0 441	1,328	, 0	2,642
2c. Scenario 2b plus South system	ava	.545	141	112	543	528	44	509	264	245	1,192	904	289	208	302	510	132	21	1.545	0	925	268	430	547	338	208	139	9 40	99	685	378	307	51	128	430	0	506	179	365	98	267	0 365	447	0	2.340
also imports North system unused	min	.235	35	35	197	197	0	197	139	0	429	429	0	113	162	275	23	0	1.235	0	429	0	335	209	158	23	29	9 28	0	237	186	23	0	23	335	0	237	0	297	0	121	0 297	(0	1.878
diversions, and North system	max	.776	257	154	1.008	937	174	802	325	663	2.067	1.231	836	425	612	1.038	331	73	1,776	0	1.303	775	492	678	408	348	222	2 50	186	900	455	534	187	266	492	0	677	308	441	217	365	0 441	1.082	0	2.642
imports unused Felton system		, .			,						,	, -				,			, -		,												-				-					-	,		1
diversions.																																													1
I															Scena	rio 3 –	Imnor	t from	Loch	omond	and Or	orato (Jymnia	Δαμίfα	ar Stora	ne and	d Recov	verv				-												4	•
3a Scenario 2h plus North system	ava	5/5	1/1	112	5/3	528	11	500	264	245	1 102	001	00	183	264	1/18	10/	100	1 5/15		1 003		/ 130	547	338	208	130		00	685	378	307	51	0	130	0	378	307	365	116	2/0	0 365	106		2 3/0
operates Olympia area ASR using u	Scenario 1a. max 1,776 257 154 1,008 937 174 802 325 663 2,067 1,231 836 425 612 1,038 65 0 1,776 0 1,231 836 492 678 408 348 222 50 186 900 455 534 187 South system nin 1,235 35 35 197 197 0 197 139 0 429 259 378 638 4 0 1,545 0 904 289 430 547 338 208 139 40 99 685 378 307 51 Lomond for in- min 1,235 35 35 197 197 0 197 139 0 429 0 1,231 836 492 678 408 348 222 50 186 900 455 534 187 South system axg 1,545 141 112 543 528 44 509 264														0	0	335	0	186	23	207	50	126	0 207	400		1 878																		
North system unused diversions	may '	1,235	257	154	1 008	937	174	802	325	663	2 067	1 231	515	3/13	193	836	202	322	1,235	0	1 552	515	492	678	408	3/18	23	2 50	186	207 Q00	455	534	187	0	192	0	455	534	231 AA1	225	202	0 237	1 006	0	2.642
North System undsed diversions.	пал	,,,,,	201	104	1,000	557	1/4	002	525	000	2,007	1,201	515	545	-55	000	202	522	1,770	U	1,002	515	752	010	400	040		2 00	100	500	-00	004	107	Ŭ	752	0	-55	004	1 1 1	225	232	0 171	1,000	Ŭ	2,072
				4.10	F 10	500		500	004	0.15	4.400	00.1	0000	470	0.40	400	000		4 5 4 5		<u> </u>	000	400		000	000	100	0 10		005	070	0.5	54	000	400		000	07	005			0 005		Ļ	0.010
3b. Scenario 2b plus North system	avg	1,545	141	112	543	528	44	509	264	245	1,192	904	289	1/3	249	422	220	0	1,545	0	904	289	430	547	338	208	139	9 40	99	685	378	85	51	222	430	0	600	85	365	116	249	0 365	3/4	0	2,340
operates Olympia area ASR using I	min	1,235	35	35	197	197	0	197	139	0	429	429	0	44	63	107	169	0	1,235	0	429	0	335	209	158	23	29	9 28	100	237	186	19	U 107	0	JJJ	0	186	19	297	50	126	0 297	23		1,8/8
Feiton system unused diversions.	max	,//b	257	154	1,008	937	1/4	802	325	663	2,067	1,231	ბახ	331	4/6	807	230	U	1,776	U	1,231	836	492	6/8	408	348	222	2 50	186	900	455	222	101	312	492	0	131	222	441	225	292	0 441	1,029	U	2,042
																																													1
3c. Scenarios 3a and 3b combined.	avg	,545	141	112	543	528	44	509	264	245	1,192	904	99	94	135	229	412	190	1,545	0	1,093	99	430	547	338	208	139	9 40	99	685	378	85	51	222	430	0	600	85	365	116	249	0 365	185	0	2,340
	min	,235	35	35	197	197	0	197	139	0	429	429	0	13	18	31	241	0	1,235	0	429	0	335	209	158	23	29	9 28	0	237	186	19	0	0	335	0	186	19	297	50	126	0 297	19	0	1,878
r I	max	,776	257	154	1,008	937	174	802	325	663	2,067	1,231	515	231	333	565	473	322	1,776	0	1,552	515	492	678	408	348	222	2 50	186	900	455	222	187	312	492	0	731	222	441	225	292	0 441	708	0	2,642
																																													1
<u> </u> 	I	I						I			I	S	cenario	o 4 – Co	ontribu	te to S	Scotts	Vallev	In-Lieu	Recha	rae whil	e Oner	rating O	lympia	ASR a	nd Imn	ortina	from Lo	ch Lom	ond			I			I				I	<u> </u>	- 1		<u> </u>	
A Scenario 3c plus SV/MD importe	ava	5/15	1/1	112	5/2	528	11	500	264	215	1 102	904	00	0/	125	220	A12	100	1 5/15	0	1 / 002	0	/30	5/7	220	202	120	a 10	00	695	378	85	51	222	430	0	600	Q	365	116	2/0	0 365	1	167	2 3/10
North and Felton system	min	235	25	112	107	107	44 A	107	120	240 N	//20	120	35	34 12	19	223	2/1	130	1,040	0	1,033	9	335	200	152	200	108	a 20	99	227	186	10	0	0	100	0	196	0	207	50	126	0 303		107	1 878
remaining unused potential	mav	776	257	15/	1 008	037	17/	802	325	599	2 067	1 231	515	231	333	565	473	322	1 776	0	1 550	1/15	102	678	100	3/18	20	2 50	186	900	455	222	187	312	492	0	731	62	441	225	202	0 1/1	201	/ 500	2 6/2
diversions	Παλ	,,,,,	201	104	1,000	551	114	002	525	000	2,001	1,201	515	201	555	505	515	522	1,770	0	1,002	140	+52	010	+00	0+0			100	500	-55	~~~	107	012	772	0	101	02	1++	220	2.52	0 441	201	500	2,042
																																											1		<u> </u>
All scenarios assume estimated 2045	5 dem	and and	repeat	of WY	1970-20	17 clima	atic cycle	e.	а	Scenario	os 2abc,	3abc, an	nd 4 Felt	ton syste	em comp	plies wit	th water	rights.				af	fy acre-fe	et per y	ear																				
Felton system diversions as currently	y perm	itted, al	l scena	rios.					b	Within d	liversion	capacity	and wa	ter rights	6.							av	g averag	е																					
See Table 6-1 for overall summary or	f scen	ario alte	rnative	assum	ptions.				с	Unmet N	North sys	stem dem	nand res	sults fron	n assum	ned limit	ts on gro	oundwa	ter produ	uction.		mi	in minimu	ım																				Tab	le 6-9

See Table 6-2 for assumed diversion, conveyance, and treatment capacities.

^d Unmet Felton system demand results from water rights compliance.

max maximum

Table 6-9 Results of Scenario 2, 3, and 4 Conjunctive Use Simulations, WYs 1970–2017

		Intertie Use (excluding for Loch Lomond)								Use of Loch Lomond Allotment									ASR of Unused				Average Reduction in				
			North System		m Felton System		n Felton System		1		Expo			prt to:					Diversions				Pumping				
		te South 9	0 Svetom	to So	outh	t North	0 Svetom	SLVV	VD to	No	orth	Fe	lton	So	uth			Allo	VWD otment	Inio	ction	Extra	oction		ľ		
					Oystern					Oystern		Oystern		Oystein				Remaining at		Пјесион		LAtraction		l			
Scenario			Max. Rate ^a	Annual	Max. Rate ^a	Annua	Max. Rate ^a	Annual	Max. Rate ^a	Annual	Max. I Rate ^a	Annua	Max. I Rate ^a	Annual	Max. Rate ^a	Total	Max. Rate ^a	End (313 a	of WY afy total)	Capa- city	Dec- May	Capa- city	Jun- Nov	NC Sys	rth tem ^c	So Sys	uth stem
			gpm	afy	gpm	afy	gpm	afy	gpm	afy	gpm	afy	gpm	afy	gpm	afy	gpm	af	%	gpm	afy	gpm	afy	afm	%	afm	%
Scenario 2 – Import from Loch Lomond																									·		
2a. North and Felton systems import from Loch	avg	0	0	0	0	0	0	0	0	4	217	51	311	0	0	55	311	262	84%	-	-	-	-	0.3	0.6%	0	0%
Lomond to satisfy unmet demand in Scenario	min									0		0		0	0	0		126	40%	-	-	-	-				
Ta.	max									65		187		0	0	192		313	100%	-	-	-	-				
2b. Scenario 2a plus South system imports from	avg	0	0	0	0	0	0	0	0	4	217	51	311	246	194	301	311	12	4%	-	-	-	-	0.3	0.6%	20	67%
Loch Lomond for in-lieu recharge.	min									0		0		121		274		0	0%	-	-	-	-				
										65		187		292		313		39	13%	-	-	-	-				
2c. Scenario 2b plus South system also imports	avg	21	153	0	0	128	355	0	0	4	217	51	311	246	194	301	434	12	4%	-	-	-	-	11	21%	22	73%
North system unused diversions, and North	min	0		0		23				0		0		121		274		0	0%	-	-	-	-				
diversions.	max	73		0		266				65		187		292		313		39	13%	-	-	-	-				
Scenario 3 – Import from Loch Lomond and Ope	rate O	lympia /	Aquife	r Storag	e and	Recove	ery																				L
3a. Scenario 2b plus North system operates	avg	0	0	0	0	0	0	0	0	0	0	51	311	249	194	301	434	12	4%	400	190	250	194	16	30%	21	68%
Olympia area ASR using North system	min									0		0		126		274		0	0%		0		150				
	max									0		187		292		313		39	13%		322		202				
3b. Scenario 2b plus North system operates	avg	0	0	0	0	222	285	0	0	0	0	51	311	249	194	301	434	12	4%	400	222	285	220	18	34%	21	68%
Olympia area ASR using Felton system	min					0						0		126		274		0	0%		0		169				
	max					312						187		292		313		39	13%		312		230				
3c. Scenarios 3a and 3b combined.	avg	0	0	0	0	222	285	0	0	0	0	51	311	249	194	301	434	12	4%	400	411	585	412	34	64%	21	68%
	min					0						0		126		274		0	0%		0		241				
	max					312						187		292		313		39	13%		634		473				
Scenario 4 – Contribute to Scotts Valley In-Lieu I	Recha	rge whi	le Oper	rating O	lympia	a ASR a	and Imp	orting	from Lo	och Loi	mond																
4. Scenario 3c plus SVWD imports North and	avg	0	0	0	0	222	285	167	350	0	0	51	311	249	194	301	434	12	4%	400	411	585	412	34	64%	21	68%
Felton system remaining unused potential diversions	min					0		19				0		126		274		0	0%		0		241				
	max					312		500				187		292		313		39	13%		634		473				
 ^a Equivalent continuous rate for simulated maximum monthly rate. ^b Expressed in acre-feet per month for comparison to minimum monthly baseflows. ^c Small reduction from imports needed to offset base-case unmet demand when well production insufficient. 						afm afy gpm	afm acre-feet per monthavg averageafy acre-feet per yearmin minimumgpm gallons per minutemax maximum							Table 6-10 Id 4 Simulated Use of System													

Interties, Loch Lomond, and Olympia ASR and Resulting Reductions in Groundwater Pumping

				Perc	cent of Mo Downstr	onthly Flo ream of D	w Remair iversion	ning		Percent of Drought Minimum Baseflow Remaining as a Result of Groundwater Pumping ^c							
						Clear &			San			Bean Ck		San	San	of Months	
				Fore-	<u> </u>	Sweet-	Fall &		Lorenzo	Newell	Zayante	at	Zayante	Lorenzo	Lorenzo	Felton	
	Peavine	man	Boulder	water	Bennett	Bull	R at Big	Creek at	Ck above	Zayante	Ck at	R above	R at Big	Non-			
			Creek	Creek	Creek	Creeks	Creeks	Creek	Trees	SLR	Bean Ck	CK	SLR	Fall Ck	Trees	compliant	
Base Case	Simulated historical record (calibrated to	avg	63	26	88	51	83	64	96	53 49 47	49	47	47	93	72	23	
	WYs 2000-2017)	mın	40	10	/2	19	32	32	89								
		max	96	81	99	100	99	94	100								
Seenerie 2	2. North and Folton quaterna impart from	P ₁₀	46	13	81	23	56	41	92	53 49	10	47	47				
Import from Loch Lomond	Loch Lomond to satisfy unmet demand in	avg	63	26	86	51	86	82	96		47	47	93	/2	U		
	Scenario 1a.	mın	40	10	65	19	42	53	87								
	2h Cooperio 2a plus Couth system importe	max	96	81	99	100	99	99	100		10						
	20. Scenario 2a plus South system imports	avg	63	26	86	51	86	82	96	53	49	55	54	93	75	0	
	nom Loch Lomona for inflied recharge.	min	40	10	65	19	42	53	87						l		
	0 - Or and the or the sector of the	max	96	81	99	100	99	99	100			-		-			
	2C. Scenario 20 plus South system also	avg	63	26	86	49	83	69	95	<u> </u>	58	58	95	78	0		
	and North system imports unused Felton	min	40	10	65	18	40	27	85								
	system diversions.	max	96	81	99	100	99	99	100								
Scenario 3 –	3a. Scenario 2b plus North system operates	avg	61	25	86	42	86	82	95	66	66 64 5	58	59	95	78	0	
Import from Loch	Olympia area ASR using North system	min	40	10	65	19	42	53	87								
Lomond Plus	unused diversions.	max	92	79	99	99	99	99	100								
Operate Olympia	3b. Scenario 2b plus North system operates	avg	63	26	86	51	84	67	95	68	66	58	59	96	79	0	
and Recovery	Olympia area ASR using Felton system	min	40	10	65	19	42	33	87								
	unused diversions.	max	96	81	99	100	99	99	100								
	3c. Scenarios 3a and 3b combined.	avg	61	25	86	42	84	67	95	83	83 82	61	64	98	81	0	
		min	40	10	65	19	42	33	87								
		max	92	79	99	99	99	99	100								
Scenario 4 –	4. Scenario 3c plus SVWD imports North	avg	61	25	86	42	84	67	95	83	83 82 61	61	64	98	81	0	
Valley In-Lieu	and Felton system remaining unused	min	40	10	65	19	42	33	87								
Recharge	potential diversions.	max	92	79	99	99	99	99	100								

Ck creek

R river

SLR San Lorenzo River

avg average

min minimum

max maximum

^a Calculated monthly as: 100 x {1 - [(diversions) ÷ (unimpaired flow)]}

^b Calculated monthly as: 100 x [1 - [(diversions) ÷ (impaired flow + base case diversions)].

Only considers effects of SLVWD stream diversions.

^c Calculated using method presented in Table 5-3. Only considers effects of SLVWD, SVWD, and MHA groundwater pumping.

Table 6-11 Scenarios 2, 3, and 4 Simulated Percent of Downstream Flow Remaining



Base Case: Historical versus Simulated North, South, and Felton System Monthly Water Production Hydrographs Assuming WY 1970–2017 Climatic Cycle, Currently Permitted Infrastructure, and Projected 2045 Dema⁴¹



See Table 1-1 for source of gauged records.

Base Case: Historical versus Simulated North System Monthly Surface Water Production Hydrographs Assuming WY 1970–2017 Climatic Cycle, Currently Permitted Infrastructure, and Projected 2045 Demand



Base Case: Historical versus Simulated Monthly North System Groundwater and Felton System Surface Water Production Hydrographs Assuming WY 1970–2017 Climatic Cycle, Currently Permitted Infrastructure, and Projected 2045 Demand



Source: Table 6-4; annual values derived from simulated monthly record.





Agenda: 2.7.19 Item: 10c

Monthly Results for Base Case and Scenarios 1a, 1h2, and 1j, WYs 1970-2017



Base Case: Hydrographs of North System Simulated Streamflow and Diversions Assuming WY 1970–2017 Climatic Cycle, Currently Permitted Infrastructure, and Projected 2045 Demand



Note differences in vertical axis scaling.

afm acre-feet per month

Figure 6-7 Base Case: Hydrographs of Felton System Simulated Streamflow and Diversions Assuming WY 1970–2017 Climatic Cycle, Current Infrastructure and Usage, and Projected 2045 Demand



Diversions Assuming WY 1970–2017 Climatic Cycle, Currently Permitted Infrastructure, and Projected 2045 Demand

Agenda: 2.7.19



Bennett, and Bull Creek Diversions Assuming WY 1970–2017 Climatic Cycle, Current Infrastructure and Usage, and Projected 2045 Demand



Scenario 1a: Hydrographs of Felton System Simulated Streamflow and Diversions Assuming WY 1970–2017 Climatic Cycle, Current Infrastructure, Permitted Use, and Projected 2045 Demand

Agenda: 2.7.19 Item: 10c

Figure 6-10



Note differences in vertical axis scaling.

Scenario 1a: Percent of Simulated Monthly Flow Remaining Downstream of Felton System Fall, Bennett, and Bull Creek Diversions Assuming WY 1970–2017 Climatic Cycle, Current Infrastructure, Permitted Use, and Projected 2045 Demand



Note differences in vertical axis scaling.

Scenario 1f: Percent of Simulated Monthly Flow Remaining Downstream of North System Diversions Assuming South System Import of Unused North System Potential Diversions and Felton Diversions as Permitted



Scenario 1g2: Percent of Simulated Monthly Flow Remaining Downstream of Felton System Diversions Assuming South System Import of Unused Permitted Felton System Diversions



Monthly Results for Base Case and Scenarios 2c, 3c, and 4, WYs 1970-2017





Scenario 3c: Percent of Simulated Monthly Flow Remaining Downstream of Felton System Diversions

On the basis of reasonably good calibration to the historical record (Section 6.2), the procedure described in Section 6.1 is used to simulate a base case and 22 conjunctive use alternatives documented in Section 6. As intended, the results are suitable for a planning-level evaluation of conjunctive use alternatives, i.e., to help qualify fundamental differences between alternatives. These scenarios are simulated under optimal, hypothetical conditions without full regard for infrastructure and other operational limitations, and as such likely overestimate potential yields. The actual yield of modified infrastructure will depend on numerous factors beyond the scope of this analysis. The presented values of simulated monthly flow have limited precision and should not be used to evaluate compliance with specific regulatory, water-right, or habitat requirements. Evaluating the effects of groundwater pumping on streamflow, beyond the simple approach used for this study, requires use of a calibrated numerical groundwater flow model, which was not within the scope of this study.

Figure 7-1 provides a summary of the base case and alternative conjunctive use scenarios evaluated in Section 6. The upper three stacked-bar charts represent simulated average annual North, Felton, and South system water production, indicated by source, for WYs 1970–2017. These plots also indicate percent reductions in groundwater pumping and compliance with Felton system water rights. The bottom bar chart indicates average annual amounts of unused stream diversions and Loch Lomond allotment for each scenario.

The bar charts presented in Figure 7-2 compare the minimum percentage of monthly streamflow simulated to remain downstream of SLVWD's diversions for each scenario during the simulation period. The bar charts in Figure 7-3 compare the minimum percentage of estimated drought stream baseflow remaining as a result of the groundwater pumping assumed by each scenario.

The simulation results summarized in Figure 7-1 support the following observations:

- Potential water transfers using the system interties are insufficient to achieve Felton water rights compliance (Scenario 1a). The North system has no unused potential diversions during months when the Felton system is not in compliance. Increased production from the Pasatiempo wells for transfer to Felton would require locally unprecedented rates of production from an overdrafted aquifer. A supplemental source, such as imports from Loch Lomond (Scenario 2), may be needed as much as 23 percent of the time to comply with Felton system water rights.
- Estimated increases in water production with assumed increases in diversion capacity (Scenarios 1c, 1d, 1e) are highly approximate but indicate the potential for increased yields with increased diversion, conveyance, and treatment capacities.
- South system imports of North and/or Felton system unused potential diversions allows 30 to greater than 50 percent reductions in South system groundwater pumping (e.g., Scenario 1h2).
- Supplementing the North system's water supply with Felton system unused potential diversions provides a 20 percent overall reduction in North system groundwater pumping (e.g., Scenario 1i).
- Supplementing the North system with extractions from an ASR project supplied by North and/or Felton unused potential diversions hypothetically allows roughly 30 to 60 percent net reductions in overall North system groundwater pumping (Scenario 3).
- Use of SLVWD's Loch Lomond allotment allows the Felton system to comply with its permitted water rights as well as reduce South system groundwater pumping by roughly 60 to 70 percent; as a result, unused potential diversions from the North and Felton systems are available for ASR instead of being used for South system in-lieu recharge (e.g., Scenario 3c).
- A 60 to 70 percent reduction in South system groundwater pumping as a result of imports from Loch Lomond and/or unused potential diversions

represents a significant contribution to SMGB groundwater storage recovery. The degree to which SLVWD could recover this storage is uncertain.

- Using the system interties to supply the South system with unused potential diversions uses roughly 40 and 50 percent of North and Felton system unused diversions, respectively.
- With the addition of a Loch Lomond supply, use of North and Felton unused potential diversions requires ASR. As simulated under optimal conditions, ASR uses roughly half of the remaining unused diversions and helps reduce North system groundwater pumping by roughly 30 to 60 percent (Scenario 3).
- The remaining North and Felton system potential unused diversions (i.e., exceeding the capacity of the hypothesized ASR project) are assumed available for export to SVWD (Scenario 4), averaging more than 150 afy and ranging up to 500 afy assuming a conveyance capacity of 350 gpm, which further contributes to the recovery of SMGB groundwater storage. The degree to which this increased storage benefits production from the SLVWD Pasatiempo wells is uncertain but likely limited.

The simulation results summarized in Figures 7-2 and 7-3 support the following observations:

- Complying with the Felton system water rights (Scenario 1a) notably increases the minimum percentages of flows remaining downstream of diversions, particularly for Bull Creek (see also Figure 6-11).
- Stream diversions for in-lieu recharge and ASR occur during high-flow periods and have relatively little effect on minimum flows remaining downstream of the diversions (e.g., see also Figures 6-12 and 6-13).
- Reduced groundwater pumping as a result of imports from Loch Lomond and the transfer of unused diversions increases the percentage of drought minimum baseflows estimated to remain in lower Newell, Zayante, and Bean

creeks to 60 to 80 percent, compared to roughly 50 percent or less for the base case (Tables 5-3, 6-6, and 6-11).

In summary, system interties combined with supplemental water supplies from Loch Lomond and/or an ASR project provide SLVWD with significant options and flexibility for increasing conjunctive use and improving stream baseflows. The results provide qualitative indications of the potential relative magnitude and effects of the various alternatives considered. Further application of this work is expected to occur in the context of in-stream flow objectives recommended by fishery biologists.

Given an apparent range of potentially successful options for increasing conjunctive use, alternatives selection may be expected to depend largely on cost, feasibility, and the recommendations of fishery biologists. For example, importing from Loch Lomond may be significantly easier, less costly, and more predictable to operate than an ASR project. Operational experience from implementing a relatively feasible alternative will guide the potential adoption of additional conjunctive use measures. Logistical, water rights, and environmental considerations, combined with the highly approximate nature of the alternative conjunctive use simulations presented in this assessment, limit the basis for formulating recommendations based on the simulation results alone.



Import of unused Felton system diversions for in-lieu recharge

ASR extraction of recharged North system unused stream diversions

ASR extraction of recharged Felton system unused stream diversions

Import of unused North system diversions for in-lieu recharge Import of unused Felton system diversions for in-lieu recharge

1f. South system imports North system unused potential diversions for in-lieu recharge.

1g2. South system imports Felton system unused potential diversions for in-lieu recharge.

1h2. South system imports unused potential diversion from North and Felton systems.

1i. North system imports Felton system unused potential diversions for in-lieu recharge.

1j. Scenario 1i plus South system imports unused potential diversion from North and Felton systems.

2a. North and Felton systems import from Loch Lomond to satisfy unmet demand in Scenario 1a.

2b. Scenario 2a plus South system imports from Loch Lomond for in-lieu recharge

2c. Scenario 2b plus South imports North unused diversions, and North imports Felton unused diversions.

3a. Scenario 2b plus North system operates Olympia area ASR using North system unused diversions.

3b. Scenario 2b plus North system operates Olympia area ASR using Felton system unused diversions.

4. Scenario 3c plus SVWD imports North and Felton system remaining unused potential diversions

Figure 7-1 Summary of Base Case and Alternative Conjunctive Use Scenarios, Simulated Annual Averages, WYs 1970-2017




Agenda: 2.7.19 Item: 10c



65%

65%

Peavine Creek

Foreman Creek

Calculated monthly as: (diversions) ÷ (total flow + base case diversions)

Boulder Creek

Clear and Sweetwater Creeks





-33%

87%

-33%

87%

Fall and Bennett Creeks

*Considers effects of SLVWD stream diversions only.

Bull Creek

Source: Tables 6-10 and 6-11

San Lorenzo River at Big Trees



Figure 7-2 **Minimum Percent of Simulated** Monthly Flow Remaining Downstream of Diversions, WYs 1970-2017



Mininum Percent of Drought Monthly Baseflow Remaining as a Result of Groundwater Pumping

*

8 References

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MINUTES BOARD OF DIRECTORS SAN LORENZO VALLEY WATER DISTRICT AGENDA January 17, 2019

MISSION STATEMENT: Our Mission is to provide our customers and future generations with reliable, safe and high quality water at an equitable price; to create and maintain outstanding service and community relations; to manage and protect the environmental health of the aquifers and watersheds; and to ensure the fiscal vitality of the San Lorenzo Valley Water District.

Thursday, January 17, 2019 at 5:00 p.m., SLVWD, 13057 Highway 9, Boulder Creek, CA

- Convene Meeting 5:04 pm Roll Call: Dir. Fultz, Dir. Swan, Dir. Bruce, Pres. Henry. Dir. Smallman-absent Staff: District Manager R. Rogers, District Counsel G. Nicholls, District Secretary H. Hossack
- 2. Additions and Deletions to Closed Session Agenda: None
- 3. Oral Communications Regarding Items in Closed Session: None
- 4. Adjournment to Closed Session
 - a. CONFERENCE WITH LEGAL COUNSEL- EXISTING LITIGATION Government Code Section 54956.9(d)(1)
 Vierra v. San Lorenzo Valley Water District, et al. (Santa Cruz Superior Court Case No. 18CV00890)
 - b. CONFERENCE WITH LEGAL COUNSEL- EXISTING LITIGATION Government Code Section 54956.9(d)(1) Holloway v. Showcase Realty Agents, Inc. et al. (Santa Cruz Superior Court Case No. CV180394; 6th District Court of Appeal Case Nos. H043704, H043492).
 - c. CONFERENCE WITH LEGAL COUNSEL- ANITICIPATED LITIGATION Government Code Section 54956.9(d)(2) One Case
- 5. Convene to Open Session at 6:00 p.m.
- 6. Report of Actions Taken in Closed Session

The Board voted in closed session - four in favor, zero against, with Director Smallman absent - to stop providing any and all further defense of former Director Terry Vierra in connection with the case of Holloway v. SLVWD, Vierra, et al. The Board finds that an actual and specific conflict of interest has arisen because Plaintiff Holloway recently filed a motion for summary judgment seeking over \$800,000 for the District at Mr. Vierra's expense.

7. Roll Call: Dir. Fultz, Dir. Swan, Dir. Bruce, Pres. Henry, Dir. Smallman arrived at 6:02

Staff: Dist. Mgr. R. Rogers, Dist. Counsel G. Nicholls, Environmental Programs Mgr. J. Michelsen, Dir. of Finance & Business Services S. Hill, Dir. of Operations J. Furtado, Dist. Sec. H. Hossack

- 8. Additions and Deletions to Open Session Agenda: Move 11d to beginning of meeting.
- 11. d. SANTA MARGARITA GROUNDWATER AGENCY JOINT POWERS AUTHORITY GUIDING PRINCIPLES & SUSTAINABLE AGENCY ROLES AND RESPONSIBILITIES

Introduction by J. Michelsen

Presentation by Dave Ceppos regarding the SMGWA - JPA guiding principles & sustainable agency roles and responsibilities.

Dir. Smallman asked what SMGWA can recommend, as a best solution, if they decide to build infrastructure to increase water production and water storage, like storm water collection and also building reservoirs? How can our agency fund these projects? How can SMGWA put pressure on our neighboring agencies to pursue the most cost effective projects in production and storage.

D. Ceppos responded-SMGWA has the authority to pursue whatever projects it decides it wants to pursue. At this time there is some new funding that came from Prop 68. Local Bonds and State Bonds will probably also become available. Nothing mandates working with neighboring agencies.

Dir. Bruce asked about the value of eco system services in a groundwater recharge conductive state, facilitating groundwater recharge, stream flow recharge so that you're promoting sustainable water land use though some kind of reward

D. Ceppos responded-that type of thinking is happening in a lot of places. The Water Resources Control Board is looking for a basin (SMGWA) to show that they have to tools to control sustainability.

B. Holloway-Boulder Creek yelled "Fire".

Unidentified man asked if there are requirements for de minimis.

D. Ceppos responded that there are between 8,000 and 10,000 wells that qualify for de minimis. Collectively that is a lot.

D. Loewen asked if as a regulatory agency has any power to lobby for better funding.

D. Ceppos responded yes.

B. Holloway asked if Mr. Ceppos knew anything about the Felton Water Permit or State water policy rights.

Unidentified woman asked if Mr. Holloway has a question.

Pres. Henry said we are not going to have a conversation between people in the public. She asked Mr. Holloway to please wrap it up.

B. Holloway continued to talk for another 1+ minutes.

D. Ceppos respectfully disagreed with Mr. Holloway.

J. Ricker-Santa Cruz County added that the City of Santa Cruz gets about 40% of its water supply from the Santa Margarita Basin and tributaries of the San Lorenzo.

Presentation by Dave Ceppos of Santa Margarita Groundwater Agency Guiding Principles.

V. Champlin asked if the Guiding Principles can be changed.

D. Ceppos responded yes. He added that the Guiding Principles are available on the SMGWA website and he plugged the SWGWA educational program.

- 9. Oral Communications: None
- 10. Unfinished Business:
 - a. BOARD POLICY MANUAL

Pres. Henry introduced this item. She said that she would like to move that we vote to accept the policy manual with a change about the times of the meetings. Closed Session will be at 5:30 and Open Session at 6:30, even if there is not a Closed Session, Open Session will always be at 6:30.

Dir. Fultz asked for clarification that she was asking for the documents that he submitted be the documents that the Board work on tonight and potentially pass tonight.

Pres. Henry agreed that that is what she wanted to do.

Dir. Fultz suggested a different approach, that the Board go through the document, edit by edit and make that change when we get to it. Pres. Henry disagreed, she said we on short on time.

Dir. Fultz reworked the document to reflect Pres. Henry's request. Pres. Henry said that we can always make edits on the Board Policy Manual, we can bring it up at every month.

Dir. Fultz asked if there are any other edits. He made a motion to adopt the Resolution...

Dir. Smallman asked about Board stipends. He also asked about committee members and that the term for public members. He noted that the District had not advertised for the Environmental Committee public member. He would like to clear up the term of a public member on a committee.

Pres. Henry said that we would be interviewing for other committees. Dir. Fultz agreed that the not advertising for the Environmental Committee was an oversight and that the Environmental Committee should be advertised. Dir. Fultz made a motion the Resolution No. 26 (18-19) that the Board adopt the Board Policy Manual 2019 based upon Exhibit A with edits by Bob Fultz, Director and that's the one we're going to pass, with edit to the time change.

Dir. Smallman seconded the motion.

DM Rogers asked if the Board was adopting the complete edited version and not address all of the other changes?

Dir. Fultz said it's adopting the entire edit.

DM Rogers said that they haven't discussed a lot of the sections. Pres. Henry, Dir. Fultz and DM Rogers said that the motion can be made

and seconded and there can still be discussion.

Dir. Fultz described the edits he made to the document.

Pres. Henry asked for comments from the public.

B. Holloway-Boulder Creek addressed the Board regarding Robert's v. Sturgis and quorum for committees.

Pres. Henry requested a vote on the motion.

All present voted in favor of the motion. Motion passed.

11. New Business:

Members of the public will be given the opportunity to address each scheduled item prior to Board deliberations. The Chairperson of the Board may establish a time limit for members of the public to address the Board on agenda items.

a. REVIEW ALL COMMITTEES AND MAKE PUBLIC APPOINTMENTS This item was introduced by Pres. Henry. She addressed the LADOC regarding oversight. She then addressed J. Gomez to say that one of the changes to the Board Policy Manual will be a public member cannot be on 2 committees.

Pres. Henry said that J. Gomez' time on the Environmental Committee will be over at the end of January 2019. She requested that staff immediately send out a request for applications to the Environmental Committee. She said she is very happy with the number of applicants for the committee and that applicants don't have to agree with everything but if you don't agree with the Board's platforms you probably shouldn't apply. Everyone is welcome to apply. They will not turn anyone away that doesn't necessarily agree with them.

Dir. Fultz asked for clarification on what committee they are talking about now.

Pres. Henry said that she is talking about the Environmental Committee.

Dir. Fultz said we should put out an advertisement for Environmental applications.

DM Rogers said we could bring the applicants to the 1st meeting in March (March 7, 2019).

Pres. Henry agreed. She said that we will be looking at all committee members in December or January, including the March appointee.

DM Rogers asked if that would be clarified in the Board Policy Manual. He questioned if the LADOC would be reviewed yearly also. Pres. Henry said no.

Dist. Sec. Hossack asked for clarification regarding a replacement committee member.

Pres. Henry said that replacement committee members will only serve for the time left on the 1 year term but they may reapply.

Dir. Smallman he thinks if somebody is appointed in Sept. or Nov. he thinks that term should be for another year. He agrees that a public member should not be on more than one committee.

Pres. Henry said that discussion is for another time.

Dir. Fultz asked are we now focused on appointing someone to the LADOC.

Pres. Henry said she was just reviewing the 2 committees that we have one person on.

B. Holloway said that the committees should follow the same rules as the directors.

T. Nelson thinks that the person should be allowed to stay for the full year term.

Pres. Henry said we're not saying that we will take them off but they can reapply.

R. Moran said he didn't resign from the Environmental Committee, he just didn't reapply.

C. Baughman asked how Pres. Henry came to the conclusion that the Board wouldn't allow someone to be on 2 committees. It hasn't come before the Board for discussion.

Pres. Henry said that she said it was a possibility and that there are going to be changes made. When Jenni was appointed to both committees there was nothing to say she couldn't be on both but there was also nothing to say she could. Pres. Henry felt there were some real shenanigans going on that C. Baughman was involved in.

C. Baughman asked Pres. Henry to clarify.

Pres. Henry said there was a good applicant for the LADOC but C. Baughman brought in 2 ringers and then voted for J. Gomez, J. Wright and D. Lynch and not the person that was most qualified. That's what she called shenanigans.

C Baughman said that was the judgement of the Board at that time. Pres. Henry that is her judgement.

Several people were talking over one another.

C. Baughman questioned if Pres. Henry is asking Jenni now. Pres. Henry said she is just telling her it happened and no she is not telling her to make a decision now. She's just saying it could happen. C. Baughman said he thinks they should bring back the discussion of whether you're changing that rule before you ask somebody to make a decision.

Pres. Henry said it will be discussed. She was letting J. Gomez know what might happen.

J. Gomez took exception to the "ringer" comment. It is untrue and unnecessarily inflammatory.

Pres. Henry disagreed. She said one of the guys said, at the meeting, that he had his arm twisted to be there.

Dist. Counsel Nicholls interrupted for Brown Act reasons and asked Pres. Henry to refocus on the committee appointments.

Pres. Henry agreed and introduced the Administrative Committee.

A. Benkert said he would like to be involved in water and water policy.

C. White said she has legitimate concerns that this Board has no reserves to fund the strategic plan.

Pres. Henry agreed that the strategic plan needs to be looked at.

B. Fultz read excerpts from the applications of T. To and M'Liss Bounds because they were not present. He suggested that 3 people be appointed to the committee. For a total of 5.

Pres. Henry said she would nominate C. White & A. Benkert. She asked if someone else would like to nominate a 3rd person.

Dir. Bruce said that she supports C. White & A. Benkert and would add M. Bounds to the nomination.

Dir. Swan agreed.

Pres. Henry suggested that C. White. A. Benkert and M. Bounds be nominated for the committee.

T. Norton questioned if all of the members would be allowed to vote. It was explained the there is no voting. Committees are advisory only. Pres. Henry said this is an experiment.

T. Norton suggested that one of the 3 be appointed and the other 2 be alternates.

Pres. Henry said that is a good idea but it isn't in the policy.

Dir. Bruce made a motion to appoint A. Benkert, C. White and M. Bounds to the Administrative Committee as the 3 new public members.

B. Fultz seconded.

Dist. Counsel recommended that the motion include mention the new size of the committee.

Dir. Bruce amended her motion to add that those 3 new public members will now constitute a 5-member committee, made up of 2 Board members and 3 public members for the duration of 1 year.

All present voted in favor of the motion. Motion passed.

Pres. Henry introduced the Budget & Finance Committee B. Fultz read excerpts from the applications of L. Hammack and L. Sanders.

Pres. Henry said only 1 person should be chosen because a 4-member committee would be awkward.

Dir. Bruce said the committee is advisory only.

Dir. Fultz made a motion to appoint L. Hammack & L. Sanders as members of the Budget & Finance Committee with a membership of 4. Dir. Smallman seconded.

All present voted in favor of the motion. Motion passed.

Pres. Henry invited applicants for the Engineering Committee to speak.

L. Farris addressed the Board regarding his application.

Dir. Fultz read excerpts from the applications from M. Smolley, S. Miracle, J. Busa and D. Fraser.

Pres. Henry nominated M. Smolley, J. Busa and L. Farris.

Dir. Smallman nominated L. Farris, J. Busa and D. Fraser.

Dir. Bruce echoed Pres. Henry's nominations.

Dir. Swan agreed with Pres. Henry's nominations also.

Dir. Fultz also agreed with Pres. Henry's nominations.

T. Norton-Lompico asked why not take all of them?

Pres. Henry she felt it was too many.

Dir. Fultz made a motion to appoint M. Smolley, J. Busa and L. Farris for a committee membership of 5.

Dir. Swan seconded the motion.

All present voted in favor of the motion. Motion passed.

Dir. Fultz commented that he thinks it's great that so many people applied to participate in the SLVWD committees. The District will be looking for more ways to involve the public.

Dir. Swan questioned if the District responds to the applicants that aren't selected.

DM Rogers responded yes.

Pres. Henry said that everyone can attend committee meetings and participate. Even if they don't have a vote, they still have a voice. Pres. Henry introduce the LADOC

D. Loewen addressed the Board with her qualifications for the LADOC.

Dir. Smallman made a motion to appoint D. Loewen to the LADOC. He noted that the LADOC is a different animal.

Dir. Fultz seconded.

All present voted in favor of the motion. Motion passed.

b.

CALIFORNIA ENVIRONMENTAL QUALITY ACT PIPELINE PROJECT J. Michelsen introduced this item.

Dir. Smallman asked how much this will cost.

J. Michelsen responded that she doesn't have the exact number. We are working with RinCon Associates to do the permitting for the USDA DM Rogers noted that it is all part of the USDA loan package.

S. Hill noted that the original RinCon contract was about \$80,000.

DM Rogers noted that there are other pipelines but these 2 pipelines happen to go through endangered species habitat.

J. Michelsen added that this a mitigated declaration which requires an initial study. The other pipelines will be a negative dec so they will not require an initial study.

Dir. Fultz questioned how much of the pipe will be above ground? DM Rogers responded approx. 99.9% will be underground.

Dir. Fultz questioned what is the expected life of the pipe above ground? DM Rogers doesn't know but will find out.

Dir. Fultz is hoping to use this as a first entry into the new inventory. What is the life span of the report that the District is adopting?

J. Michelsen said she does not believe the report expires.

Dir. Fultz explained that he is asking because if something goes wrong with the USDA.

DM Rogers says that we have a commitment and we're locked in with an interest rate.

Dir. Fultz questioned if the commitment is in writing.

J. Michelsen said that we have an email from them.

DM Rogers said that we signed the final papers the day before the government shut down.

Dir. Bruce noted that even underground pipelines can be vulnerable. Are there pipes can survive catastrophic fire?

DM Rogers HDP you probably could.

Dir. Bruce questioned if the HDP is going above ground for flexibility, does that also cause vulnerability?

DM Rogers responded yes.

Dir. Fultz questioned if there is a difference in price between the HDP and ductile piping.

DM Rogers said he doesn't know without doing a cost analysis.

Dir. Smallman added that HDP is very durable.

Pres. Henry asked Dir. Bruce if she would like to make a motion.

L. Farris added that the cost of the pipe is not substantial but the cost of the installation cost is very substantial.

Unidentified woman said that one of the benefits of larger mains is that it would provide superior firefighting capabilities but if the pipe melted would that impact the ability to fight fires?

Pres. Henry said if we have a forest fire, it will be fought from the air. Structure fires are where the water pipes and fire flow is important.

Dir. Bruce would like to acknowledge that this is actually well done study. Pres. Henry noted that it is like reading 2 novels.

Dir. Bruce made a motion to accept this initial study and open the public comment period

The motion was seconded.

All present voted in favor of the motion. Motion passed.

c. SLVWD PROHIBITION OF GLYPHOSATE

Pres. Henry introduced this item.

Dir. Smallman said that he wants to ban glyphosate and the resolution needs to cross out "until the Integrated Pest Management Plan".

DM Rogers said that the intent was to bring this to the Board and to ban glyphosate but do make the permanent ban through the Integrated Pest Management Plan.

Dir. Smallman is concerned that there is wriggle room in the current wording.

DM Rogers wants to go through the transparent, best practices process. The Board can do want it wants, is that correct Gina?

Dist. Counsel G. Nicholls said yes, it is within the Board's power to ban glyphosate.

J. Michelsen wants to read the memo.

Pres. Henry said she thinks the residents of the San Lorenzo Valley have spoken, they do not want glyphosate used.

J. Michelsen said she is not trying to change your mind I just want you to know that we know a lot about glyphosate. It is probably the most studied chemical ever. Glyphosate is probably carcinogenic. The carcinogenic effects are directly related to exposure.

President Henry stated that a human is a lot larger than a frog. We don't know how it effects the little critters.

J. Michelsen responded when you have a dense patch of an invasive species that are crowding out the habitat of endangered species and you only use the glyphosate on the broom in small doses, studies show, the other species will come back.

Pres. Henry says that she has seen other things that are totally different. She says we need to stop using it and we need to ban the use of it.

DM Rogers injected that we were not planning to debate this tonight. Dir. Swan made a motion to ban it.

Dir. Fultz do we know when we acquired the 14 acres of sandhills habitat? J. Michelsen responded that it was part of the Olympia Watershed in 1977. The District recognized it was an important watershed supply.

Dir. Fultz asked if the 57 acres the only quality sandhills habitat left and are they contiguous.

J. Michelsen explained that there are varying qualities of sandhills habitat. The 57 acres are the Sand Parkland Habitat and she described the area. Dir. Fultz on the calculation for the 1 oz. of glyphosate used per acre, is that a measured amount or an average?

J. Michelsen responded that is an average.

Dir. Fultz questioned the wording of the memo.

J. Michelsen explain the process. It's up to the community to have the public debate.

Dir. Fultz said that he can go either way. To strike the clause about the Integrated Pest Management Plan or not. At the end of the day if the IPMP came back with glyphosate I'd simply move to strike it.

Dir. Smallman said that Dir. Swan made the motion to ban glyphosate. Dist. Counsel Nicholls made a legal clarification; the word forever is essentially irrelevant.

DM Rogers noted that as the Board moves ahead with the IPMP the Board has to look at this piece of property and develop a plan to eradicate the invasive species. Previous Boards have spent thousands of dollars to eradicate invasive species only to have them return because there isn't an ongoing plan.

Dir. Fultz asked if the 14 acres contain our wells.

DM Rogers said no they are not in the middle of the 14 acres.

Dir. Fultz suggested that other organizations might be better suited to manage the property.

S. Hill enquired if our land trust contains this acreage.

J. Michelsen said that part of the 14 acres is in the preserve.

Dir. Bruce said that we must consider our employees, our residents and the landscape that we are stewards of. We need to talk about the costs to

eradicate the broom from the lands we are stewards of through physical means. The Board should consider how much it costs to eradicate the broom using other means and how much it costs to use glyphosate. The local hardware store sells gallons of Roundup compared to the 16 ounces the District used in 2 years. The County and Caltrans use the stuff by the truckload. This needs to be brought into the conversation, let's acknowledge the long term stewardship costs.

Unidentified woman said that she spoke to Mark Stone about this issue. He told her that he got glyphosate banned in the County. She questioned alternatives to glyphosate.

R. Moran explained his opinion on glysophate. He wants non conditional ban on glysophate.

J. Gomez explained her opinion said that she is not pro glysophate, she is pro Sandhills Parkland.

L. Summers-Boulder Creek described her experience pulling broom. She said that she doesn't advocate for glysophate but in some instances it is useful.

Suzanne Schettler-Ben Lomond said that the cancer related to glysophate is caused by careless contact, not using protective equipment. She questioned if anyone has tested the water for glysophate.

DM Rogers said that the water has been tested with not sign of residual glyphosate. J. Michelsen concurred.

D. Loewen-Lompico shared her opinion on glysophate use. She encouraged the Board to ban glysophate completely.

V. Champlin-Brookdale said that there are already glyphosate resistant plants. A choice should be based on science.

T. Nelson just because someone is opposed to glyphosate doesn't mean they are against the sandhills habitat. Stop using until all of the tests are completed.

C. Baughman what are you going to do instead of glyphosate? It has been suggested that funds should not be spent on protecting these precious ecosystems. Our mission includes protection of the watersheds as well as providing water. The Board should develop a plan to get rid of the broom, if not with glyphosate, then with something else.

L. Farris requested that the District post the glyphosate testing.

C. White-Ben Lomond what are the long term costs of eradicating the broom.

Pres. Henry questioned how we pay for glyphosate. She has seen many species disappear. No one knows what glyphosate can do. She knows that the broom needs to be dealt but would like to see the Board ban glyphosate tonight.

Dir. Smallman said he is probably the only person here tonight that has bid this kind of work. He said it is a negligible difference in cost between pulling broom and using glysophate. His plan is to do small areas of pulling with a pull permit and a careful biological monitor.

Dir. Swan made a motion to ban glyphosate and strike the language on the resolution saying *until the Integrated Management Plan is completed*. Dir. Smallman seconded.

4 Directors voted in favor of permanently banning glyphosate, Dir. Bruce voted no. Motion passed.

- 12. Consent Agenda:
 - a. MINUTES FROM BOARD OF DIRECTORS MEETING JANUARY 3, 2019
 Consideration and possible action by the Board to approve minutes from the January 3, 2019 BoD meeting. The minutes were approved.

13. District Reports:

No action will be taken and discussion may be limited at the Chairperson's discretion. The District encourages that questions be submitted in writing (<u>bod@slvwd.com</u>) on items listed in the District Reports. Questions submitted, if any, will be posted in the next available District Reports, along with a reply.

DEPARTMENT STATUS REPORTS

Receipt and consideration by the Board of Department Status Reports regarding ongoing projects and other activities.

- o Administration/Engineering
- o Finance
- o Environmental
- o Operations
- Legal

R. Rogers introduced this item.

Dir. Bruce asked about LAFCO and the Bear Creek Wastewater.

DM Rogers said that he was contacted by LAFCO because they are going to commission a study on the Bear Creek Wastewater and some other facilities throughout the County.

B. Fultz said he would like to get the engineering study done for BCEWW in an expedited fashion.

J. Michelsen asked that Dir. Fultz phone her so that they can make sure his questions are being answered.

Dir. Smallman added to the BCEWW conversation.

DM Rogers responded thinks once some work is done and the system is upgraded it will be a more palatable situation.

S. Hill added that USDA loan was locked in at the 4% rate.

Dir. Swan asked about the payments to Don Alley.

J. Michelsen said that by payments are not monthly but project specific.

Dir. Swan continued with a question about the Fall Creek Fish Passage, what was that for?

J. Michelsen responded that the District contracted with him a while ago and he finally completed the project.

Dir. Swan questioned if we cross charge other agencies for his services.

J. Michelsen explained that he was working on our project, no other agencies were involved. There are other projects for which we are collaborative.

Dir. Swan continued to question other invoices.

Dir. Fultz questioned the Written Communications, have we responded to Sharon Tapper?

DM Rogers said that she was responded to, all water quality concerns are responded to.

L. Farris asked about the UCSC Climate Change Symposium. Dir. Bruce said the information will be on the Feb. 7th BoD.

- COMMITTEE REPORTS
 - o Future Committee Agenda Items
 - Committee Meeting Notes/Minutes
- 14. Written Communication:
 - o Email from S. Tapper
 - Email from M. Lee

15. Informational Material: None

16. Adjournment 9:44 pm

Holly Hossack

From: Sent: To: Cc: Subject: Attachments: BRUCE HOLLOWAY <b3r1h@comcast.net> Monday, January 14, 2019 2:31 PM Board of Directors Gina R. Nicholls Letter to Board of Supervisors about SLVWD conflict-of-interest code Part_1.html

Hello:

Attached is a letter I wrote to the county Board of Supervisors about the proposed SLVWD conflict-ofinterest code. It has taken years to establish that the SLVWD board members are subject to section 87200, so don't expect me to drop it.

Regards, Bruce

891 Elsie Mae Dr. Boulder Creek, CA 95006

January 14, 2019

The Honorable Board of Supervisors 701 Ocean Street, Room 500 Santa Cruz, CA 95060

Dear Supervisors:

Item 37 on your January 15 consent agenda regards a proposed conflict-of-interest code for the San Lorenzo Valley Water District that conflicts with a decision by our local superior court. Attached is the court's Statement of Decision in the case Holloway v. Vierra. It found (on pages 1, 2-3) that members of the board of directors of SLVWD are "public officials who manage public investments" as described in section 87200 of the Political Reform Act.

The judgment was appealed to the Court of Appeal in San Jose, fully briefed and ordered submitted, so an opinion will certainly issue within the next couple of months. The SLVWD board was aware of the controversy when they approved their revised code in September, and didn't want to be subject to section 87200. A new board majority took office last month and hasn't had time yet to consider another revision.

Also attached is page 115 of the Candidate Manual prepared for the last election by our county Elections Department. It refers specifically to section 87200 and says candidates for special districts like SLVWD must file Form 700. The Elections Department relies on your County Counsel for legal advice, so I infer that at least once upon a time, the County Counsel's office agreed with the superior court and me.

Subdivision 87302(a) of the PRA says conflict-of-interest codes must enumerate positions within the agency "other than those specified in section 87200". To follow the superior court's Statement of Decision, either SLVWD board members should be omitted from the conflict-of-interest code or the code should be annotated to indicate that board members are subject to section 87200.

The latter is what our Library does and Appendix A of the Library's conflict-of-interest code approved by your board on May 10, 2016, is further attached. As well as board members, the Library's conflict-of-interest code notes that its Library Director and Treasurer are 87200 filers.

I believe SLVWD's District Manager should be an 87200 filer just as the board of directors, but it isn't clear to me that SLVWD's Director of Finance must be an 87200 filer because that position is subordinate to the District Manager. Section 87310 states that if duties are "broad or indefinable" the position shall be subject to "the requirements of Article 2", which is to say, section 87200.

One reason this matters is that 87200 filers are subject to section 87105, which says such public officals must recuse themselves and "Publicly identify the financial interest that gives rise to the conflict of interest or potential conflict of interest in detail sufficient to be understood by the public..."

Members of your board understand this because county supervisors are expressly listed in section 87200. But one SLVWD board member recused himself in 2016 and refused to say why. The Fair Political Practices Commission declined to enforce section 87105 because it couldn't tell from the SLVWD conflict-of-interest code whether a member of the board of directors was an 87200 filer. (A sheaf of correspondence is available upon request.)

SLVWD has already been non-compliant with the PRA by failing to do the biennial review of its conflict-of-interest code in 2016 according to subdivision 87306.5(a). Nor did it submit a written statement in 2016 to your board, the code-reviewing body, that no change was required according to subdivision 87306.5(b). Since then, SLVWD hired a new District Counsel, sued its old District Counsel, and recently its District Manager resigned in disgrace after wasting over \$250,000 of taxpayer funds on legal expenses defending a former board member's conflict of interest. Please annotate Exhibit 1 of the SLVWD's proposed conflict-ofinterest code to show that board members and the District Manager are 87200 filers and return it to them. That will resolve the controversy. Otherwise please table this until the Court of Appeal issues its opinion.

Your board hasn't reviewed SLVWD's conflict-of-interest code since 2014 so the opportunity for a resident of the jurisdiction to get it corrected is rare when there's a self-interested, self-protecting, SLVWD board of directors. If your board takes action contrary to the superior court's finding, our County might wind up wasting Measure G funds on unnecessary litigation pursuant to section 87308.

Sincerely yours,

Bun Hollowy

Bruce Holloway

Cc: County Counsel

1 2		JAN 0 4 2017 ALEX CALVO, CLERK	
3	DEPUTY, SANTA CRUZ COUNTY		
4			
5	SUPERIOR COURT OF CALIFORNIA,		
6	COUNTY OF SANTA CRUZ		
7			
8	BRUCE HOLLOWAY,	Case No. CV180394	
9	· Plaintiff,	STATEMENT OF DECISION	
10	VS.		
11			
12	VALLEY WATER DISTRICT;	Trial Date: 12/13/16 Time: 10:00 AM	
13	SHOWCASE REALTY AGENTS, INC.; GREGORY DILDINE: EDWIGE	Dept.: 4 Filed: 11/7/14	
14	DILDINE; and DOE 1 to 25,		
15	Defendants.		
16	Having reviewed the parties Proposed Statements of Decision and objections the Court		
17	announces its Statement of Decision. The trial in this matter came on regularly for bench trial at		
18	the above noted time and courtroom, the	Honorable John Gallagher presiding. Gary	
19	Redenbacher appeared on behalf of Plaintiff, Bruce Holloway. Marc Hynes appeared on behalf		
20	of Defendant Terry Vierra. After consideration of the testimony and evidence provided at trial		
21	the Court announces this Statement of Decision in favor of the plaintiff. Bruce Holloway and		
22	against defendant, Terry Vierra.		
23	Mr. Holloway is a citizen taxpayer who brought this action under the Political Reform		
24	Act that prohibits public officials from self dealing, conflicts of interest or profiting from		
25	governmental decisions. He alleged that Mr. V	Vierra, then a director of the San Lorenzo Valley	

Water District (District), made, participated in or influenced a governmental decision to
 purchase a property in which he knew he had a financial interest and for which he received an
 economic benefit in violation of Government Code § 91005(b). That section reads, "Any

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STATEMENT OF DECISION 1

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1 designated employee or public official specified in Section 87200, except an elected state 2 officer, who realizes an economic benefit as a result of a violation of Section 87100 (making, 3 participating or using position to influence decision where one has a financial interest) or of a 4 disqualification provision of a conflict of interest code is liable in a civil action brought by the 5 civil prosecutor or by a person residing within the jurisdiction for an amount up to three times 6 the value of the benefit."

The Court finds that the plaintiff met his burden of proof on all the elements of his cause of action under Government Code § 91005(b).

The elements to be proven were:

1. Terry Vierra was a public official;

2. Terry Vierra participated in, made, or influenced a governmental decision in which;

3. Terry Vierra had a financial interest in the decision, and;

4. Terry Vierra realized an economic benefit.

The elements of financial interest and receiving an economic benefit

17 Mr. Vierra admitted in testimony that he had a financial interest in the decision to purchase the property at 1130 Rebecca Drive, Boulder Creek. He and his wife were owners of 18 the real estate agency listing the property and his wife was the listing agent of the property. He 19 also admitted that he realized an economic benefit when his company and wife received a 20 commission from the sale of the property to the District. 21

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The element of "a public official"

The Court finds there is no question that Mr. Vierra was a public official as that is 23 defined under Government Code § 87200. That section defines a public official, for our purposes, to include those who manage public investments. The purchase of the land in 25 question was an investment of public funds by the District which allowed it to adjust property 26 lines with an adjoining property where District tanks were partly located but encroached on the subject property. Following the boundary adjustment the District sold the subject property, 28

STATEMENT OF DECISION 2

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making the purchase/sale funds available for other District purposes. The purchase, alteration and sale of the subject property were decisions managing public investments

Several of Mr. Vierra's fellow directors testified that the board formulated and approved the board's investment policy on an annual basis. Corroborating the testimony of the directors was the board's policy manual which states that the board is responsible for "all District finances" including establishing written guidelines for the investment of all the District's funds.

The element of making or participation in a governmental decision

Plaintiff introduced five actions he claimed as making a decision or participating in a
 governmental decision: providing the district manager with information about the property in
 an email, directing an action to vote on expenditures for the purchase of the property and voting
 to approve expenditures for the property on three separate occasions.

12 While defendant did not deny these actions, he sought to reduce some of them to 13 ministerial acts. His fellow board members testified, for example, that the voting was not 14 discretionary. The board minutes, however, reflected those who voted for, against, abstained or 15 were absent, indicating that there was discretion. One of the most important ways that elected officials make or participate in governmental decisions is by voting at public meetings to 16 approve, disapprove of or abstain from making public decisions. Voting on government 17 decisions is what public officials are elected to do. Mr. Vierra should not have voted on those 1.8 matters related to the property. 19

And although Mr. Vierra and his fellow board members tried to minimize his participation, the courts have stated, regarding the Political Reform Act, "It is not just actual improprieties which the law seeks to forestall but also the appearance of possible improprieties" <u>*Witt v. Morrow*</u> (1977) 70 Cal. App. 3d 817, 823. <u>*Hamilton v. Los Gatos*</u> (1989) 213 Cal. App. 3d 1050, 1058. This is to promote public confidence in our government officials.

Evidence

All of Plaintiff's exhibits 1 to 23 are admitted into evidence. Defendant's exhibits, with the exception of exhibit K and AA, are admitted into evidence. The Court takes judicial notice as requested by plaintiff and defendant.

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STATEMENT OF DECISION

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Remedy

The remedy for a violation of Government Code § 91005 is contained in § 91005(b): any public official "who realizes an economic benefit as a result of a violation of Section 87100" is liable "for an amount up to three times the value of the benefit."

Government Code § 91009 goes on to state, "In determining the amount of liability
 under Sections 91004 or 91005, the Court may take into account the seriousness of the violation
 and the degree of culpability of the defendant. If a judgment is entered against the defendant or
 defendants in an action brought under Section 91004 or 91005, the plaintiff shall receive fifty
 percent of the amount recovered. The remaining fifty percent shall be deposited in the General
 Fund of the state."

This Court does not believe that the defendant had evil intent in violating 91005 and finds that it is not necessary to set the maximum fine. Still, the legislature has set strict guidelines to prevent conflicts of interest with public officials and the Court cannot ignore the law.

The Court exercises its discretion in making an award against Terry Vierra in the amount of his wife's commission, \$9,004.50, plus 11.4% of \$3,001.50, \$342.17. \$3,001.50 represents the commission paid to Mr. Vierra's real estate agency. 11.4% represents Mr. Vierra's and his wife's ownership interest. Total award, therefore, is for \$9,346.67. Of this amount, Mr. Vierra is ordered to pay 50%, or \$4,673.34 to the state's General Fund and \$4,673.33 to Mr. Holloway pursuant to Government Code § 91009. Plaintiff's counsel is to prepare a separate form of judgment.

22 Dated: 1/4/16 23 24

JOHN GALLAGER Judge of the Superior Court

STATEMENT OF DECISION 4

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Form 700: Disclosure of Economic Interests

Who Must File

State law (the Political Reform Act of 1974) requires candidates for school and special districts to disclose their interests in real property and income within the past 12 months in a Statement of Economic Interests (Form 700) to be filed with the Declaration of Candidacy and candidates appointed to an office file within 30 days after assuming office. (Gov. Code §87200, et. seq.)

Candidates for city council are required to file with the City Clerk a Statement of Economic Interests (Form 700) with their Declaration of Candidacy.

EXCEPTION: This statement is not required of a candidate who has filed a statement for the same jurisdiction as an officeholder within sixty (60) days prior to assuming office or filing the Declaration of Candidacy. (Gov. Code §87201, 87202)

Persons elected to school and special districts who must file a Statement of Economic Interests with their Declaration of Candidacy will be required to file a second statement for their annual statement due on April 1, 2019.

Candidates for federal offices file under federal rather than state disclosure laws. For information, candidates for U.S. Representatives should write to: Office of the Clerk of the House of Representatives, 1036 Longworth House Office Building, Washington D.C., 20515 202-224-3121.

Every person who is elected to an office specified in Section 87200 shall, within 30 days after assuming the office, file a statement disclosing his or her investments and his or her interests in real property held on the date of assuming office, and income received during the 12 months before assuming office. (Gov. Code §87202(a))

What Must be Disclosed

Under state law, persons filing economic interests statements as candidates are required to disclose investments and interests in real property and income within the past 12 months. (Gov. Code §87201, 87203)

When and Where to File

Candidates who must file may obtain forms and instructions from the Santa Cruz County Elections Department. The Form 700 must be filed with the Elections Department with their Declaration of Candidacy. Declarations of Candidacy are filed between July 16 and August 10.

If the statement is filed after the deadline, candidates may be penalized up to \$10 per day up to a maximum of \$100. Late filing penalties can be reduced or waived under certain circumstances. Santa Cruz County filers should obtain a copy of the "Late Filing Policy" from the County Elections Department. (Gov. Code §87201, 87500)

Statements Are a Public Record

Statements of Economic Interests are a public record. They may be inspected by anyone and copies may be purchased from the filing officer for 10 cents per page. (Gov. Code §81008)

APPENDIX A

Schedule of Designated Positions and Their Disclosure Categories

DESIGNATED POSITIONS	DISCLOSURE CATEGORY
DIRECTORS	Govt.Code §87200
COMMISSIONERS	1
DIRECTOR OF LIBRARIES	Govt.Code §87200
TREASURER-CONTROLLER	Govt.Code §87200
DIVISION MANAGER SYSTEM SERVICES	1
DIVISION MANAGER PROGRAMS &	4
PARTNERSHIPS	
DIVISION MANAGER ONSITE SERVICES	4
DIVISION MANAGER COLLECTION	3
MANAGEMENT SERVICES	
MANAGEMENT ANALYST	3
LIBRARY INFORMATION TECHNOLOGY	3
MANAGER	
ASSISTANT ONSITE SERVICES MANAGER	3
LIBRARIAN II – SELECTION	3
LIBRARIAN II – SELECTION	3
LIBRARIAN II – SELECTION	3
LIBRARIAN II - CATALOGING/SELECTION	3
VIRTUAL SERVICES LIBRARIAN	3
LEARNING SYSTEMS COORDINATOR	3
VOLUNTEER COORDINATOR	3
FIELD SERVICE CREW LEADER	3
LEGAL COUNSEL	1
SPECIFIED CONSULTANTS	1
Theory and the statility of the state of the	
Those consultants likely to participate in the	
making of a governmental decision as determined	
by the Director of Libraries or Board of Directors	
in writing.	

Agenda: 2.7.19 Item: 12.1

Holly Hossack

From: Sent: To: Subject: Mark D. Lee <mdlee4125@gmail.com> Saturday, January 26, 2019 2:35 PM Board of Directors Lake Nacimiento group sues county, water agency for \$120 million over water levels -Monterey Herald 1/25/19

Lake Nacimiento group sues county, water agency for \$120 million over water levels

Jim Johnson, Monterey Herald 1/25/19

SALINAS — A Lake Nacimiento property and business owners group has sued Monterey County and the county Water Resources Agency for at least \$120 million alleging mismanagement of the lake's water levels has harmed recreation and property values.

In a lawsuit filed in San Luis Obispo County Superior Court on Jan. 15, the Atascadero-based non-profit Nacimiento Regional Water Management Advisory Committee alleges the county water agency has "operated the Lake in a manner that renders it almost unusable to property owners and visitors for recreation," in violation of what the suit alleges the water agency promised six decades ago as part of agreements to establish the reservoir.

The suit describes the lake as "one of the largest freshwater lakes in Central California" that draws "thousands of people from throughout the United States" during the summer months for recreation.

But it alleges the water agency has set a minimum water level too low to allow reasonable use of the lake, especially during the busy summer season; claims the agency has exceeded the annual 180,000 acre-foot release limit at least once and possibly multiple time; seeks an injunction to prevent the agency from continuing to release water from the reservoir on an accelerated basis; and argues that the agency failed to properly respond to the plaintiff's Public Records Act request and may have improperly destroyed relevant records.

County Counsel Charles McKee confirmed Thursday that the county and water agency had both been served with the lawsuit, and said the Board of Supervisors would consider the suit during its meeting on Tuesday.

NRWMAC director Harvey Smith said the organization was referring media questions to the organization's lead attorney Wayne Lemieux of the Los Angeles-based law firm Olivarez, Madruga, Lemieuz, O'Neill. According to the suit, the county water agency agreed decades ago to make recreation uses a priority at the lake as part of an agreement that included \$1.5 million in state funding for establishing the reservoir, which was completed in 1957 and has since reaffirmed that commitment over the intervening years.

The suit does also acknowledge the reservoir is used for "dam safety, flood protection, (Salinas Valley) groundwater recharge, the operation of the Salinas River Diversion Facility (SRDF), water supply, fish mitigation, fish habitat requirements (and) agriculture," as well as recreation.

In addition to alleging the water agency has released too much water from the lake, the suit argues the agency has "purposefully misrepresented" the minimum lake water level required for recreation, setting it at 730 feet and arguing that level would still render most boat ramps usable and allow most private property owners access to the reservoir.

That, the suit argues, is "false," and maintains that a minimum elevation of 748 feet is needed during the summer season between Memorial Day and Labor Day to allow recreational uses, while also satisfying the needs of Salinas Valley farmers and fish habitation flow requirements.

The lawsuit does not mention the impact of fluctuating rainfall totals, including during a recent historic drought period, on the lake's water levels.

Holly Hossack

From:	Mark D. Lee <mdlee4125@gmail.com></mdlee4125@gmail.com>
Sent:	Saturday, January 26, 2019 2:18 PM
То:	Board of Directors
Subject:	Santa Clara Valley Water District lawsuit Against State Water Board jeopardizes future projects as Court case sets precedent & alienates Santa Clara County residents who care about the environment

January 23rd 2019 11:00 AM

https://www.mercurynews.com/2019/01/23/opinion-water-district-lawsuitjeopardizes-future-projects/

Agenda: 2.7.19 Item: 12.4

JAN 27 19

RECEIVED

JAN 30 2019

SLV. WATER BOARD

SAN LORENZO VALLEY WATER DISTRICT

THIS IS MY SECOND LETTER ON THIS SUBJECT, PARTEX BECAUSE I SUSPECT THE FIRST ONE WAS THROWN IN THE TRASH CAN. BUT, I WHILL NOT BE SILENCED, YOU ARE A PUBLIC UTILITY, YOU ARE CHARGED WITH SERVING THE COMMUNITY. LOCKING YOUR POOR AT NOON IS A GLANT VIOLATION OF YOUR RESPONSABILITY TO THE PUBLIC, WHAT YOUR'E TRYING TO FOIST OFF ON THE COMMUNITY 19 CLEARLY WRONG. CHEATING THE PUBLIC OUT OF OFFICE HOURS IS NOT THE BEHAVEIOR OF A TRUE PUBLIC SERVENT. I AN OFFICIALLY INFORMING YOU THAT SOME PEOPLE NEED TO PAY THER BILL DURING THE NOON HOUR, I'AN ONE OF THEM! WEATHER YOU LIKE IT OR NOT FAIRNESS TO THE COMMUNITY DEMANTS THAT YOUR OFFICE REMAIN OPEN. I'M PROMISING YOU I WILL NOT BACK OFF UNTILL IT 19 50. YOU ARE WRONG ... FIX IT !! NOT BECAUSE I WANT YOU TO, BUT BECAUSE IT'S YOUR OUB PO YOUR JOB !! DUANE COX

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January 2019

Holly Hossack San Lorenzo Valley Water District 13060 Highway 9 Boulder Creek, CA 95006-9119

Dear Ms. Hossack,

Whether the members of your Board of Directors are new to their role or are seasoned officials, CSDA knows they'll be looking for the resources to help them best serve their community in the coming year. CSDA has been providing our members with those resources – educational opportunities, information sharing, advocacy services, and more – for 50 years. We are dedicated to the success of your district.

CSDA is the only statewide association representing all types of special districts and serving more than 1,200 members. In keeping with our mission, we have prepared a packet of information we ask you to share with your Board members.

- Newly updated **CSDA Special District Board Member Handbook**, full of information needed to be an effective and productive official.
- **Special District Leadership Academy** brochure, with comprehensive governance training designed for experienced and newly elected/appointed officials.

If you would like additional copies of these items, please contact CSDA Member Services and we'll be happy to provide a few more. To ensure your Board members receive the weekly CSDA *eNews* and legislative updates, make sure we have a unique email for each member. Contact us at 877.924.2732 or cassandras@csda.net if you have questions. For additional resources and a calendar of educational offerings, visit our website at www.csda.net.

Serving on the Board of Directors/Trustees for a special district is a unique and significant responsibility. Please extend our congratulations to your newly elected/appointed Board members and our thanks for their commitment to special districts.

We are proud to count your district as a CSDA member.

Best regards,

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Cathrine Lemaire Member Services Director

PS: Don't forget! If you renewed your CSDA membership by the January deadline, you get access to free online Ethics Training for your entire Board for a limited time. Call 877.924.2732 for details.

1112 I Street, Suite 200 Sacramento, CA 95814 Toll-free: 877.924.2732 t: 916.442.7887 f: 916.442.7889 csda.net



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You have been elected or appointed to a special district board by your community. This is a tremendous honor that comes with much responsibility.



Printing made possible by the California Special Districts Alliance, a partnership between CSDA, the CSDA Finance Corporation, and the Special District Risk Management Authority (SDRMA).

What do You Need to Know as a Special District Board Member?

You have been elected or appointed to a special district board by your community. This is a tremendous honor that comes with much responsibility. The mission of the California Special Districts Association (CSDA) is to provide you and your district with the resources necessary to best meet this responsibility. This handbook will serve as a fundamental guide in this endeavor.

Your special district may refer to its board members as trustees, directors, commissioners, or another similar term. For simplicity and readability, this handbook will use the term "board member" as a universal term for all special districts. The handbook will focus on the commitments, responsibilities, and resources that are relevant to all board members of every type of special district.

As a board member for a special district, you have committed to represent the best interests of your community, ensure the delivery of essential local services and infrastructure, and faithfully serve the public good while upholding the law. This is a high calling that depends upon mutual trust, support, and collaboration with your fellow board members, your district's professional staff, and the network of special district leaders you will develop through CSDA.





OUICK TIPS

First steps board members should take after election or appointment include:

- Meet with the district's general manager and legal counsel
- Ask the general manager and/or finance officer for an overview of the most recently approved budget and audit
- Take a tour of the district facilitie
- Read your district's enabling act found in California's statutory codes
- Review your district's most recent municipal services review (MSR) published by the local agency formation commission (LAFCO)
- Register for board member training at csda.net
About Special Districts

As a special district board member, you will often be asked, "What is a special district?" People sometimes do not realize how many of their essential services are provided by special districts, and they often do not understand what a special district is, how it functions, or even why it exists. Here are few answers to some frequently asked questions you'll encounter as a board member.

What is a "special district"?

An independent special district is a local form of government that is created, funded, and overseen by a community's residents to provide a new or enhanced level of service and infrastructure to a community. Like counties and cities, special districts are an independent form of local government. Special districts are not school districts, community college districts, joint powers authorities, assessment districts, community facilities districts, "Mello-Roos" districts, or improvement districts.

Why are special districts formed?

Special districts are formed when a community decides a specific type of service is needed and the community wants the service to be maintained with local control. The first special district in California, the Turlock Irrigation District, was established in 1887. Local farmers needed a way to access the local water supply and the Wright Act was passed by the Legislature to provide the legal foundation for water districts, and many other special districts.

The Legislature continued to develop new types of special districts as tools to help local residents come together to solve community problems and needs. Ultimately, special districts are formed by the community for the community. Special districts empower residents to find local solutions to fit the unique needs of their community.

What types of special districts exist?

There are many types of special districts that can be established to fit the specific needs of a community. Some district types include:

- Airport
- Cemeterv
- **Community Services**
- **Fire Protection**
- Harbor and Port
- Healthcare
- Irrigation
- Library

How many special districts are there?

There are just over 2,000 independent special districts throughout California. They vary in size and some may serve a community of hundreds of thousands while others serve only a few hundred. Special districts are created to fit the size of the community they serve.

How are special districts governed?

Independent special districts are governed by a board of directors that is elected by the community or appointed to fixed terms by one or more other locally elected governing bodies. Board members are responsible for setting the policies that ensure special districts continue to function and serve the community. It is also important to distinguish independent special districts from dependent special districts. Unlike independent special districts, dependent districts are indirectly governed by other government entities, such as city councils or county boards of supervisors. This is because dependent special district board members include ex-officio members from another legislative body or board members who are appointed to non-fixed terms. Ex-officio board members serve on the special district board only by virtue of their participation on another board. Board members appointed to non-fixed terms serve at the pleasure of another governing body. In other words, they may be replaced at any time and are not entitled to a full four-year term.





To expand your knowledge further, visit csda.net to find the About Special Districts Guide and the Special District Formation Guide to learn more about special districts and how they are formed.

- Mosquito and Pest Abatement
- **Recreation and Park**
- **Resource** Conservation
- Sanitation
- Transit
- Utility
- Veterans Memorial
- Water

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Special districts and their board members are subject to a number of laws established to ensure special districts remain transparent and accountable to their communities. These laws are discussed in greater detail later in this handbook under the chapter, Accountability and Transparency.

How are special districts funded?

Special districts utilize many different funding sources to establish and maintain their services and overall infrastructure. Some districts receive enterprise revenues that are collected as fees for services such as water, sewer, or electricity. Special districts can also receive non-enterprise revenues that include one percent ad valorem property tax, parcel taxes, or benefit assessments that are approved by the community. Frequently, special districts will receive a combination of enterprise and non-enterprise revenues in order to best meet the needs of their community.

What makes special districts so "special"?

As a board member who dedicates time and effort to your local special district, you understand and know from firsthand experience what makes special districts so special. It's the connection to the community, the focused specialized service, and the commitment of local residents such as yourself that distinguishes special districts from other forms of government.

To raise awareness and understanding of special districts, CSDA established the Districts Make the Difference public outreach campaign. Resources are available at DistrictsMakeTheDifference.org to explain special districts and include:

- Videos Fact sheets
- Posters

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- Brochures
- Infographics

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Good Governance

Special district boards are the voice of the community. Every elected or appointed public official needs to care about governance—it is the essence of what boards do. Governance is taking the wishes, needs, and desires of the community and transforming them into policies that govern the district.

The success of your district, and special districts as a form of government, depends largely upon how well you do your job as a board member. If the board does not respond to the needs of the community and govern its district effectively, it will erode the public trust, jeopardize public support of district services, and may even threaten the existence of the district itself.

Effective Governance Model

The good news is that a lot of work has been done on effective governance. Based upon a model developed by the California School Boards Association and adapted by CSDA for special districts, there are three critical dimensions that interact to determine how a board operates and its effectiveness as an organization:

- 1. The board as an organizational entity;
- 2. Individuals who together make up the board; and
- 3. Specific jobs the board must perform.

These are the core components of effective special district governance: a competency-based group of individual citizens coming together as an effective team to accomplish the specific responsibilities that only governing boards can do on behalf of their community.

The Board as an Organizational Entity

Any board, public or private, nonprofit or corporate, exists as an organizational entity, with its own unique organizational culture, norms, values, and operating style. There are attributes or characteristics that are consistently present in boards that operate in a highly effective way.

Effective boards become known as effective because they operate in an organizational environment of trust, honesty, and openness. These boards exhibit, as a team, the following characteristics:

- Recognize all board members as equally legitimate—no matter how different or difficult an individual may be.
- Strive to maintain a "no secrets, no surprises" operating norm.
- Acknowledge that conflicts and differences are inevitable, not necessarily "bad", and must be faced and analyzed.
- Immediately turn to solutions rather than playing the "gotcha" game.
- Treat all staff with dignity and respect.
- Treat all community members with dignity and respect, even in the face of criticism and opposition.
- Exhibit creative thinking, know how to handle failure as well as success, encourage risk taking, and create a climate of support for excellence.
- Accept collective responsibility for the conduct, behavior, and effectiveness of the board.

Individuals Who Together Make up the Board

While boards develop unique organizational cultures, they are, after all, composed of individuals. These individuals and their values, skills, and knowledge shape how boards operate an any given time. Individuals also determine whether the board will sustain effective behavior as a group expectation.

Not everyone who serves on a special district board becomes an effective board member or leader. Those who do become effective board members also become highly valued community leaders. When an entire board is composed of truly effective board members, rather than individuals, the board becomes highly effective.

So, how are highly valued community leaders different than individuals who just serve on boards? They think about governance differently by understanding the fundamental role

Governance is taking the wishes, needs, and desires of the community and transforming them into policies that govern the district.



The most effective board members maintain the following priorities:

- · Serve the public
- Support the staff as they carry out direction
- Respect fellow board members
- · Seek consensus



of effective governance and the citizen leader. Effective board members exhibit the following characteristics:

- Recognize that the board, not the individual board member, governs the special district—the authority of any one board member rests only with the board as a whole.
- Heed caution when someone attempts to impose their own agenda on the district rather than working to build support for an institutional agenda.
- Appreciate that how a board member governs is as important as what a board member does—that manners make a huge difference.
- Establish trust and treat everyone with the same respect with which the board member expects others to treat them.
- Respect the diversity of perspectives and styles.
- Operate in a transparent fashion, while always keeping confidential information confidential.

Specific Jobs the Board Must Perform

We know that effective boards have strong competencybased cultures and that individual effective board members have strong governance skills, but the next question is: "To do what?" The third dimension of a board addresses the governing body's specific responsibilities. Special district boards have certain duties that no one else in the organization or the community can perform. In the next chapter, *Primary Roles and Responsibilities*, we will explore these duties, but first we must acknowledge one of the biggest challenges to special districts—how board members can learn and demonstrate competency.

Training and Development

We all have room to learn the governance skills required to be an effective special district leader. To do so, we must establish a culture of participation in our special district community. Just as we expect our staff to be involved in their profession, to learn and develop new skills, so too must we as effective board members learn to hone our governance skills.

We must lead by example and encourage our colleagues to branch out and learn the skills of governance. We must establish a culture of continuing education in the special district community. This includes both required trainings and recommended trainings.

Required Trainings

Every special district board member is required by law to complete ethics training and sexual harassment prevention training at least once every two years.

Ethics training is mandated by Government Code Section 53235 et. seq., which is popularly referred to by its enacting legislation, AB 1234 (Salinas) of 2005. Special district board members must receive the required two-hour training within one year of their first day of service, and then every two years thereafter. A board member who serves more than one agency shall satisfy the requirements once every two years, regardless of how many boards they serve on.

All ethics trainings must cover laws related to conflicts of interest, gifts, reimbursements, government transparency, and fair processes, including but not limited to incompatible offices and competitive bidding practices.

Sexual harassment prevention training is mandated by Government Code 53237 et. seq., which was enacted by AB 1661 (McCarty) of 2016. Special district board members must receive the required two-hour training within the first six months of taking office, and then at least once every two years thereafter.

All sexual harassment prevention trainings must include practical guidance regarding the federal and state statutory provisions concerning the prohibition against, and the prevention and correction of, sexual harassment and the remedies available to victims. The training includes practical examples aimed at instructing the board member in the prevention of sexual harassment, discrimination, and retaliation.

CSDA offers various forms of online and in-person ethics and sexual harassment prevention training opportunities. You can register online at csda.net.

Recommended Trainings

It is recommended that every newly elected or appointed special district board member attend CSDA's workshops that introduce the topic of governance. CSDA strives to offer these opportunities in various locations throughout the state annually.

As a longer-term goal, during your first term in office it is also recommended you obtain the Recognition in Special District Governance certificate from the Special District Leadership Foundation (SDLF). This recognition was designed to honor special district board members and is comprised of two distinct parts: the completion of the Special District Leadership Academy and 10 hours of continuing education.

The Special District Leadership Academy consists of four courses: Governance Foundations, Setting Direction/ Community Leadership, Board's Role in Human Resources, and Board's Role in Finance and Fiscal Accountability. The four courses are unique from any other courses on special district governance in that they are curriculum that has been created by special districts and agreed upon as what governing officials of special districts should know. SDLF has endorsed the Academy as the core special district governance training in California.

SDLF is a 501(c)(3) organization formed to provide recognition and certification opportunities to special district officials and employees to enhance service to the public. It is dedicated to excellence in local government. You can learn more about SDLF at sdlf.org.



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Learn more about CSDA's professional development offerings at csda.net.

ACHIEVING DISTRICT GOALS... TOGETHER.

A Comprehensive Governance Leadership Conference for Elected and Appointed Directors/Trustees.



Special District Leadership Academy Conference



A CSDA and co-sponsore by SDRM



Primary Roles and Responsibilities

One of the first and most important distinctions to make in your work as a board member is the difference between your responsibilities and those of the general manager and staff. Clearly understanding and respecting these roles, and how they interact, is critical to the long-term success and sustainability of your special district.

Role of a Board Member

One of the most significant responsibilities as a board member is to understand that the board is a team and you need to work together as such. Understanding the dynamics of the group, as well as the individual perspectives and opinions of your fellow board members, is crucial to the success of the team, the district, and community you represent. This united approach will help to strengthen the district and provide the grounds for maintaining a clear vision of the future, a unity of purpose, and a cohesive board. The specific responsibilities of the board are clustered into five areas:

- 1. Setting the direction for the district;
- 2. Establishing and supporting the policies and structure of the district;
- 3. Overseeing the financial resources necessary to fund the district;
- Guiding employee relations policy, including the hiring and supervising of the general manager who, in turn, operates the district and hires/manages its staff; and
- 5. Serving as community leaders who communicate effectively on behalf of the district.

Setting Direction

The board establishes the special district's mission and vision. In building a mission statement, the board must clearly understand the purpose of the district and answer the question of "why?" Why does the district exist? It will also be helpful for the board to identify core values that guide the district in its mission.

When developing a vision statement, the board must answer the question of "what?" What would the district look like should it accomplish its mission to the fullest extent? Doing so requires agreement on the board as to what the future of the district should look like.

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With a mission and vision as its foundation, the board sets direction through the district's strategic plan, which may guide the development of more specific objectives for implementation by the general manager and staff. In developing a strategic plan, the board will evaluate the present, anticipate the future, and prioritize goals that must be accomplished to achieve the vision. Strategic plans should be reviewed periodically and adjusted appropriately.

Establishing Policies

Policies are written statements specifying the manner in which the district's business is conducted. The board's job is to develop, maintain, revise, and enforce the district's policies. These policies provide needed direction for the general manager and staff, and for the constituents of the district.

One may view a special district's enabling act in California statute as the framework or "constitution" the district must operate under as a "subdivision of the state." However, independent special districts are not state entities, nor are they entities of a city or county. They are independent local governments, which are separate legal entities similar to other municipalities. Board-approved policies, resolutions, and ordinances are the tools by which boards direct the district in achieving its mission and securing its vision within the boundaries of its enabling act.

Board policies should guide district governance, such as board meetings, agendas, and minutes, board conduct, and rules of order. Policies should also be adopted concerning district finances, personnel, communications, and other key functions.

While policies are approved by the board and may be requested by the board, they are typically drafted and recommended by staff. Sometimes this is done with review and direction of a board subcommittee.

Overseeing Finances

Boards ensure sound fiscal policy exists and that practices and controls are in place so that the district, board, general manager, and staff have direct accountability to their constituents. Furthermore, the board will approve an annual budget and request and approve periodic reports on the fiscal status of the district.

Commensurate with the board's role in financial oversight and fiduciary responsibilities, it should establish a financial reserve policy and capital improvement plan (CIP). It will also approve contracts of certain size and scope according to State law and board policy. To ensure adequate funding to provide quality services and infrastructure to its community, the board must impose sufficient rates, fees, and taxes.

Guiding Employee Relations

The board's charge is to support and assess the performance of the general manager, approve personnel policies, establish salary structure and benefits packages, approve memorandums of understanding (MOUs) negotiated with labor, approve job descriptions and organizational structure, and establish a strong communications link between the board and general manager.

One of the most important decisions a board will ever make is the hiring of a general manager. Other than a district's general counsel and some rare additional exceptions for large special districts, the general manager is the only individual the board hires and supervises.

The general manager is responsible for hiring and supervising all other staff, sometimes through senior or mid-level managers in larger districts. Empowering the general manager to successfully carry out this key duty is critical to the success of the district. This should include a fair and constructive annual general manager evaluation process.

Serving as Community Leaders

A district and its board are linked in the eyes of the public and often seen as one and the same. Therefore, the conduct of board members reflects upon the district and the community it serves. This holds true during board meetings and formal district events, as well as during other interactions with community, the media, businesses, and other levels of government. Even the personal lives and behaviors of a board member can impact the perception and effectiveness of the district.

In your role as a board member, your board may designate you to formally represent your board to other organizations or participate in ceremonial events. Boards will often establish policies to guide such situations. It is





To expand your knowledge further, visit csda.net to find CSDA's Sample Policy Handbook and Special District Reserve Guidelines to learn more.

important to distinguish when you are speaking on behalf of the board and when you are speaking as an individual. However, as a public official, you should recognize that people will often construe your speech and actions as representative of your district, its staff, and your fellow board members regardless of the manner, time, and place in which they occur. This reality should lead board members to be thoughtful, intentional, and unified, not to be silent or absent.

It is a mistake for a special district to attempt to "fly under the radar." Transparency is essential to democracy, and scrutiny is inevitable in government. This will be covered more in the next chapter, *Accountability and Transparency*, but here it is important to note that board members play a key role in a special district's public outreach and engagement efforts. If a special district and its leaders are not telling the story of the district, somebody else will.

Role of the General Manager and Staff

The general manager is the executive staff officer of the district and for the board. This individual administers the district, providing day-to-day leadership, and maintains exclusive management and control of the operations and works of the district within State law and the policies of the board. In some districts, this position may be referred to as the district administrator, chief executive officer, executive director, district director, or another title. For the purposes of this handbook, it will be referred to as general manager. Overarching best practices for a general manager include:

- Developing and delivering reports to keep the board of directors and public well-informed of district operations and the status of district goals;
- 2. Providing recommendations on actions requiring board approval, including policies, resolutions, ordinances, and other matters;
- 3. Maintaining and advancing the operations of the district and implementing those policies, strategies, and directives approved by the board; and
- 4. Playing an active role in moving the district forward in serving its mission, carrying out its strategic plan, and attaining its vision.

As noted previously, the general manager has authority over and directs all employees, including hiring, supervision, evaluations, promotions, disciplinary actions, and terminations. All directives for staff should be given by the general manager or designated supervisor within the district. Authority may be delegated to other staff or consultants at the general manager's discretion.

The general manager should dutifully and faithfully carry into effect the lawfully expressed policies of the board, including planning the short, medium, and long-term work program for the district, facilitating constructive and harmonious board relations, preparing and managing the district budget, conducting studies, and delivering written and oral presentations.





Visit sdlf.org to download the SDLF High Performing District Checklist to provide special districts with best practices related to the areas of finance and human resources.



Best practices that make the best board members:

- Do your homework: Read all board packets and materials in advance of meetings.
- Don't play "gotcha": Share questions with the general manager in advance of the board meeting.
- · Listen first, speak second: Prioritize understanding the perspectives of others.
- Build an expertise: Find an important issue that other board members are not already invested in and become a leader such as on LAFCO, environmental sustainability, etc.
- Stick to principles, not positions: Develop strong and well-considered principles, rather than digging heals into
 one position of a false dichotomy.
- Oppose the action, not the implementation: When necessary, vote "No" on a board agenda item, but don't undermine or
 obstruct the successful implementation of board-approved decisions. Support and respect the actions of the board as a whole.





Accountability and Transparency

The residents of the district, as voters, owners, constituents, and customers of the district, possess the ultimate responsibility for its oversight and direction. The board is elected or appointed to serve as the voice of these residents. There are a host of legal requirements designed to ensure special districts remain accountable and transparent to its residents.

While special district boards must meet all mandated State laws, they should strive to exceed these requirements and set an example to other governments and organizations.

Legal Requirements

Significant mandates have been placed upon special districts by the State Legislature, which often exceed the standards for the State and some other local agencies. These legal requirements include, but are not limited to:

- Website Maintenance
- Open and Public Meetings under the Ralph M. Brown Act
- Public Records under the California Public Records Act
- Regular Financial Audits
- Finances and Compensation Posted Online
- Ethics Training for Board Members
- Conflict of Interest Compliance under the Political Reform Act

Websites

Beginning January 1, 2020 every special district must maintain a website, per Government Code Section 53087.8. All special district websites must display district contact information, agendas, state-mandated financial transaction and compensation reports, and a report of the district's enterprise systems. An exemption is available for special districts that pass an annual resolution detailing evidence of a hardship.

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Open and Public Meetings

Per the Ralph M. Brown Act (Brown Act), special district board meetings must be accessible to the public. To facilitate access and participation, special districts must post their regular meeting agendas at least 72 hours in advance in a publicly accessible location and on their website. The board may only act on issues included in the agenda and the public must be permitted to address the board. The Brown Act includes myriad provisions and exceptions and has been the subject of significant litigation. It is recommended that board members read the Brown Act, found at Government Code Section 54950 et. seq., in its entirety and consult district legal counsel as necessary.

Public Records

As required by the California Public Records Act (CPRA), found in Government Code 6250 et. seq., special district records are subject to public review and scrutiny. The public may request copies of records in the possession of a special district, including records on a board member's personal device or account that are related to district business. Districts may charge a reasonable fee for the cost of printing and paper, but the district may not charge for staff time in producing such copies. As with the Brown Act, the CPRA includes numerous provisions and exceptions and is shaped by countless lawsuits. It is recommended special districts consult legal counsel as necessary in response to specific public records act requests.

Financial Audits

Government Code Section 26909 mandates regular audits of special districts by the county auditor-controller or a certified public accountant. The audit must be filed with the state controller and county auditor-controller.

Online Financial and Compensation Reports

Since 1949, special districts have been required to submit a financial transaction report to the state controller. In 2014, legislation additionally required completion of a compensation report and required that both the compensation report and financial transaction reports be posted or linked to

a conspicuous place on each special district's website. The state controller now provides all of this information in an open data format at www.bythenumbers.ca.gov and www.publicpay.ca.gov.

Ethics Training

In 2005, the State enacted AB 1234 (Salinas) mandating special district board members complete at least two hours of training in general ethics principles and ethics laws every two years. Board members have an obligation to conduct business in an ethical manner and make decisions that are in the best interests of their constituents. Building and maintaining the public's trust requires you to avoid any situation where your self-interest may come first.

Conflict of Interest Compliance

Passed by voters via Proposition 9 in 1974, the Political Reform Act (PRA) is designed to ensure elections are fair and government officials serve all citizens equally. The PRA generally governs political campaign spending and contributions, as well as a variety of ethics rules, including conflicts of interest. It prohibits a special district official from making, participating in making, or influencing a decision in which the official knows or has reason to know the decision will have a material financial effect on the official's economic interests, with limited exceptions.

Third Party Oversight, Review, and Regulation

In addition to the legal requirements adhered to by special districts, there are a number of entities and programs, which provide varying levels of oversight, review, or regulation:

- Local Agency Formation Commission
- County Auditor-Controller
- County Civil Grand Jury
- County District Attorney and State Attorney General
- State Controller
- State Auditor
- State Treasurer
- State Fair Political Practices Commission
- Other State Regulators

Best Practices

Many special districts go beyond State mandated legal requirements to promote accountability and transparency. To facilitate and recognize best practices among special districts, the Special District Leadership Foundation (SDLF) has established a District Transparency Certificate of Excellence as well as other programs and scholarships. Visit sdlf.org to review the programs and download an application.





Legislative Advocacy, Media Outreach, and Public Engagement

The decisions you make and the actions you take as a board member directly impact your community and the services they receive. It is equally true that districts are affected when board members do not make crucial decisions or fail to take action.

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As a board member, you are an advocate for your district and your community. You will have to balance a number of responsibilities throughout your term. However, there are several simple yet influential ways you can take action as a board member.

Engage with the Capitol

Extensive travel to Sacramento is not necessary to effectively engage with the Capitol. Likely the most important way board members can partake in advocacy efforts is to submit letters of support or opposition when CSDA sends out a "Call-to-Action."

Throughout the legislative session, CSDA closely analyzes and tracks any bill that may impact special districts. When an especially important bill arises, CSDA will issue a "Callto-Action" and request letters so the Capitol hears the voice of special districts. Make sure your district's voice is heard and work with others at your district to write support and opposition letters on behalf of your district.

Meeting with your legislators is another valuable way of advocating for your district and engaging with the Capitol. There are times throughout the year when legislators leave the Capitol and return to their legislative districts. During these legislative recesses, do your best to schedule a meeting with your legislator and their staff. Just as you represent your community as a special district board member, your legislator represents you, your special district, and your community. Make sure your legislator knows what issues are important to your district and how your district is impacted by legislation. The more legislators know about the special districts they represent, the more educated they will be when creating legislation that affects all special districts.

Once you've met with your legislators, let CSDA know which legislators you have a relationship with so that CSDA can coordinate grassroots activities on key votes in the State Legislature. Do this by completing the Grassroots Mobilization Survey at csda.net/take-action.

Engage with the Media

During your term as a special district board member, you will likely have to interact with the media. Do not be intimated by the idea of communicating with the press. It is vital that you help inform the media's narrative regarding your district. You do not want the only media mentions for your district to be one-sided or unfairly skewed against your district. The only way to ensure your district has a voice in what the media covers is for your district to be proactive. Be sure that any media outreach you undertake is in line with your board policies and/or protocols. Every special district should have a media protocol that determines who should serve as a spokesperson for the district under different circumstances. It is important to work as a team and support a clear and consistent message from your district.

Press releases should be utilized as a way to inform the press of particularly significant events. A few opportunities to send out press releases include when your district receives an award, after new board members are elected, or after a major project is successfully completed. Encourage your district to send out timely press releases in accordance with your board policy. You should also be looking for the best opportunities for your district to interact with the media. Not everything will be compelling to the media, but the media cannot acknowledge your district's positive achievements if they are not informed. Media advisories are another way to engage with the media. If your district is hosting an event, encourage the general manager or district staff to send out an invitation to local reporters. Sometimes allowing the media to see for themselves helps garner positive press for your district. Also, inviting the media to your district allows you and other district representatives to build a working relationship with the

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Throughout the year, CSDA maintains multiple resources to ensure you can stay up to date on the latest legislative issues impacting special districts. Explore the following resources:

- Advocacy News: Provides real-time notifications or daily summaries of legislative updates directly to your inbox. Join Advocacy News at csda.net/advocate/advocacy-blog.
- Take Action Page: Lists the most pressing legislative issues and provides background information and next steps for your district. Visit the Take Action page at csda.net/advocate/take-action.
- Legislative Roundup: Biannual webinar, free to CSDA members, connecting members with CSDA's lobbyists for a live update and Q and A on the latest events in Sacramento.

reporters in your community. You want to serve as a resource to the media so when reporters have questions, they reach out for your district's perspective.

You may also want to suggest your district's media policy and/or protocol includes standard talking points for district representatives to reference when working with the media. Maintaining consistent messaging with the media will lend a level of credibility and reliability that the media will remember when writing about your district. As the media's understanding of your district grows, you should notice more accurate and informed press attention for your district.

Engage with Your Community

Special districts provide essential services to millions of Californians. Yet, many people have not heard of special districts or do not understand what a special district truly is. Polling shows that as soon as people understand the services provided and maintained by special districts, their perceived value of special districts rises exponentially. As a board member, you can help the public understand your district and its important role in your community.

Social Media

There are numerous ways to interact and connect with the community you serve. In today's world, most community members are on some form of social media. Although social media can be time consuming for you and district staff, it is worthwhile. A district policy or protocol should guide who is responsible for posting on behalf of the district. Typically, this is assigned to a member of the staff and board members may engage by liking and/or sharing district posts from their personal accounts.

Social media can provide an instant connection with your community. Instead of forcing local residents to go looking for information, you can make important information immediately available on social media.

Engaging on social media does not require continuous posts to all platforms throughout the day. Instead, post to social media when you have something you need and want to share with the public. Post about any community events where your district will be represented. Share a quick fact or update about your district that may interest your community.

Even if you do not frequently post to social media, monitor your accounts to see if people make comments, have questions, or provide suggestions. You may choose not to respond to comments on social media but at least you are aware of what your community is saying. People may voice something on social media that they would not ordinarily say in person or in a more formal setting. At times, people may post negative comments but with social media, engagement is ultimately the goal. Social media starts an ongoing conversation with your community.

Community Events

Another effective way to engage with your community is with community events. As a board member, you can encourage your district to host an event where the public is invited to your district. Holding tours during the summer to demonstrate how your district functions or hosting a holiday party as a way for the community to celebrate together are just a few event ideas.

If you are a board member at a smaller district or a district type that does not easily lend itself to visits, collaborate with other districts and businesses in your community. Reach out to other special districts in your area to discuss a possible "district day" where representatives from multiple districts gather together and answer questions about their respective districts. Hosting a booth at the local career fairs or sponsoring a local event are other valuable ways of building a connection with the community you serve.

Join the Public Outreach Campaign

CSDA launched the Districts Make the Difference public outreach campaign to raise awareness and understanding for special districts. Encourage your district to participate in the campaign. Add a link to the DistrictsMakeTheDifference.org on your district's website so people can utilize the campaign resources and learn about the different types of special districts and how they are governed. Raising awareness for special districts helps local residents understand the value of special districts and the significant role they play in the community.





CSDA's *California Public Records Act Compliance Manual* is a general summary of the CPRA as it applies to special districts. For more information on this manual visit csda.net.



Responses to Tough Questions

As with all forms of government, special districts sometimes face tough questions. Special district board members should be aware of these questions and be prepared to respond to them.

Why are some special districts funded by property taxes, while others are funded by fees or a combination of fees and taxes?

Special district funding is primarily determined by the residents who receive district services and pay for those services. Special districts may receive two types of revenue: enterprise revenue and non-enterprise revenue. Some districts rely exclusively on one type, but most receive a combination of the two.

Enterprise revenue is derived by fees for service. Common forms of enterprise revenue include property-related fees, governed under Proposition 218, such as water, sewer, or trash rates. However, enterprise revenue may also include smaller charges like registration fees for a soccer league or yoga class. Facility rentals, cemetery interment fees, and medical billing are also forms of enterprise revenues.

Non-enterprise revenue is derived from taxes and assessments paid as a condition of owning property that benefits from the services and infrastructure provided by a special district. The most common form of non-enterprise revenue is the one percent ad valorem local property tax, which is distributed through the county auditor-controller's office. This is dictated by Proposition 13 and is usually what someone is referring to when they mention the "property tax." Non-enterprise revenue may also include special taxes, benefit assessment districts, community facilities districts (also known as CFDs or Mello-Roos districts), and similar funding mechanisms.

It is important to note that most residents have approved at least some level of both enterprise and non-enterprise revenue for their special district. This provides the district with a diverse and sustainable revenue portfolio that can better withstand economic shifts and secure the highest credit ratings for infrastructure investment. It also ensures that everyone who benefits from a district contributes to the cost of the district. For example, water and sewer services benefit a property's value regardless of whether that property's owner currently uses those services.

Can special districts tax residents without their consent? No. Proposition 13 limited ad valorem property taxes to one percent of property value for every homeowner. Many special districts, along with cities, counties, and schools, receive a share of this revenue. If a district requires additional revenue it must obtain the approval of its voters or property owners as appropriate.

While cities and counties may impose general taxes with majority voter approval, all special district taxes are considered "special taxes" and require a two-thirds vote. A general obligation bond that raises property taxes temporarily to pay-off the bond must also receive two-thirds voter approval. Certain assessments may be approved with a majority of those who benefit from the service and property related fees must go through what's known as a majority protest proceeding in accordance with Proposition 218.

Why do we have community facilities districts, Mello-Roos districts, and special districts all funding our services? Community facilities districts (CFDs) and Mello-Roos districts are just two names for the same thing, but neither are a special district with a board that provides a service. CFDs or Mello Roos districts are funding mechanisms that may be established by a special district, city, county, or school district to help fund services and public works for that area. CFDs or Mello-Roos districts are typically approved by property owners in developing areas where there are fewer than 12 residents. In cases where there are 12 or more residents, they must be approved by voters.

Why do special districts have such large reserves? Special districts need adequate reserves to ensure they can respond to their community's needs in the event of emergencies or disasters, like flooding, earthquakes, wildfires, or even droughts. Prudent reserves are often needed to accumulate the capital to pay for large infrastructure projects, or to secure financing. In addition, reserves provide a safety cushion to stabilize rates and maintain adequate services during economic downturns.

It should be noted that some reports of special district reserve levels have misinterpreted data within the state controller's Financial Transaction Report in a manner that confused districts' fixed assets with cash on hand. CSDA has worked with the state controller's office to ensure this report is presented in the most clear and consistent manner possible to avoid such errors in the future.

CSDA has also developed the Special District Reserve Guidelines, a comprehensive guide for accumulation and management of special district reserves. The report lays out policy procedures and high standards for special districts to follow in handling their fiduciary responsibilities.

Don't special districts have board members who are heavily compensated?

Board member compensation is set in statute by the State Legislature. Some special districts have statutory authority to adjust compensation, within strict limits, via a vote of the board during a properly noticed open and public meeting. Unlike city council members and county supervisors, special district board members are not eligible for the California Public Employees' Retirement System (SB 53 of 1993).

While every type of special district must comply with its own statutory parameters, most special district board members receive about \$100 per meeting. It is important to note that the work of a board member does not begin when a meeting commences and end when it adjourns. Board members typically review lengthy meeting packets, study issues thoroughly, and may be in communication with constituents or district staff throughout the month.

Every special district is unique and the demands and qualifications necessary to well-serve different special districts will vary.

Aren't special districts fragmented government? Special districts provide real-world solutions to meet the needs of residents that otherwise would not be met. In fact, their name and their strength is derived from the way they specialize in a service. Special districts are passionate about providing a service people need. They are not easily distracted from their mission, and they develop an expertise at providing a service in the most efficient, effective, and sustainable manner possible.

While special districts may dot many local landscapes, each one is unique to the needs of its community. Special districts arguably offer the closest, or "most local," level of service to their community. Residents will likely notice a difference in access and responsiveness when attending a recreation and park district meeting to discuss a playground as opposed to what they may receive on such a specific topic at a generalpurpose government meeting. The same could be said in relation to library districts, harbor districts, mosquito abatement districts, water districts, and so on.

Similarly, special districts offer residents a meaningful opportunity to engage with their government and serve their community. The barriers associated with running for Congress, the State Legislature, and even county or city governing bodies are often staggering, with campaigns sometimes costing hundreds of thousands or millions of dollars. And the politics are sometimes highly partisan. Raising that level of campaign money and investing that number of hours away from family and paid employment is out of the reach of most Californians. While serving on a special district board is a significant undertaking, it is far more accessible to the average person.

Do special district services overlap with cities and counties? No. local agency formation commissions (LAFCOs) oversee the formation, dissolution, and boundaries of special districts and cities. There are 58 LAFCOs, one per county. They ensure that special districts and cities don't overlap in a way that provides redundant services. LAFCOs also conduct regular municipal services reviews (MSR) on special districts to help ensure they are providing efficient and effective services.

There are just over 2,000 independent special districts compared to 977 school districts, 482 cities and 58 counties. Why so many and why can't they be consolidated to save taxpayers money?

What really matters is the quality of services and how well a special district responds to the residents it serves. Consolidation may work in some cases, but it doesn't work in all cases. Bigger bureaucracies that are further removed from voters are not always more efficient. Even where consolidation may make sense in concept, it may not be economically feasible due to lack of proximity to neighboring infrastructure, such as water or sewer pipes.



An inherent bias for or against consolidation doesn't improve services. Rather, a thoughtful, case-by-case approach, that includes stakeholders and an objective analysis, will promote the best local government options for each community. Ultimately, the residents who receive and pay for the services should have the final say.

It is also important to keep in mind that there are not 2,000 special districts providing the same service throughout the state. For instance, there are about 346 fire protection districts, 47 mosquito abatement and vector control districts, 95 recreation and park districts, 10 airport districts, and so on.

Who are special districts accountable to?

Special districts are accountable to the residents who elect their boards, approve their funding sources, and use their services. This offers a community local control.

If residents need something or want to see something changed, they may go to their special district and petition their board. When authority is pulled away from local government bodies and centralized further from residents, the community's ability to influence its government and hold it accountable may become more challenging.

Numerous state laws help residents hold special districts accountable, such as the Ralph M. Brown Act, the California Public Records Act, the Political Reform Act, and more. Additionally, a number of other bodies facilitate oversight and reporting requirements, including the LAFCO, county auditor-controller, county district attorney, state attorney general, and state controller's office.



Quick Reference for Laws Affecting Special Districts

As subdivisions of the State of California, special districts are governed by state law. Every fall, after the legislative session concludes, CSDA runs a "New Laws" series. At the beginning of each year, CSDA provides its members with a New Laws report, which includes hundreds of enacted bills and court rulings.

CSDA's publication, *Laws Governing Special Districts,* is a member resource that provides a thorough overview of the most significant long-standing laws affecting the governance of all types of special districts. This resource includes a spreadsheet outlining the enabling act for each type of special district. Following are excerpts of some of the most frequently referenced laws affecting all special districts.



Resources for You and Your Special District

Since 1969, CSDA has been providing special districts with representation at the Capitol, professional development opportunities, and a host of programs and resources designed to help them better serve their communities.

Advocacy and Public Affairs

CSDA is the only association representing the interests of California's independent special districts, of all types and sizes and from all corners of the state. Our legislative staff reviews and monitors every bill introduced for its potential impact on special districts. Bills requiring action are quickly brought to the attention of the Legislative Committee and Board of Directors to adopt a position on each issue and lobby accordingly.

Our six District NetWorks help special districts connect and take action on issues of concern, locally or statewide. A CSDA Public Affairs Field Coordinator works with leaders in each Network, providing valuable legislative updates, facilitating communications, and coordinating regional events. Local chapters of CSDA provide more opportunities for collaboration and information sharing.

Professional Development

CSDA offers many unique educational opportunities for special district board members and staff. These range from extensive governance training to specialized conferences and regional workshops.

- Special District Leadership Academy (SDLA)
- Special District Board Secretary/Clerk Conference
- General Manager Leadership Summit
- Annual Conference and Exhibitor Showcase
- Workshops in Ethics, Harassment Prevention, and more

In addition, CSDA webinars, offered live and ondemand, provide affordable and convenient access to education in a wide variety of topics. Find a complete list of trainings at csda.net.

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Visit csda.net for online resources available for members, including tools and information crucial to any special district's operational effectiveness.



CSDA is committed to providing solutions to special district needs. That includes discounts and programs especially designed to save districts time and money.

A complete listing of Value Added Benefits is available at csda.net.

Online Resources

At csda.net, members have access to tools and information crucial to any special district's operational effectiveness. Below are a few highlights of what you can find once you've logged in.

CSDA Communities

Our online forum gives CSDA members a fast and easy way to share relevant information and get answers to questions from those most qualified to answer – your peers. Search for and connect with other members through the Member Directory, or find service and product providers through the Buyers Guide.

Knowledge Base

The Knowledge Base is your online go-to for answers to many questions about local governance and policies related to special districts. The Frequently Asked Questions section contains answers to the inquiries we hear most often from special districts. The Sample Document Library is a collection of useful examples contributed by other special districts.

Also included in the Knowledge Base is an array of downloadable publications and reference materials on topics such as:

- Ballot Measure Guidelines
- Brown Act Compliance
- California Public Records Act
- Parliamentary Procedure
- Reserve Guidelines
- And many more

California Special Districts Alliance





CSDA Finance Corporatio

California Special Districts Alliance is a collaborative partnership between CSDA, the CSDA Finance Corporation and the Special District Risk Management Authority (SDRMA). Our three organizations work together to provide the best in resources and education for your special district.

CSDA Finance Corporation has facilitated nearly \$1 billion in financing for capital improvements, land acquisitions, and equipment purchases. Learn more at csdafinance.net.

Special District Risk Management Authority provides full-service risk management programs, including Workers' Compensation, Property/Liability, and Health Coverages. Learn more at sdrma.org.





California Special Districts Association 1112 | Street, Suite 200 Sacramento, CA 95814

toll-free: 877.924.2732 csda.net

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Agenda: 2.7.19

Item: 13.1

GOVERNANCE LEADERSHIP TRAINING

ACHIEVING DISTRICT GOALS... TOGETHER.

Two Conference Location Options – First Time and Returning Attendee Tracks!



A Comprehensive Governance Leadership Conference for Elected and Appointed Directors/Trustees.





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Attend for the first time and complete all four modules of the Special District Leadership Academy:

- Governance Foundations
- Setting Direction / Community Leadership
- Board's Role in Human Resources
- Board's Role in Finance and Fiscal Accountability

Academy? Take a deep dive

into common opportunities

and challenges facing special

districts. Returning attendee

• The Intricacies of Running a Public

 Propelling Your District Forward in **Challenging Situations**

Direction and Build Your District's

Future Around its Core Priorities

 The 3 Cs: Using Communications, Consistency and Cooperation to

Benefit Your District

And much more!

How Your Board Can Set Clear

Meeting: Deep Dive into the Brown

Already completed the

sessions include:

Act



April 7 - 10, 2019 **Embassy Suites San Diego Bay** 601 Pacific Highway San Diego, CA 92101

ROOM RESERVATIONS

Room reservations are available at CSDA rate of \$174 plus tax, single or double occupancy by calling 1-800-EMBASSY and using the group code CSD. The room reservation cut-off is March 15, 2019; however, space is limited and may sell out before this date.

EARLY BIRD DISCOUNT



The early bird discount for this location requires registration on or before Friday, March 8, 2019.

Cancellations must be in writing and received by CSDA no later than March 26, 2019 at 5:00 p.m. All cancellations received by this date will be refunded less a \$75 cancellation fee. There will be no refunds for cancellations made after March 26. 2019. Substitutions are acceptable and must be done in writing no later than April 1, 2019 at 5:00 p.m. Please submit any cancellation notice or substitution requests to meganh@csda.net or fax to 916-520-2465.



July 7 - 10, 2019 **Embassy Suites Napa Valley** 1075 California Blvd. Napa, CA 94559

ROOM RESERVATIONS

Room reservations are available at CSDA rate of \$189 plus tax, single or double occupancy by calling 1-800-HILTONS and using the group code CSD. The room reservation cut-off is June 7, 2019; however, space is limited and may sell out before this date.

EARLY BIRD DISCOUNT



The early bird discount for this location requires registration on or before Friday, June 7, 2019.

Cancellations must be in writing and received by CSDA no later than June 24, 2019 at 5:00 p.m. All cancellations received by this date will be refunded less a \$75 cancellation fee. There will be no refunds for cancellations made after June 24. 2019. Substitutions are acceptable and must be done in writing no later than July 5, 2019 at 5:00 p.m. Please submit any cancellation notice or substitution requests to meganh@csda.net or fax to 916-520-2465.

Credit Incentive Points

SDRMA Credit Incentive Points

Special District Risk Management Authority (SDRMA) is committed to establishing a strategic partnership with our members to provide maximum protection, help control losses and positively impact the overall cost of property/ liability and workers' compensation coverage through the Credit Incentive Program. Credit incentive points can be earned based on an agency's attendance at the Special District Leadership Academy Conference reducing SDRMA member's annual contribution amount.

*Important Cancellation Information

All cancellations received by the date indicated for that particular conference and location will be refunded less a \$75 cancellation fee. There will be no refunds or cancellations made after the date as specified per location. Please submit any cancellation notice or substitution requests to meganh@csda.net or fax to 916-520-2465.

SUBJECT TO MINOR CHANGES BASED ON INSTRUCTOR AND LOCATION.



Don't miss the Sip and Savor evening reception on Monday night. Sponsored by SDRMA. "The workshop on Setting Direction/Community Leadership was outstanding. The Leadership Academy should be a requirement for all new board members."

- Dave Kulchin, Board Member, Leucadia Wastewater District



Evening receptions are offered as great networking opportunities.



THE IMPORTANCE OF MOVING FROM "I" TO "WE" AS THE GOVERNANCE TEAM.

THE BOARD'S ROLE IN SETTING DIRECTION FOR THE DISTRICT.

> THE BOARD'S ROLE IN FINANCE AND FISCAL ACCOUNTABILITY.

> > AND MUCH MORE!

SUBJECT TO MINOR CHANGES BASED ON INSTRUCTOR AND LOCATIO



Tuesday

8:30 – 10:00 a.m. **PROJECT FINANCING - PAY-GO VS. DEBT FINANCING - THINGS TO CONSIDER WHEN PLANNING FOR THE RIGHT MIX** *CSDA Finance Corporation Consultante*

CSDA Finance Corporation Consultants

CSDA Finance Corporation consultants, Bill Morton and Nicki Tallman, present an overview of the pros and cons for both debt financing and payas-you-go in their discussion of the best practices for capital improvement financial planning. Learn about the financing tools and programs available to special districts, and how to determine the right financing "mix" for your project. Also covered are how to prepare your district for financing as well as how to educate other board members and the community about your financial plan. Other topics include explanations of the different methods of sale for a financing and respective transaction timeline, as well as a review of current market trends.

10:00 — 10:30 a.m. **BREAK** (*All Attendees*)

10:30 a.m. – 12:00 p.m. SAY WHAT?!? SPEAKING PLAINLY THROUGH POLICY BHI Management Consulting

This session outlines the critical nature and importance of making long-lasting and meaningful policy as a board. Good policy is the most professional expression of a great board and agency. Yet special districts struggle with what policy means and how to make and use them. Brent lves, recognized organizational consultant to special districts in California on policy and planning, will bring his years of experience as a consultant and his long tenure as Mayor and Council member of the City of Tracy to this critically important topic. In Brent's words, "Making good policy moves our board to the highest level of performance"

12:00 – 1:00 p.m. LUNCH PROVIDED (All Attendees) 1:15 – 2:45 p.m. MEDIA RELATIONS: SURVIVING AND THRIVING WHEN DEALING WITH MEDIA

Communication Advantage

Presenter will share secrets of successful news interview and media relations: crafting great messages that resonate with the public, the techniques for using them in interviews, and practical tips for gaining control and confidence during the interview process.

2:45 — 3:00 p.m. **BREAK** (All Attendees)

3:00 – 4:00 p.m. LEGISLATIVE DEVELOPMENTS BOARD MEMBERS SHOULD KNOW

California Special Districts Association

Is your district at the table or on the menu? Straight from the lobbies of the State Capitol Building, CSDA's advocacy staff will present on the latest legislation introduced in Sacramento and breakdown the potential impacts on special districts. Gain a better understanding of current legislative trends, hear what CSDA is doing to advocate for special districts, and learn how you can help CSDA, your district, and your community can come out ahead.

4:00 p.m. CONFERENCE ENDS FOR RETURNING ATTENDEES

Whether you're new to the board or someone who has served for many years, this conference provides essential tools and information to effectively govern your district!



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Guiding the way to a more secure future.

SDRMA has been helping California public agencies navigate liability and manage risk for over 30 years. In fact, our experienced risk management staff and technical experts work exclusively with public agencies. All your coverage and risk management needs are met by a single resource that functions as an extension of your team. Public agencies can best proceed with confidence when they have a guiding star.

Learn more about our Workers' Compensation, Property/Liability and Health Benefits Programs at www.sdrma.org or 800.537.7790.

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L DISTRICT OF DISTINCTION ACCREDITATION

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The **District of Distinction Accreditation** is designed as a way for districts to highlight their prudent practices important to effectively administer and govern a special district.

In a time when proper fiscal management and responsibility in public agencies is paramount, it has become increasingly important to demonstrate that districts have sound fiscal management, transparency, and governance policies/practices in place. Apply today!

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