5.1 HYDROLOGY, WATER SUPPLY, AND WATER QUALITY

5.1.1 OVERVIEW AND SUMMARY

The proposed Master Plan Update will provide for additional water infrastructure facilities for the City of Solvang (City). The analysis of the proposed Master Plan Update was divided into potential construction and operational impacts to the surface and groundwater hydrology, the water supply, and water quality of the Santa Ynez River. The Master Plan Update proposes that the Santa Ynez River be the primary source of water for the City.

The City will be required to obtain and implement a Storm Water Pollution Prevention Plan (SWPPP) as required by the State Water Resources Control Board (SWRCB). Therefore, the proposed Master Plan Update impacts to water quality during construction would be less than significant (Class III). The proposed Master Plan Update impacts to surface water hydrology, groundwater hydrology, water rights, and water supplies during construction would be less than significant (Class III).

Operation of the proposed wells identified in the Master Plan Update would result in minimal reductions in flows along the Santa Ynez River at the Alisal Bridge compared to baseline conditions. Surface water quantity and quality along the Santa Ynez River would be consistent with historic measurements at the Lompoc Narrows under baseline conditions and under the proposed Master Plan Update. Water right users along the Santa Ynez River downstream of Bradbury Dam to the Highway 101 Bridge in Buellton would receive their entire water right entitlement from the riparian groundwater basins and the Cachuma Project. Therefore, potential cumulative water right impacts would be less than significant (Class III). Surface water quality and hydrology would result in similar impacts under baseline conditions and under the proposed Master Plan Update.

The proposed Master Plan Update is located within the Santa Ynez and Buellton groundwater subbasins of the Santa Ynez River Riparian aquifer. On average, groundwater water levels in the Santa Ynez Subbasin would not decline with implementation of the proposed Master Plan Update if the proposed well sites located downstream from the Alisal Bridge are utilized. Groundwater levels in the Buellton Subbasin would also not decline with implementation of the proposed Master Plan Update due to the larger groundwater storage capacity in this Subbasin, distance from other groundwater wells in the Santa Ynez Subbasin, recharge of the groundwater aquifer from water rights releases from Lake Cachuma, and natural recharge from local runoff. Groundwater impacts would be less than significant (Class III) with implementation of the proposed Master Plan Update.

The development of the proposed new wells in the Extended Reach of Diversion would include mitigation to minimize damage from 100-year flooding events. Impacts would be less than significant with the implementation of mitigation (Class II). Water supply impacts would be reduced to less than significant impacts with the incorporation of mitigation measures (Class II).

5.1.2 DATA SOURCES AND METHODOLOGY

Project Specific Technical Studies

The analysis of hydrologic conditions, including surface water and groundwater, and water quality, have been completed through a number of studies as listed below and included in **Appendix 5**:

- Hopkins Groundwater Consultants, Inc., Preliminary Hydrogeology Study, City of Solvang, Santa Ynez River Well Field, Well Site Evaluation Project, Solvang, California. April 2003;
- Stetson Engineers, Inc., Technical Memorandum - New City of Solvang Well Field, May 14, 2010;
- Stetson Engineers, Inc., Technical Memorandum No. 1. Hydrologic Impact Analyses for City of Solvang's CEQA Environmental Document for a Time Extension for Water Right Permit 15878, April 23, 2004;
- Stetson Engineers, Inc., Technical Memorandum No. 2. Water Quality Impact Analyses for City of Solvang's CEQA Environmental Document for a Time Extension for Water Right Permit 15878, May 10, 2004;
- Stetson Engineers, Inc., Technical Memorandum No. 3. Solvang EIR Groundwater Model Modflow Simulations, July 19, 2004;
- Stetson Engineers, Inc., Technical Memorandum No. 4. Additional Alternative Analyses for City of Solvang's CEQA Environmental Document for a Time Extension for Water Right Permit 15878, November 11, 2004;
- Stetson Engineers, Inc., Technical Memorandum No. 5. Assessment of Impacts of Proposed Solvang Pumping on Alisal Ranch Wells, July 19, 2005;
- Stetson Engineers, Inc., Technical Memorandum No. 6. Additional Alternative Analyses for City of Solvang's CEQA Environmental Document for Time Extension for Water Right Permit 15878 – New Wells Downstream of Alisal Bridge, January 24, 2011; and
- Stetson Engineers, Inc., Water Distribution System Evaluation, February 22, 2008.

Technical Memoranda Nos. 1-5 modeled all proposed river wells upstream of the Alisal Bridge, while Technical Memorandum No. 6 analyzed wells downstream of the bridge

Initially, the Stetson technical memoranda Nos. 1 through 3 (see **Appendix 5.1**) analyzed the long-term flow targets in the Santa Ynez River for steelhead habitat at the Highway 154 Bridge and at the Alisal Bridge (also sometimes referred to as Solvang or Mission Bridge). Releases from Lake Cachuma for

steelhead rearing and passage were modeled for three sets of operating conditions.[1] The three initial operating conditions ranging from 600 to 3,600 acre-feet per year (afy) modeled by Stetson included:

1. No change from current river well pumping by Solvang (average 600 afy in years 2000 to 2002);
2. Total river well pumping by Solvang of 2,400 acre-feet per year and maximum diversion of 5 cubic feet per second (cfs); and
3. Total river well pumping by Solvang of 3,600 acre-feet per year and maximum diversion of 5 cfs per Permit 15878.

In November 2004, Stetson[2] included a fourth operating condition that evaluated total river well pumping by Solvang of 1,053 acre-feet per year and maximum diversion of 1.85 cfs. This amount was based on the SWRCB's compliance inspection dated August 11, 1999, which found that there had been no changes in beneficial use, and determined that Solvang's annual beneficial use of diverted Santa Ynez River water was 1,053 afy and the maximum diversion rate was 1.85 cfs.[3] Stetson's analysis thereafter (Technical Memoranda Nos. 4 through 6) considered new wells extracting groundwater under four scenarios with gross pumping amounts of 600, 1,053, 2,400 and 3,600 afy.

Stetson analyzed each of the four operating conditions in conjunction with the alternatives set forth in the 2003 Cachuma Water Rights Draft EIR[4] by the State Water Resources Control Board for a total of twelve alternatives.[5]

The 2003 Draft EIR for the Cachuma Project considered the following alternatives, all of which incorporate the requirements of the National Marine Fisheries Service (NMFS) Biological Opinion[6] for operation and maintenance of Bradbury Dam:

1. Operations under the Original WR Order 89-18.

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1 Stetson Engineers, Inc., Hydrologic Impact Analyses for City of Solvang's CEQA Environmental Document for a Time Extension for Water Right Permit 15878, April 23, 2004. (**Appendix 5.1**).

2 Ibid, Technical Memorandum No. 4. Additional Alternative Analyses for City of Solvang's CEQA Environmental Document for a Time Extension for Water Right Permit 15878, November 11, 2004.

3 State Water Resources Control Board, Letter to Mr. Craig Martin, City of Solvang, Permit 15878 (Application 22423) Santa Ynez River Underflow in Santa Barbara County, dated December 15, 1999.

4 Ibid, Draft Environmental Impact Report, Consideration of Modifications to the U.S. Bureau of Reclamation's Water Right Permits 11308 and 11310 (Applications 11331 and 11332) to Protect Public Trust Values and Downstream Water Rights on the Santa Ynez River below Bradbury Dam (Cachuma Reservoir), State Clearinghouse No. 1999051051, August 2003.

5 Ibid, Hydrologic Impact Analyses for City of Solvang's CEQA Environmental Document for a Time Extension for Water Right Permit 15878, April 23, 2004. (**Appendix 5.1**).

6 National Marine Fisheries Service. 2000. Biological Opinion for U.S. Bureau of Reclamation Operation and Maintenance of the Cachuma Project on the Santa Ynez River in Santa Barbara County, California September 11, 2000.

2. Baseline Operations under Orders WR 89-18, WR 94-5 and the Biological Opinion (interim release requirements only) – environmental baseline conditions.

3A. Operations under the Biological Opinion assuming Reclamation achieves a 3.0-foot surcharge, except that releases for fish rearing and passage would be provided with current 0.75-foot surcharge.

3B. Operations under the Biological Opinion assuming Reclamation achieves a 3.0-foot surcharge, except that releases for fish rearing and passage would be provided with a 1.8-foot surcharge.

3C. Operations under the Biological Opinion assuming Reclamation achieves a 3.0-foot surcharge.

4A. Operations under the Biological Opinion assuming Reclamation achieves a 3.0-foot surcharge and provision of State Water Project (SWP) water directly to the City of Lompoc in exchange for water available for groundwater recharge in the Below Narrow Account established by Order WR 73-37, as amended by Order WR 89-18.

4B. Operations under the Biological Opinion assuming Reclamation achieves a 3.0-foot surcharge and the discharge of SWP water to the river near Lompoc in exchange for water available for groundwater recharge in the Below Narrows Account established by Order WR 73-37, as amended by Order WR 89-18.

Stetson used Alternatives 1, 2, 3A and 3C in their preliminary analyses;[7] the other alternatives were not considered by Stetson due to questions regarding their feasibility.[8] For each of these twelve potential alternatives, analyses of surface water hydrologic impacts were performed.

Under certain river conditions, primarily during the summer months, the concentration of wells created well interference with both the Alisal Ranch wells and the Santa Ynez River Water Conservation District – Improvement District No. 1 (ID No. 1) wells.[9,10] In addition, the modeling showed that the

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7 Stetson Engineers, Inc., Hydrologic Impact Analyses for City of Solvang's CEQA Environmental Document for a Time Extension for Water Right Permit 15878, April 23, 2004. (**Appendix 5.1**).

8 At the time in 2004, the Final EIR/EIS for the Lower Santa Ynez River Fish Management Plan and Biological Opinion which evaluated the 3.0 foot surcharge as the proposed Cachuma Project. The flashboards increasing the height of Bradbury Dam and water levels in Lake Cachuma were already installed and the decision was made to proceed directly to the 3.0 foot surcharge. Thus, the 1.8 foot surcharge was not considered and Alternative 3B became moot at that point in time. Similarly, the City of Lompoc had rejected the Alternatives 4A and 4B. Because the focus for the 2004 Solvang Technical Memorandum No. 1 was to analyze different Solvang pumping amounts with different fish flow operations, and therefore only 12 alternatives were. After the completion of Technical Memorandum No. 1, additional Solvang pumping amounts were analyzed with only Alternatives 2 and 3C.

9 Stetson Engineers, Inc., Technical Memorandum No. 4. Additional Alternative Analyses for City of Solvang's CEQA Environmental Document for a Time Extension for Water Right Permit 15878, November 11, 2004. (**Appendix 5.1**).

10 Ibid, Technical Memorandum No. 5. Assessment of Impacts of Proposed Solvang Pumping on Alisal Ranch Wells, July 19, 2005. (**Appendix 5.1**).

concentration of wells just upstream of the Alisal Bridge may result in additional pumping restrictions due to potential impacts to steelhead.[11]

As a result, the City requested that Stetson evaluate alternate locations downstream of Alisal Bridge to minimize and/or avoid interference with riparian users, and permitted and/or licensed diverters (i.e., Palmer Gavit Jackson Trust [Alisal Ranch] and ID No. 1).[12] This evaluation identified potential Well Sites A and B as described in **Section 2.0, Project Description**.

In 2011, the City developed and analyzed a new alternative with the new wells located in the proposed Well Sites A and B downstream from the Alisal Bridge.[13] This alternative considered extraction of 2,400 afy. The new alternative (referred to as GW5 in Technical Memorandum No. 6) was analyzed and compared to the other four alternatives, with specific focus on pumping 2,400 afy upstream of Alisal Bridge (Alternative GW2 in Technical Memorandum No. 6).[14] For this analysis, the Santa Ynez River Hydrology Model was used to assess impacts on Cachuma Project operations, Santa Ynez River flows, groundwater storage in the Above Narrows Riparian Aquifer, and water rights releases. Finally, an analysis of impacts to local groundwater was performed for the proposed well field downstream of Alisal Bridge.

Stetson analyzed potential impacts to nearby wells, Cachuma Project water supply, and endangered steelhead.[15] A conservative value of 2,400 afy of pumping was used as a valid assumption and for direct comparison to the prior study. The actual peak annual pumping that the City is now requesting, 1,980 afy, is lower than this assumption. Additionally, the City has not determined how many wells and what percentage of the total City diversions from the Santa Ynez River will be required downstream of the Alisal Bridge. The City cannot make that determination until it begins drilling wells in that reach and tests the actual amount of water available. Stetson analyzed two variations for the annual pumping of 2,400 afy including (1) all river well pumping occurs upstream of Alisal Bridge (GW2 in Technical Memorandum No. 6) and (2) all river well pumping occurs downstream of Alisal Bridge (GW5 in Technical Memorandum No. 6). The proposed Master Plan Update anticipates that all new wells will be located downstream of Alisal Bridge and that the existing City's wells upstream of Alisal Bridge will also be utilized.

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11 Stetson Engineers, Inc., Technical Memorandum No. 1. Hydrologic Impact Analyses for City of Solvang's CEQA Environmental Document for a Time Extension for Water Right Permit 15878, April 23, 2004. (**Appendix 5.1**).

12 Ibid, Technical Memorandum - New City of Solvang Well Field, May 14, 2010. (**Appendix 5.1**).

13 Ibid, Technical Memorandum No. 6. Additional Alternative Analyses for City of Solvang's CEQA Environmental Document for Time Extension for Water Right Permit 15878 – New Wells Downstream of Alisal Bridge, January 24, 2011. (**Appendix 5.1**).

14 Ibid.

15 Ibid.

Since the completion of the earlier Stetson technical memoranda (Technical Memoranda Nos. 1 through 5), the Cachuma reservoir has gained the capability of reaching the 3-foot surcharge level above the historical maximum elevation of 750 feet above mean sea level (msl).

Santa Ynez River Hydrology Model

The hydrologic characteristics and impacts of the various alternatives were evaluated using the Santa Ynez River Hydrology Model (SYRHM), developed by the Santa Barbara County Water Agency (SBCWA). The SYRHM was first developed in 1979 and has since been used by water agencies to evaluate various management alternatives in the basin. Over the last two decades, the SYRHM has been expanded and modified in consultation with the Santa Ynez River Hydrology Committee, composed of technical hydrology experts from the US Bureau of Reclamation (Reclamation), the Member Units, the County Water Agency, the City of Lompoc, and the Santa Ynez River Water Conservation District (SYRWCD).

The SYRHM became the basis for numerous hydrologic studies of water releases for fish, water quality, and water rights in preparation of the Biological Assessment, NOAA Fisheries Biological Opinion (BO), the Lower Santa Ynez River Fish Management Plan, the Settlement Agreement of 2002, the Final EIR for the evaluation of Reclamations Applications for Modification of Water Permits 11308 and 11310 (Applications 11331 and 11332) (2011), and the Draft EIR/EIS (2003) on the Fish Management Plan and the BO (see references). The analyses for the additional City of Solvang river well pumping use the same programming model logic and assumptions as these previous studies. The SYRHM has been expanded by Stetson Engineers for fish flow operations, surface water salinity, and State Water Project imports. A detailed description of the modeling and the results of the hydrological simulations is provided by Stetson in the various technical memoranda noted above.

The Santa Ynez River between Bradbury Dam and Lompoc Narrows is divided into three reaches in the model: (1) Bradbury Dam-Solvang (Santa Ynez subarea), (2) Solvang-Buellton Bend (Buellton sub-area), and (3) Buellton Bend-Narrows (Santa Rita sub-area). The SBCWA expanded the SYRHM to incorporate a detailed version of the Bradbury-Solvang reach, in which the reach is divided into 12 segments between tributaries. This allows for a direct modeling of tributary flow contributions in the Bradbury Dam-Solvang reach of the SYRHM. This version of the model, referred to as SYRHM 498, was used for the analyses supporting the National Marine Fisheries Service (NMFS) Biological Opinion (BO), as well as for this EIR.

Emergency winter storm operations and ramping of outlet releases have not been included in the SYRHM due to its limitation (i.e., use of monthly time steps). [Winter storm operations and ramping of outlet releases would occur within days and are also not included.]

One element that is common to all of the operating criteria is the conjunctive operation of releases for purposes of satisfying downstream water rights with fish releases. This dual-purpose use would extend the period each year when instream flows improve fisheries habitat for over-summering and juvenile rearing within the mainstem.

It should be emphasized that the results presented in this EIR are the result of analyzing simulated operations using SYRHM. Simulated operations should not be confused with experience or real-time operations. Modeling of the proposed Master Plan Update used the historic hydrologic conditions from the period of record 1918 to 1993, which includes a wide range of rainfall conditions. For example, there were four significant dry periods in this period of record, as well as several very wet years. By using the historic period of record as the basis of the modeling, the hydrologic impacts can be predicted with significant certainty. Review of current precipitation data for Lompoc and Gibraltar Dam[16] shows that average annual rainfall for the project area from 1993 to 2010 is within the range of precipitation of the model historic period (14 to 30 inches).

The SYRHM operations have some limitations because the model uses monthly time steps. Other limitations of the SYRHM are related to real-time management decisions. For example, releases under Order WR 89-18, project delivery reductions in times of shortages, and SWP deliveries could vary based on real-time management decisions.

SYRHM does not reproduce historic operations because the model simulates current operations using historical hydrology (1918-1993). In other words, the SYRHM simulates operations using historical climatic and hydrologic data within acceptable limits of error. It is important to note that the analysis for the EIR is comparative in nature. Hence, all model simulations contain the same degree of error, and the use of the model for comparative purposes is valid.

Groundwater Model

Stetson[17] evaluated the potential impact of a combined pumping rate of 2,400 afy at Well Sites A and B. As discussed above, this is considered a conservative analysis of impacts as the Master Plan Update proposes to pump 1,980 afy and a portion of that will be pumped from existing wells located upstream of the Alisal Bridge. The estimated peak pumping rates range from just over 1.0 cfs in February to approximately 5 cfs in September. The previous analysis completed by Stetson (see Technical Memoranda

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16 Lompoc station: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca5064; Gibraltar 2 http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca3402

17 Stetson Engineers, Inc., Technical Memorandum No. 6. Additional Alternative Analyses for City of Solvang's CEQA Environmental Document for Time Extension for Water Right Permit 15878 – New Wells Downstream of Alisal Bridge, January 24, 2011. (**Appendix 5.1**).

Nos. 1 through 5) did not extend far enough to the west to include all of the proposed Well Sites A and B wells (**Figure 2.0-6**). In the previous analyses the City's new wells were located upstream of the Alisal Bridge. Under certain river conditions, primarily during the summer months, new wells in that location created well interference with both the Alisal Ranch wells and the ID No. 1 wells.

Stetson[18] utilized analytical methods to evaluate the impact of pumping on groundwater levels and depletion from the Santa Ynez River. Stetson used a Theis (1943)[19] drawdown analysis to evaluate the effect on groundwater levels under proposed Master Plan Update conditions.

The Theis method can be used to estimate drawdown in an aquifer at any distance from a pumping well or wells. It can simulate the boundaries of an aquifer using image wells. For this analysis, four new wells were assumed to be located in the proposed well field area at Well Site B with spacing between them of approximately 1,000 feet. Image wells were used to represent the northern and southern boundaries of the river and floodplain alluvium. The monthly total pumping rate for the City was divided evenly between these simulated wells. The monthly average pumping rate per well is estimated to range from about 140 gpm in February to 550 gpm in September. The analysis was simulated for 24 months to determine the potential drawdowns in the vicinity of the Well Sites that may occur over a summer period with no flow in the river, as well as for an extended dry period in which inflows may be less than about five cfs per month for two years.

Pumping by others in the reach of the Santa Ynez River alluvium below the Alisal Bridge (refer to **Table 4.0-1** for other permitted users) was not included in this analysis because: (1) the location and annual or monthly pumping is unknown and difficult to estimate; and (2) drawdown due to pumping is additive due to the principal of superposition such that the drawdown due to the proposed pumping can be added to current water levels experienced by well owners in the area.

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18 Stetson Engineers, Inc., Technical Memorandum No. 6. Additional Alternative Analyses for City of Solvang's CEQA Environmental Document for Time Extension for Water Right Permit 15878 – New Wells Downstream of Alisal Bridge, January 24, 2011. (**Appendix 5.1**).

19 The Theis method is a graphical method that involves steps to determine aquifer transmissivity and storativity in a confined aquifer under nonequilibirum (nonsteady state) radial flow conditions. This analysis is conservative for the Santa Ynez River alluvium which is an unconfined aquifer that would decline at a slower rate.

5.1.3 APPLICABLE REGULATIONS

5.1.3.1 Federal Regulations

Federal Pollution Control Act

The Federal Pollution Control Act,[20] commonly known as the Clean Water Act (CWA), was originally enacted in 1948. The primary purpose of the act is restoring and maintaining the chemical, physical, and biological integrity of the nation's water in order to achieve a level of water quality that provides for recreation in and on the water and the propagation of fish and wildlife. Section 208 of the CWA and the requirements of the Code of Federal Regulations require local water management plans. Preparation of these water management plans has been delegated to the individual states by the U.S. Environmental Protection Agency (US EPA), which is charged with implementing the CWA.

Pursuant to Section 404 of the federal CWA, the United States Army Corps of Engineers (USACE) regulates discharges of dredged and/or fill material into waters of the United States.[21] "Waters of the United States" is defined in USACE regulations such that navigable waters of the United States are those waters of the United States that are navigable in the traditional sense.[22] "Waters of the United States" is a broader term than "navigable waters of the United States" and includes adjacent wetlands and tributaries to navigable waters of the United States and other waters, the degradation or destruction of which could affect interstate or foreign commerce.

The CWA requires all states to conduct water quality assessments of their water resources to identify water bodies that do not meet water quality standards. The water bodies that do not meet water quality standards are placed on a list of impaired waters pursuant to the requirements of Section 303(d) of the CWA.

National Pollutant Discharge Elimination System

In 1972, the Federal Water Pollution Control Act (Clean Water Act) was amended to prohibit the discharge of pollutants to waters of the United States unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. The CWA focused on tracking point sources, primarily from wastewater treatment facilities and industrial waste dischargers, and required implementation of control measures to minimize pollutant discharges. The CWA was amended again in 1987, adding Section 402(p) to provide a framework for regulating municipal and industrial storm water discharges. In November 1990, the US EPA published final regulations that established requirements for specific categories of industries, including construction projects that encompass greater than or equal to 5

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20 US Code, Title 33, Federal Pollution Control Act, (1972 as amended), Sec. 1251–1387.

21 Ibid, Sec. 1344.

22 Ibid, Chapter II, Part 328.3, Definitions.

acres of land. The Phase II Rule became final in December 1999, expanding regulated construction sites to those greater than or equal to 1 acre. The regulations require that stormwater and non-stormwater runoff associated with construction activity, which discharges either directly to surface waters or indirectly through municipal separate storm sewer systems (MS4), must be regulated by an NPDES permit.

The US EPA has delegated management of California's NPDES program to the SWRCB and the nine regional board offices; the project site is located within the Central Coast Regional Water Quality Control Board (RWQCB), or Region 3. The NPDES program was established in 1972 to regulate the quality of effluent discharged from easily detected point sources of pollution such as wastewater treatment plants and industrial discharges. The 1987 amendments to the CWA[23] recognized the need to address non-point-source stormwater runoff pollution and expanded the NPDES program to operators of municipal separate storm sewer systems (MS4s), construction projects, and industrial facilities.

The State of California is required by Section 303(d) of the CWA[24] to provide the US EPA with a list of water bodies considered by the state to be impaired (i.e., not meeting water quality standards and not supporting their beneficial uses). The list also identifies the pollutant or stressor causing impairment, and establishes a schedule for developing a control plan to address the impairment, typically a total maximum daily load (TMDL). The TMDL specifies the amount of the target pollutant that the water body can sustain on a daily or annual basis and is established by amending the water quality control plan. TMDLs are prepared by the RWQCBs and result in amendments to the Water Quality Control Plan (WQCP), which must be approved by the US EPA. The 303(d) list is used by the US EPA to prepare the biennial federal CWA Section 305(b) Report on Water Quality.

5.1.3.2 State Regulations

California Porter-Cologne Act

The California Porter-Cologne Act of 1970[25] is largely responsible for creating the state's extensive regulatory program for water pollution control. As discussed above, preparation of water management plans has been delegated to the individual states by the US EPA. Pursuant to the Porter-Cologne Act, the responsibility for protection of water quality in California rests with the SWRCB. In turn, the SWRCB has delegated the regulation of the hydrologic basin to nine RWQCBs to regulate the nine hydrologic basins in the state. The Porter-Cologne Act gives the SWRCB and RWQCB broad powers to protect water quality by regulating waste discharges to water and land and by requiring cleanup of hazardous conditions.

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23 US Code, Title 33, Section 402(p), Clean Water Act, National Pollution Discharge Elimination System, Municipal and Industrial Stormwater Discharges, (2008).

24 Ibid, Section 303(d), Clean Water Act, Water Quality Standard and Implementation Plans, (1972).

25 California Water Code, Porter-Cologne Water Quality Act, (1970 as amended), Sec. 13000-14958.

State Water Resources Control Board

The State Water Resources Control Board (SWRCB) administers California's statutes pertaining to the law of water rights. California law recognizes and protects rights to the use of surface waters other than rights initiated pursuant to the Water Commission Act[26] or the Water Code[27]. Foremost among these are rights acquired by priority of appropriation initiated before December 19, 1914, commonly referred to as "pre-1914 rights" and riparian water rights, which are part and parcel of lands contiguous to streams or lakes.

In addition, the Water Code authorizes a proceeding whereby all rights to the use of surface waters within a given stream system, regardless of doctrinal origin, may be adjudicated on a system-wide basis.[28] This proceeding, known as a statutory adjudication, quantifies and prioritizes all water rights and integrates them into a comprehensive decree, thus producing a high degree of certainty and security of right.

California law also recognizes and protects rights to extract and use waters percolating beneath the surface of the land. Again, while the Water Code implies the existence of these groundwater rights, their doctrinal bases and characteristics are essentially the product of the decisions of our courts.

The SWRCB administers the NPDES General Permit for Storm Water Discharges associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ; as amended by Order No. 2010-0014-DWQ; NPDES General Permit No. CAS000002).[29] To obtain coverage under this General Permit, dischargers shall electronically file the Permit Registration Documents (PRDs), which include a notice of intent (NOI), Storm Water Pollution Prevention Plan (SWPPP), and other compliance-related documents required by this General Permit, and mail the appropriate permit fee to the SWRCB. It is expected that as the storm water program develops, the RWQCBs may issue General Permits or Individual Permits containing more specific permit provisions. When this occurs, the Statewide General Permit will no longer regulate those dischargers.

The PRDs must be submitted to the SWRCB prior to the beginning of construction for projects disturbing 1 acre or more of land, or whose projects disturb less than 1 acre but are part of a larger common plant of development that in total disturbs one or more acres, to be covered under the General Permit. The General Permit requires that a SWPPP identify potential sources of pollution and specify runoff controls, or best management practices (BMPs), during construction for the purpose of minimizing the discharge

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26 Water Commission Act, Cal. Stats. 1913. Approved by referendum December 19, 1914.

27 California Water Code, Section 1 to 26.

28 State Water Resources Control Board, Statutory Water Rights Law and Other Related Water Code Sections, January 2011.

29 California Environmental Protection Agency, State Water Resources Control Board, General Permit For Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2010-0014-DWQ, NPDES No. CAS000002.

of pollutants in stormwater from the construction area. In addition, the SWPPP must identify post-construction control measures and a monitoring plan.

Central Coast Regional Water Quality Control Board

The project site is located within the Central Coastal Basin, which is governed by the Central Coast RWQCB, also known as Region 3. The Central Coast RWQCB has jurisdiction over a 300-mile-long by 40-mile-wide section of the state's central coast. The Central Coast RWQCB has adopted a Water Quality Control Plan[30] (Basin Plan) in accordance with criteria contained in the CWA, California Porter-Cologne Water Quality Control Act, and other pertinent state and federal rules and regulations. The intent of the Basin Plan is to provide definitive guidelines and give direction to the scope of Central Coast RWQCB activities that will optimize the beneficial uses of the state waters within the Central Coastal Basin by preserving and protecting the quality of these waters. The intended beneficial use of water determines the water quality objectives. For example, drinking water must be of higher quality than the water used to irrigate pastures. Both of these are beneficial water uses, but the quality requirements for irrigation water are different from those for drinking water.

The Central Coast RWQCB implements the Basin Plan by issuing and enforcing waste discharge requirements for appropriate persons and groups; these can include individuals, communities, or businesses whose waste discharges may affect water quality. These requirements include, as applicable, both State Waste Discharge Requirements for discharge to land, or federally delegated NPDES permits for discharges to surface water. Dischargers are required to meet water quality objectives and, thus, protect beneficial uses. Additional information regarding these approvals is summarized above under the NPDES subsection.

California Planning and Zoning Law

The development of general plans in California is governed by Government Code Section 65302. Section 65302(a) establishes the requirements for the land use element of the general plan which requires cities and counties located within the state to review the Land Use, Conservation, and Safety elements of the general plan "for the consideration of flood hazards, flooding, and floodplains" to address flood risks.[31] Any amendment to the Land Use, Conservation, or Safety elements requires a review of other general plan elements for internal consistency, including the Housing Element.

The code also requires cities and counties in the state to annually review the land use element within "those areas covered by the plan that are subject to flooding identified by floodplain mapping prepared

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30 Central Coast Regional Water Quality Control Board, *Water Quality Control Plan*, 1994.

31 California Government Code, Sec. 65300-65303.4, Authority and Scope of General Plans.

by the Federal Emergency Management Agency (FEMA) or the Department of Water Resources." FEMA's floodplain mapping includes:

- Flood Insurance Rate Maps (FIRM)
- Digital Flood Insurance Rate Maps (DFIRM)

DWR's floodplain mapping includes:

- Awareness Floodplain Maps
- Best Available Mapping (BAM)
- Levee Flood Protection Zones (LFPZ) Maps
- Central Valley Floodplain Evaluation and Delineation (CVFED) Maps

Additionally, the location and designation of land uses in a general plan Conservation Element now "need to consider the identification of land and natural resources" that are used "for purposes of groundwater recharge and stormwater management."

California State Water Project

The California State Water Project (SWP) is the nation's largest state-built water and power development and conveyance system. It includes facilities—pumping and power plants; reservoirs, lakes, and storage tanks; and canals, tunnels, and pipelines—that capture, store, and convey water to 29 water agencies. Of the contracted water supply, 70 percent goes to urban users and 30 percent goes to agricultural users. The SWP provides supplemental water to approximately 25 million Californians and about 750,000 acres of irrigated farmland.

The SWP makes deliveries to two-thirds of California's population. It is maintained and operated by the California Department of Water Resources (DWR). Today, the SWP includes 34 storage facilities, reservoirs and lakes; 20 pumping plants; 4 pumping-generating plants; 5 hydroelectric power plants; and about 701 miles of open canals and pipelines.

Since the SWP became operational, the contracted needs for water from the SWP have increased. As a result, the SWP is not capable of delivering the full contracted allocation every year. The focal point of SWP supplies is the Bay-Delta, the largest estuary on the west coast, through which 60 percent of the freshwater used in the state must pass. In recent years, the delta smelt, winter-run chinook salmon, spring-run chinook salmon, and splittail were added as threatened or endangered species under the federal Endangered Species Act (ESA). These actions taken to protect the ecosystem of the Bay-Delta, along with others, have placed additional restrictions on SWP operations.

In 2007, federal Judge Wanger, and others, ruled that the Reclamation's Operating Criteria and Procedures (OCAP) for the federal Central Valley Project (CVP) and the Biological Opinion (BO) issued by the USFWS were to address CVP operation impacts on the delta smelt, a federally listed species. The court ordered that a new OCAP and a new BO be prepared. The revised OCAP and BO were completed in December 2008.[32] Reclamation provisionally accepted the Reasonable and Prudent Alternative (RPA) included in the final BO and stated that Reclamation needed additional time to determine whether implementation of the RPA by the CVP and SWP is reasonable and prudent.[33] Further, Reclamation has indicated that the actions required in the final BO have the potential to impact other endangered species (salmonids); thus the implementation of the RPA in the final BO needs to be coordinated with the National Marine Fisheries (NMFS) through Reclamation's ongoing consultation with NMFS regarding the effects of long-term operations. Until Reclamation completes its review, CVP and SWP pumping will be restricted.

In February 2008, the California Fish and Game Commission accepted the long fin smelt as a candidate species for listing under the California Endangered Species Act (CESA). The longfin smelt is a close relative to the delta smelt that lives in the San Francisco Bay Delta and is believed to be impacted by water exports from the San Joaquin River Delta.[34] As a result, the Commission adopted regulations meant to protect this species. Preliminary estimates of the possible impacts of longfin smelt protection on SWP deliveries are reductions between 0 and 400,000 afy.

Recent rulings by Judge Wanger on May 18, 2010 (in regards to salmonids) and May 27, 2010 (in regards to delta smelt) indicated that federal agencies did not comply with environmental law when they imposed actions to protect the salmonids and delta smelt fish species. The environmental document analyzing potential environmental impacts to fish species as a result of water pumping failed to comprehensively and competently evaluate whether the alternatives can be prescribed and did not comply with the National Environmental Policy Act (NEPA). The NEPA document also failed to evaluate the significant detrimental effects on the human environment.

On December 14, 2010, Judge Wanger found that because of numerous deficiencies he identified in the BO, the BO is arbitrary, capricious, and unlawful, and should be remanded to the U.S. Fish and Wildlife Service (USFWS) to address the deficiencies in the BO.[35] On May 4, 2011, Judge Wanger ruled that the

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32 US Department of Interior, Fish and Wildlife, Formal Endangered Species Act Consultation on the Proposed Coordinated Operations of the Central Valley Project (CVP) and State Water Project (SWP), December 15, 2008.

33 US Department of Interior, Bureau of Reclamation, memorandum regarding Biological Opinion for Delta Smelt, dated December 15, 2008.

34 The Bay Institute, Center for Biological Diversity, and the Natural Resources Defense Council, "Petition to List the San Francisco Bay-Delta Population of Longfin Smelt as Endangered Under the Endangered Species Act," (August 8, 2007).

35 Environmental Law Network, "Judge Wanger Issues Ruling in the Delta Smelt Consolidated Cases, Remands Biological Opinion to US Fish and Wildlife Service," (December 21, 2010).

deadline to address concerns in the 2008 BO will be extended to 2013. In the meantime, the ruling on the 2008 BO remains in place.[36]

On August 31, 2011, Judge Wanger issued an order partially enjoining[37] the Fall X2 Action[38] of the 2008 BO prohibiting the federal CVP and SWP from operating to set X2 further downstream than 79 kilometers (km) for the purpose of meeting the requirements of the 2008 BO. On September 20, 2011, Judge Wanger issued a Memorandum Decision on the merits in the challenge to the 2008 BO. On December 13, 2011, Reclamation transmitted a memorandum to the USFWS outlining a process by which Reclamation intends to develop a new project description, including actions intended to protect listed species, through a NEPA process.[39] The first draft BO has been prepared in response to Judge Wanger's May 4, 2011, amended Final Judgment.

The DWR issues the SWP Delivery Reliability Report every two years, with the Draft State Water Project Reliability Report 2011 being the most recent.[40] The 2011 draft report accounts for impacts to water delivery reliability associated with climate change and recent federal litigation. Based on information from the 2011 Draft SWP Reliability Report, the average reliability of future SWP Table A deliveries through 2031 is projected to be approximately 60 percent (2,466 acre-feet out of a maximum delivery of 4,133 acre-feet); the forecast for estimated maximum annual delivery is approximately 98 percent (4,063 acre-feet out of a maximum delivery of 4,133 acre-feet).[41] The SWP Table A water deliveries under future conditions are similar between the 2009[42] and 2011 Reports, with estimated average and minimum annual deliveries decreasing by 1 percent and 3 percent, respectively. The percentage of allocations is based on computer modeling of the state's watersheds, past hydrology adjusted for climate change, recent federal litigation, and the condition of the river and reservoir systems.

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36 John Ellis, "Deadline for smelt protection plan extended," *The Fresno Bee*, May 4, 2011, Local – Crime & Court News – Court civil cases section.

37 Enjoining: A judicial remedy issued in order to prohibit a party from doing or continuing to do a certain activity.

38 Reasonable and Prudent Alternative Component 3, Action 4 of the which is the requirement to maintain a monthly average location of two parts per thousand salinity (X2) no greater (more eastward) than 74 km from the Golden Gate Bridge in "wet" water years and 81 km from the Golden Gate Bridge in "above normal" water years. The average monthly location of X2 in the fall must be maintained in September and October (in November, the Fall X2 Action requires the CVP and SWP to adjust their upstream reservoir releases to prevent the storage of inflow).

39 US Fish and Wildlife Service, *First Draft 2011 Formal Endangered Species Act Consultation on the Proposed Coordinated Operations of the Central Valley Project and State Water Project, Consultation History*, December 14, 2011.

40 California Department of Water Resources, Bay-Delta Office, *Draft - The State Water Project Delivery Reliability Report 2011*, January 2012. The Draft 2011 reliability report issued in January 2012 shows similar SWP water reliability as the Final 2009 report.

41 Ibid, page 63, Table 7.1

42 California Department of Water Resources, Bay-Delta Office, *The State Water Project Delivery Reliability Report 2009*, August 2012.

Water purveyors make annual requests to the DWR for water allocations and DWR makes an initial SWP Table A allocation for planning purposes, typically in the last month before the next water delivery year. Throughout the year, as additional information regarding water availability becomes available to DWR, its allocation/delivery estimates are updated. **Table 5.1-1, Department of Water Resources Table A Water Allocations, 2005–2012,** outlines the historic reliability of SWP deliveries, including their initial and final allocations for the past 7 years.

Table 5.1-1
Department of Water Resources Table A
Water Allocations, 2005–2012

Year	Initial Allocation	Final Allocation
2005	40 percent	90 percent
2006	55 percent	100 percent
2007	60 percent	60 percent
2008	25 percent	35 percent
2009	15 percent	40 percent
2010	5 percent	50 percent
2011	25 percent	80 percent
2012	60 percent	60 percent
Average	**36 percent**	**64 percent**

Source:
Department of Water Resources (DWR), Water Contract Branch within the State Water Project Analysis Office, Notices to State Water Contractors, 2005–2012.
The 2012 Allocation was increased from 50 percent to 60 percent by DWR on April 16, 2012.

The DWR's SWP allocations for 2012 resulted in statewide average delivery to be 60 percent of the Table A amounts.[43] This final allocation reflects recent precipitation, current water supply conditions, SWP operational constraints of the current BO, for the Sacramento San Joaquin Delta and 2012 contractor demands.

Interim Enhanced Surface Water Treatment Rule

In 1998, the US EPA promulgated the Interim Enhanced Surface Water Treatment Rule.[44] The EPA published a revision in 2001, as required by the 1996 Safe Drinking Water Act (SDWA) Amendments that provide increased public health protection against microbial pathogens, specifically the protozoan

43 Department of Water Resources, California State Water Project, Notice to State Water Contractors, 12-07, 2012 State Water Project Increase to 60 Percent, April 14, 2012.

44 Federal Register 63 (241), 69478-69521, December 16, 1998.

Cryptosporidium. Additionally, in 2001 the US EPA promulgated the Filter Backwash Recycling Rule,[45] also as required by the SDWA.

California currently requires water suppliers to filter and disinfect surface water and ground water under the influence of surface water pursuant to Chapter 17 (commencing with section 64650 of Title 22, Division 4 of the California Code of Regulations). Since California must adopt federal regulations to maintain primacy for the Drinking Water Program, the regulation package incorporates all the federal revisions. The regulation package also includes provisions in addition to the federal revisions.[46]

The California Department of Public Health (CDPH) was created and took over the duties, powers, purposes, functions, responsibilities, and jurisdiction of the California Department of Health Services, pursuant to Health and Safety Code.[47]

Disinfectants/Disinfection By-Products Rule

Community water systems and non-transient, non-community (community water system that regularly serves at least the same 25 persons over six months per year) water systems that treat their water with a chemical disinfectant in any part of the treatment process, or which provide water that contains a chemical disinfectant shall comply with the requirements of the Disinfection Rule. Systems using approved surface water and serving fewer than 10,000 persons and systems using only groundwater not under the direct influence of surface water were required to comply beginning January 1, 2004.[48]

5.1.3.3 Local Regulations

City of Solvang

General Plan Safety Element

The City of Solvang's Safety Element[49] identifies issues involving potential hazards and public safety considerations relevant to the City. The Safety Element sets forth goals, objectives, and policies to provide for public health, safety, and welfare. The following objectives and policies are applicable to the proposed Master Plan Update:

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45 Federal Register 66 (111), 31086-31105, June 8, 2001.

46 California Code of Regulations, Title 22, Division 4, Chapter 17, "Surface Water Treatment."

47 Health and Safety Code Section 131051, et seq.

48 California Code of Regulations, Title 22, Division 4, Chapter 15.5, "Disinfectant residuals, Disinfection Byproducts, and Disinfection Byproduct Precursors."

49 City of Solvang, General Plan, *Safety Element*, 1988.

Goal 3.1 Minimize hazards to public health, safety, and welfare resulting from natural and man-made phenomena.

Objective 2.0 Establish siting and development standards to reduce risk and damage from flood hazards.

Policy 2.a The City shall enact an ordinance which specifies the types of land uses to be permitted within 100-year flood hazard areas and which requires all structures proposed within 100-year flood zones to be elevated at least one foot above the 100-year flood level.

Policy 2.b The City shall require the submittal of information prepared by a qualified civil or hydrological engineer that certifies compliance within development standards established for 100-year flood zones.

Objective 3.0 Minimize the adverse effects of urbanization upon drainage and flood control facilities

Policy 3.a The City shall require the implementation of adequate erosion control measures for development projects to minimize sedimentation damage to drainage facilities.

Municipal Code

The City of Solvang Municipal Code provides for regulation of flood issues that affect public safety. The Municipal Code Flood Control Chapter[50] promotes the public health, safety, and general welfare, and minimizes public and private losses due to flood conditions in specific areas. Provisions in the code are designed to protect human life and health; minimize expenditure of public money for costly flood control projects; to minimize damage to public facilities and utilities such as water, gas main, electric, telephone, and sewer lines; and streets and bridges located in areas of special flood hazard. The Municipal Code also includes construction standards in all areas of special flood hazards.

County of Santa Barbara

A portion of the proposed Well Site B is located in unincorporated Santa Barbara County. Therefore, portions of the County of Santa Barbara General Plan and the Santa Ynez Valley Community Plan and ordinances are applicable to the proposed Master Plan Update.

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50 City of Solvang Municipal Code, Title 13, "Flood Control."

Santa Ynez Valley Community Plan

The Santa Ynez Valley Community Plan[51] (SYVCP) includes by reference relevant policies of the County's Comprehensive General Plan.[52] The SYVCP also contains development policies specific to the Santa Ynez Valley Region along with measures to implement those policies.

Land Use and Development Codes and Zoning Ordinances

Land use and development within unincorporated Santa Barbara County is governed by the Land Use and Development Code and Zoning ordinances.[53] Each piece of property within the unincorporated portions of Santa Barbara County has been assigned to a specific zone (e.g. residential, commercial, industrial) which describes the rules under which that land may be used. A development proposal must comply with the property's zone requirements, including its permitted uses, density, setbacks, parking requirements, minimum lot size, etc. In addition, the Land Use and Development Code and zoning ordinances contain general regulations and permit regulations which further describe the way property may be developed and the conditions under which projects may be approved.

The County Code also controls development adjacent to watercourses in the unincorporated areas of the County of Santa Barbara.[54] The controls are necessary to:

a) Prevent undue damage or destruction of development by flood waters;

b) Prevent development on one parcel from causing undue detrimental impact on adjacent or downstream properties in the event of flood waters;

c) Protect the public health, safety and welfare.

The County Code places certain restrictions on development along watercourses including_construction, or placement of a development subject to a building or grading permit within fifty feet of the top of the bank of any watercourse, or within two hundred feet from the top of the bank of the Santa Ynez River, the Santa Maria River, the Sisquoc River and the Cuyama River unless previously approved. The County Code defines "Development" as any man-made change to improved or unimproved real property,

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51 County of Santa Barbara, Planning & Development Department, Long Range Planning Division, *Santa Ynez Valley Community Plan*, 2009.

52 County of Santa Barbara, Planning & Development Department, Long Range Planning Division, *Santa Barbara County Comprehensive Plan*, 1991.

53 Ibid, County Code, Chapters 21 – Land Division and 35 – Zoning.

54 Ibid, Chapter 15B - Development Along Watercourses.

including but not limited to buildings or structures, mining, dredging, filling, grading, paving, excavation or drilling operations.

Santa Barbara County Public Works Department

The County of Santa Barbara Public Works Department's Water Resources Division includes two separate dependent special districts: the Santa Barbara County Flood Control and Water Conservation District ("Flood Control District") and the County Water Agency ("Water Agency").

Flood Control District

The primary purpose of the Santa Barbara County Flood District is to provide flood protection and to conserve storm, flood and surface waters for beneficial public use. The District was empowered through the California Water Code[55] to pursue various activities including the control of flood and storm waters and the conservation of such waters for beneficial use, to cooperate with other federal, state, and local agencies; and to review adequacy of drainage plans for new subdivisions within the County.

Today, the Flood Control District's major programs involve channel maintenance, design and construction of capital improvements, review of new development, and operation of a hydrological data collection/flood warning system. The Flood Control District is divided into ten active flood control zones including most of the county unincorporated area and the seven cities in the County.

Water Agency

The Santa Barbara County Water Agency was established to control and conserve storm, flood and other surface waters for beneficial use and to enter into contracts for water supply. Today, the Water Agency is primarily involved in projects for the storage, diversion, transportation, delivery and sale of water. It prepares investigations and reports on the County's water requirements, the water needs of projected development and the efficient use of water. It provides technical assistance to other County departments, water districts, and the public concerning water availability and water well locations and design. The Water Agency also administers the Cachuma Project Dam Project contract with the Reclamation.

The Water Agency was originally empowered under the State Water Code to cooperate and contract with the United States and the State of California on behalf of municipalities and districts within the Agency's boundaries. It has since been empowered to also acquire property, condemn for the purpose of right-of-way, and assume indebtedness either as principal, guarantor, or underwriter.

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55 California Water Code, Division 5, Flood Control, Chapter 2 Flood Control in Counties, Article 3 Flood Control Districts.

5.1.3.4 Santa Ynez River Water Rights

The SWRCB administers water rights along the Santa Ynez River. Reclamation's Bradbury Dam, which forms Lake Cachuma, the largest of three reservoirs on the River. Water from Lake Cachuma is released into the Santa Ynez River below Bradbury Dam to satisfy downstream water rights. As shown on **Table 4.0-1**, numerous entities maintain water right applications, permits and licenses for diversion and use below the Dam to the U.S. Highway 101 Bridge, these include John V. Crawford, Anne V. Crawford, the City of Solvang, the Palmer Gavit Jackson Trust (Alisal Ranch), Santa Ynez River Water Conservation District Improvement District No. 1 (ID No. 1) and Reclamation.

In 1958, the SWRCB issued water right Permits 11308 and 11310 to Reclamation to store and use waters flowing to the ocean, including flood flow waters from the Santa Ynez River to provide a critically needed water supply for agricultural and urban users along the South Coast of Santa Barbara County and in the Santa Ynez Valley. Reclamation completed construction of Bradbury Dam in 1953, to form Lake Cachuma. Reclamation holds the Cachuma Project water right permits for the benefit of the Cachuma Project Member Units. The Member Units consist of the Montecito Water District, the City of Santa Barbara, Goleta Water District, Carpinteria Valley Water District, and the Santa Ynez River Water Conservation District, ID No. 1. SYRWCD ID No. 1 includes all of Solvang in its service area and provides a portion of Solvang's water supply. The SWRCB recently completed the Final EIR and is currently considering modifications to Reclamation's water right permits 11308 and 11310 (applications 11331 and 11332).

Biological Opinion (BO) for Reclamation's Operation and Maintenance of Bradbury Dam

A BO for the Reclamation's operation and maintenance of the Cachuma Project on the Santa Ynez River in Santa Barbara County, California[56] was issued by the NMFS in September of 2000 for the Reclamation operation and maintenance of Bradbury Dam (the Cachuma Project) on the Santa Ynez River in Santa Barbara County, California. NMFS is the Federal agency that oversees protection of Southern California steelhead (*Oncorhynchus mykiss* or *O. mykiss*). The BO addresses the effects of the proposed Cachuma Project operations on steelhead and its designated critical habitat in accordance with Section 7 of the Endangered Species Act of 1973.

The BO covered the proposed changes to Cachuma Project operations to improve habitat conditions downstream of Bradbury Dam for the steelhead, while maintaining current water deliveries. NMFS concluded that the new Cachuma Project operations are not likely to jeopardize the continued existence

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56 US Bureau of Reclamation and the National Marine Fisheries Service, Southwest Region, *Biological Opinion for the US Bureau of Reclamation operation and maintenance of the Cachuma Project on the Santa Ynez River in Santa Barbara County, California*, 2000.

of the Southern California steelhead, and if carried forward many years into the future, are likely to appreciably increase the likelihood of survival and recovery of the species.

The new operations in the BO focused on two major areas: (1) flow-related enhancement, and (2) tributary enhancement measures. Flow-related enhancement includes releases to maintain habitat for steelhead and releases to provide additional opportunities for steelhead to migrate into the system to spawn. Water for these releases is provided from "surcharging" Lake Cachuma in spill years and the year following a spill or from project yield in years when the reservoir does not spill. Additional actions are included for several tributaries downstream of Bradbury Dam. These actions include improving fish passage at existing impediments, purchasing conservation easements to protect good habitat, and planting trees along streambanks, among others.

Many of the proposed operations are being implemented based on an adaptive management strategy. This strategy allows managers to take advantage of new opportunities, evaluate current actions, and make changes as necessary to benefit steelhead. A long-term monitoring program is also required.

Cachuma Project Settlement Agreement

The Cachuma Project Settlement Agreement,[57] for the first time in many decades, brought peace among the various parties with water right interests in the Lower Santa Ynez River. The parties to the Settlement Agreement are the Cachuma Conservation Release Board, ID No. 1, the Santa Ynez River Water Conservation District (SYRWCD), and the City of Lompoc. The City of Solvang subscribed to the Settlement Agreement as a member of SYRWCD.

The Settlement Agreement was executed in 2002 and resolves key issues related to the protection of downstream water rights. Through negotiation of the Settlement Agreement, the parties developed a detailed understanding of downstream water quality and supply impacts, as well as impacts to Cachuma Project supplies. Those impacts, while adding to water management challenges for water users downstream of Bradbury Dam and in Santa Barbara County's South Coast Region, are understood and accepted by the parties.

The Settlement Agreement is partially dependent upon implementation of the fisheries management actions identified in the Cachuma Project BO and Lower Santa Ynez River Fish Management Plan (FMP)[58] for the protection of endangered steelhead. It also adopts agreed upon Modified Winter

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57 Cachuma Conservation Release Board, Santa Ynez River Water Conservation District, Santa Ynez River Water Conservation District Improvement District No. 1, City of Lompoc, *Settlement Agreement Relating to Operation of the Cachuma Project*, 2002.

58 Santa Ynez River Consensus Committee, *Lower Santa Ynez River Fish Management Plan*, 2000.

Storm Operations to minimize flooding in the lower river. Lastly, the parties agreed to cease all future litigation against one another regarding their respective water rights.

Reclamation holds the Cachuma Project water right permits for the benefit of the Cachuma Member Units. Although not a signatory, Reclamation strongly endorsed the Settlement Agreement and formally requested that the SWRCB modify certain terms of WR 89-18 determined by the parties to be necessary to protect water rights on the Santa Ynez River downstream of Bradbury Dam.

The SWRCB's consideration of modifications to Cachuma Project permits includes minor technical modifications to WR 89-18, as well as other provisions of the Settlement Agreement. The SWRCB has the authority to issue a decision acknowledging the Settlement Agreement, including the proposed modifications to WR 89-18, as the means for resolving the public trust and water right issues identified as "key issues" in Phase 2[59] of the Cachuma Project Water Right hearings. Phase 2 has been pending since 2003. The SWRCB recently (April 2012) admitted the Final EIR[60] for the Cachuma Project into the hearing record.[61] It is anticipated that a decision on changes to water rights permits 11308 and 11310 (applications 11331 and 11332) will be made later in 2012.

SWRCB EIR on Modifications to Cachuma Project Water Right Permits

Because the SWRCB is evaluating various alternatives to existing Cachuma Project operations, it decided to prepare an EIR on Modifications to Reclamation's Cachuma Water Right Permits. A Draft EIR was published in August 2003. Based on testimony presented at the Phase 2 Hearing, the SWRCB issued a revised Draft EIR in July 2007 that included two new alternatives. The SWRCB released a Revised Draft EIR in April 2011 and the Final EIR in December 2011. The Final EIR is the last remaining evidentiary document that the SWRCB must consider prior to rendering a decision and a new water right order for the Cachuma Project; the Final EIR was admitted in the hearing record on April 5, 2012.[62]

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59 Phase 2 addressed continued delivery of vital water supplies, and protection of the steelhead fishery downstream of Lake Cachuma.

60 State Water Resources Control Board, Final Environmental Impact Report, Consideration of Modifications to the U.S. Bureau of Reclamation's Water Right Permits 11308 and 11310 (Applications 11331 and 11332) to Protect Public Trust Values and Downstream water Rights on the Santa Ynez River below Bradbury Dam (Cachuma Reservoir), SCH # 1999051051, December 2011.

61 State Water Resources Control Board, Cachuma Project Hearing – Applications 11331 and 11332 – Ruling, April 5, 2012. Accessed via the web at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/cachuma/docs/cachuma_feir%20ruling_040512.pdf.

62 Ibid.

The eventual outcome of the hearing is unknown, as well as when the SWRCB may issue a new water right order. Future SWRCB actions regarding the Cachuma permits may or may not modify the current appropriations for diversion of water from the Santa Ynez River.

Lower Santa Ynez River Fish Management Plan

The primary goal of the Lower Santa Ynez River Fish Management Plan (FMP)[63] is to provide physical projects and management strategies that will protect, enhance, restore, and create new habitat for spawning and rearing of endangered steelhead. The FMP also seeks a balance between fish management, other ecological needs, the delivery of adequate water supplies to customers of local water agencies, and groundwater recharge downstream of Bradbury Dam.

Memorandum of Understanding for Fish Studies

Two Memoranda of Understanding (MOU) were executed in 1994 and 1995 by the public agencies with water rights on the Santa Ynez River. In 2001, essentially the same group of public agencies entered into a MOU[64] that shifted from studies to Implementation of steelhead management actions including habitat improvements, removal or modification of numerous fish passage barriers on the tributaries, and fish water releases for target rearing flows and supplementary migration passage flows as specified in the BO and FMP. The Fish Reserve Account was effectively superseded. Instead, "surcharging" the reservoir in spill years provides about 9,200 acre-feet of water, which is wholly dedicated to the downstream fishery, with 3,200 acre-feet reserved for passage supplementation, 500 acre-feet reserved for adaptive management actions, and the balance to meet those target rearing flows rates established for various hydrological conditions. The downstream target flows must be met regardless, so when the surcharge water is depleted, target flows are provided from the Cachuma Project yield.

Adaptive Management Account

Reclamation proposed to create an Adaptive Management Account to provide additional releases for future habitat needs that may be identified under an adaptive management program. Under Reclamation's operating plan, Reclamation will allocate 500 acre-feet to the account in years when the reservoir surcharges at 3 feet. Though the reservoir was surcharged at 2.47 feet in 2005, the full 500 acre-feet was allocated to the Adaptive Management Account. The account is not subject to evaporation or seepage losses, and can be carried over to subsequent years. The account is used at the discretion of an Adaptive Management Committee (AMC) to benefit *O. mykiss* and its habitat as determined by the

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63 Santa Ynez River Consensus Committee, *Lower Santa Ynez River Fish Management Plan*, 2000.

64 State Water Resources Control Board, Fisheries Memorandum of Understanding, (2001).

committee, which is composed of Reclamation, NMFS, CDFG, USFWS, CCRB, ID No. 1, SYRWCD, and Lompoc.

Agreement Between Alisal Ranch and Improvement District No. 1

Alisal Ranch has five irrigation wells including three for the golf course north of the Santa Ynez River, herein referred to as the River Course, and two for the golf course south of the river along Alisal Creek, herein referred to as the Ranch Course. Alisal Ranch also has as a monitoring well (Alisal Ranch Monitoring Well No. 3, 6N/31W-22F1 [22F1]) upstream of the Alisal Bridge, near the confluence of Alamo Pintado Creek and the Santa Ynez River. This well is measured monthly by Reclamation.

An existing agreement between the ID No. 1 and the Alisal Ranch (Petan Company) on the grant of permanent easement provides for the monitoring of observation well 22F1. The grant of permanent easement was dated August 18, 1981, and was later amended on December 29, 1981. According to the agreement, as amended, if water levels in well 22F1 are at or below the elevation of 375 feet and the Alisal Ranch's ability to pump is significantly adversely impaired, then ID No. 1 must stop its pumping from the 6 cfs well field or provide water to the Alisal Ranch Golf Course. The historical lowest groundwater elevation was measured at 375 feet before ID No. 1 began pumping upstream. Under this agreement, ID No. 1 will have to stop pumping groundwater, or supply water to Alisal Ranch, before the City would have to stop pumping or supply water.

5.1.4 EXISTING CONDITIONS

5.1.4.1 Santa Ynez River Watershed

The Santa Ynez River watershed encompasses about 900 square miles and is located in the central part of Santa Barbara County, as shown in **Figure 3.0-2**, **Santa Ynez River Watershed**. The south side of the basin is formed by the Santa Ynez Mountains. These mountains, ranging in elevation from 2,000 to 4,000 feet, separate the Santa Ynez River basin from the South Coast of the County. The Purisima Hills and the San Rafael Mountains, which range in elevation from 4,000 to 6,000 feet, form the north side of the basin.

The Santa Ynez River Basin has a Mediterranean climate with hot, dry summers and cool, wet winters. Almost all precipitation occurs between November and April; large variations in annual quantities occur within the basin. Annual rainfall ranges from about 14 inches near the ocean to about 30 inches at Juncal Dam with higher rates in the headwater areas due to orographic effects.

The Santa Ynez River flows westerly about 90 miles to the Pacific Ocean, passing through Jameson Lake, Gibraltar Reservoir, and Lake Cachuma. Immediately above Lake Cachuma, the river passes through a narrow valley between the San Rafael and Santa Ynez mountains. Below Bradbury Dam, the river passes

between the Santa Ynez Mountains and the southern edge of the Santa Ynez Upland, and through the broad part of the valley near Buellton, as shown in **Figure 5.1-1, Lower Santa Ynez River**. West of Buellton, the river flows through a narrow meandering stretch, then emerges onto the broad, flat Lompoc Plain. The Santa Ynez River flows across the Lompoc Plain for about 13 miles and empties into the Pacific Ocean.

Surface water diversions from the Santa Ynez River Basin are made primarily from Juncal, Gibraltar, and Bradbury dams that regulate flow in the upper portion of the watershed. These facilities divert water from the river for agricultural, municipal and industrial uses in the Santa Ynez Valley (Cachuma Project only) and on the South Coast of Santa Barbara County. About 10 percent of Cachuma Project supply is provided to ID No. 1 for municipal and agricultural uses in the Santa Ynez Valley.

Juncal and Gibraltar dams are located above Bradbury Dam (Lake Cachuma), and regulate 14 and 216 square miles of watershed, respectively. Lake Cachuma regulates about 417 square miles, or less than half of the Santa Ynez River Basin. **Section 3.0, Environmental Setting** contains additional information on the dams located along the Santa Ynez River.

The average annual runoff of the Santa Ynez River at Bradbury Dam was about 71,400 afy from 1953 to 1992. The average annual runoff for the Santa Ynez River at the Narrows is about 66,500 afa for the same period. The Narrows flow includes the effects of Lake Cachuma winter spills averaging about 34,800 afa and summer river releases of about 7,000 afy.

Data available from Reclamation for the period 2001 through 2010 (10 water years after the BO) shows that the average annual runoff of the Santa Ynez River at Bradbury Dam (reported as inflows in to Lake Cachuma) is about 86,900 afa and at the Narrows is currently about 91,900 afa, including the effects of Lake Cachuma winter spills, which average approximately 42,000[65] afa and average river releases of approximately 10,100 afa for the same period (2001 through 2010).[66]

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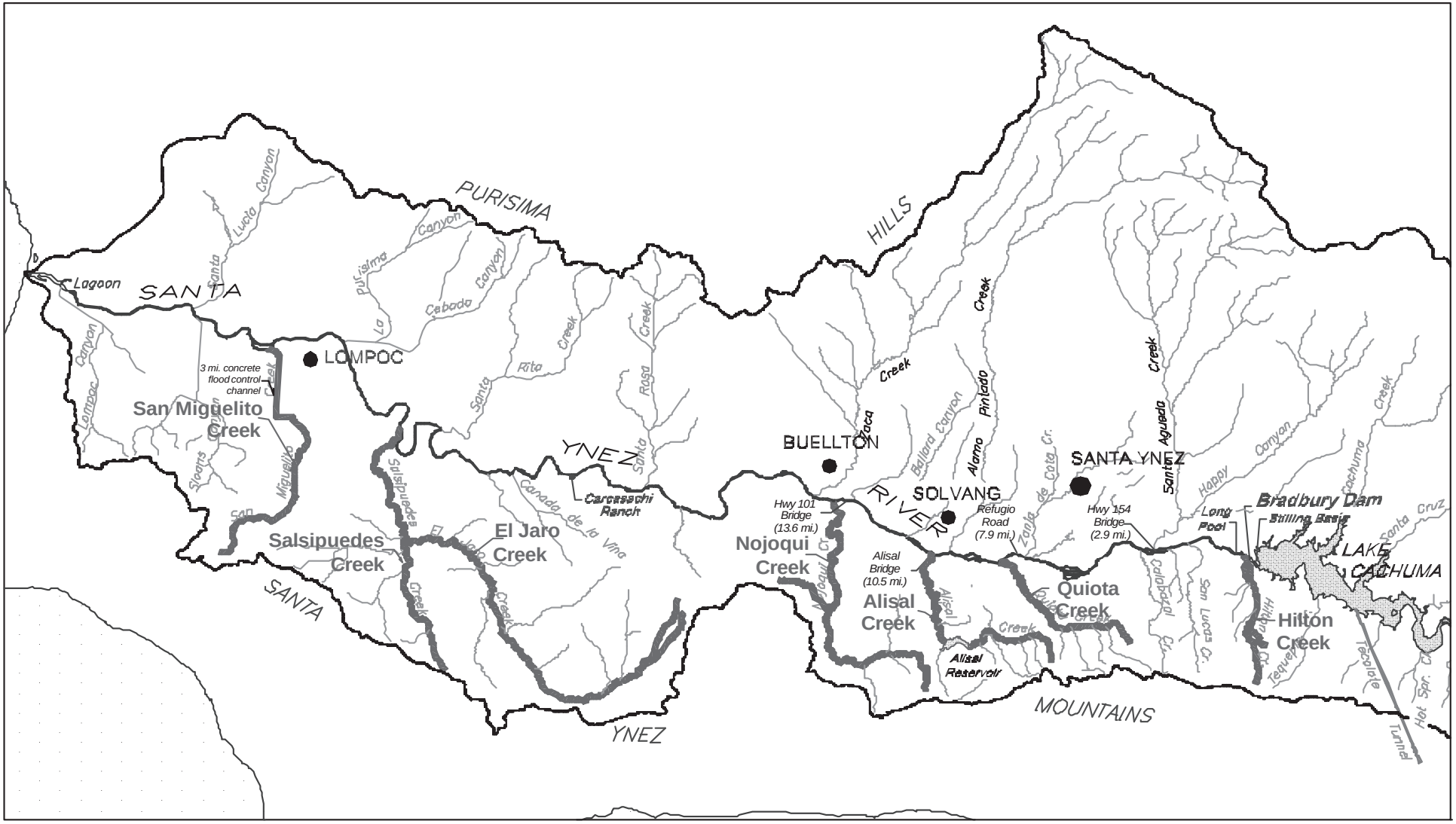
65 Four winter spills occurred during the period 2001 to 2010 in years 2001, 2005, 2006, and 2008.

66 Bureau of Reclamation, "Central Valley Operations Office," http://www.usbr.gov/mp/cvo/reports.html.



SOURCE: Santa Ynez River Consensus Committee, Lower Santa Ynez River Fish Management Plan - October 2000

FIGURE **5.1-1**

Meridian Consultants

Lower Santa Ynez River

001-001-12

5.1.4.2 Lake Cachuma Operations

Under the Reclamation Act of 1939 and Permits 11308 and 11310, water appropriated using Cachuma Project facilities may be used for municipal, industrial, domestic, irrigation, salinity control, and incidental recreation purposes. The Cachuma Project provides about 65 percent of the total water supplies for the Member Units who provide water to an estimated 207,000 people along the South Coast and in the portion of the Santa Ynez Valley within the ID No. 1 service area including Solvang. Approximately 38,000 acres of croplands are irrigated by water from the Cachuma Project. Approximately 30 percent of total deliveries are used for purposes of irrigation, and 70 percent are used for municipal and industrial purposes.

Lake Cachuma Yield and Deliveries

The initial planning studies that supported the original Cachuma Project contract indicated that the project could deliver a safe yield of 32,000 afy. Safe yield is usually defined as the amount of water a project can be expected to deliver over a sustained hydrologic period (i.e., a period that preferably is long enough to contain wet periods as well as droughts). Since the 1950s, the original estimate of safe yield has been reduced several times based on: (1) use of a longer hydrologic period that incorporates a key drought period, 1946-51; and (2) loss of reservoir storage due to ongoing sedimentation.

In 1995, the 25,908 afy estimate of Lake Cachuma' s operational yield was developed for the Contract Renewal EIR/EIS.[67] Operational yield is usually defined as that amount of water supply that can be delivered in all years with acceptable shortages or deficiency levels in critically dry years. The estimated operational yield, 25,908 afy was based on hydrologic model simulations using the SBCWA's Santa Ynez River Hydrologic Model (SYRHM). The hydrologic period of analysis for the model simulations included the water years 1918 through 1992. Key assumptions in the modeling included Lake Cachuma' s capacity of 190,409 acre-feet, a minimum pool of 12,000 acre-feet, and a maximum allowable shortage of 20 percent in any single year with shortages beginning when the lake storage recedes to 100,000 acre-feet. The Member Units consider the 20 percent deficiency criterion to be an acceptable level of shortage. A higher operational yield for Lake Cachuma can be attained, but it would increase the risk of a shortage greater than 20 percent in any single year.

Under the original Cachuma Project water supply Master Contract between Reclamation and the Santa Barbara County Water Agency (the County in turn signed contracts with the Member Units), the Member Units were entitled to 32,000 afy, based on the initial estimate of Cachuma' s safe yield. However, with

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67 US Bureau of Reclamation, Cachuma Project Authority, *Contract Renewal EIR/EIS* (1995).

the exception of deliveries in 1976, the Member Units have requested annual deliveries that are lower than the original entitlement in order to avoid shortages in dry years.

Under the current Master Contract, Reclamation delivers an annual amount to the Member Units that does not exceed the "Available Supply." The latter represents the maximum amount of Lake Cachuma water that is available after Reclamation has met all requirements for water for other purposes under current and future state and federal laws, permits, orders, and requirements. Hence, Available Supply does not include water released pursuant to SWRCB Orders WR 89-18 and WR 94-5 for downstream groundwater replenishment, or water released for fish under WR 94-5 and the flow requirements of the BO issued by NMFS for the endangered southern steelhead.

However, an operational yield of 25,714 afy has been maintained by Member Units based on the new estimate of reservoir capacity completed in 2000; since 1993, this is the maximum Lake Cachuma allocation.[68] In essence, this delivery limit constitutes an estimate of operational yield developed by the Member Units.

Conveyance and Releases of SWP Water

Deliveries and Allocations

Beginning in 1997, water from the SWP has been delivered to ID No. 1 and the South Coast Member Units. For the latter, SWP water is delivered to Lake Cachuma through the outlet works in Bradbury Dam. The SWP water mixes with water in Lake Cachuma, and an equivalent amount is removed from the lake through the Tecolote Tunnel to deliver SWP water to the South Coast. ID No. 1 receives its SWP entitlement by direct delivery from the Central Coast Water Authority (CCWA) pipeline. In addition, ID No. 1 receives SWP water directly under an exchange agreement with South Coast Member Units, although this water is not included in ID No. 1's SWP entitlement. The 1,500 acre-feet of ID No.1 contract allocation that is contractually assigned to Solvang is delivered directly to Solvang at a separate connection to the CCWA pipeline in the City.

SWP contract entitlements for the Member Units are listed below:[69]

- Carpinteria Valley Water District – 2,000 afy
- Montecito Water District – 3,000 afy
- City of Santa Barbara – 3,000 afy

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68 State Water Resources Control Board, *Cachuma Project Water Right Hearing Final EIR*, December 2011, 4.3-14.

69 Ibid, *Cachuma Project Water Right Final EIR*, December 2011, 2.0-12.

- Goleta Water District – 4,500 afy (Goleta Water District has an additional 2,500 acre-feet drought buffer)
- ID No. 1 – Under the Water Supply Agreement, the District is entitled to 2,000 afy, of which 500 afy plus 200 acre-feet of drought buffer water is delivered. The remaining 1,500 acre-feet is contractually obligated to the City of Solvang through a separate agreement

The overall availability of SWP water varies with hydrologic cycles in Northern California and contractor demands throughout the state. During wet years, the SWP is able to deliver sufficient amounts to meet all or most contractor requests. During dry years, the SWP experiences shortages and contractors only receive a portion of the requested deliveries. Actual deliveries of SWP since 1998 have ranged from 15 to 100 percent, with an average of 65 percent in the last 7-year period, as shown in **Table 5.1-1**.

SWP water is delivered to Lake Cachuma at the dam outlet works, which is also used for releasing water to the river. SWP water can be mixed with water being released from the dam and simultaneously discharged to the river due to configuration of the outlet works; however, no release of SWP water into the river occurs December through June if flow is continuous in the river. The SWP pipeline can deliver up to 22 cfs through the outlet works. A Warren Act Agreement between Reclamation and CCWA provides for the conveyance of SWP water through the Cachuma Project and includes the following key terms:

- SWP water may be co-mingled with Cachuma water, but must not exceed 50 percent of the total rate of releases to the river at any time,
- Co-mingled water must not enter the stilling basin with a temperature over 18 degrees Celsius,
- SWP water may not be delivered to the reservoir during spill events, and
- Mixing of SWP water with Cachuma downstream releases is utilized to address water quality concerns per the Settlement Agreement.

5.1.4.3 Surface Water Conditions

Under existing conditions for the period 1918 through 1993, the simulated average annual stream flows[70] at the Highway 154 Bridge are 45,734 afy, 48,649 afy at Alisal Bridge, and 65,182 afy at the Lompoc Narrows.[71]

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70 It should be noted that the average annual stream flow statistic can be influenced by infrequent, extremely large storm events.

71 Stetson Engineering, Inc., *Draft Technical Memorandum No. 6: Additional Alternative Analyses – New Wells Downstream of Alisal Bridge*, (2011) Table 6. (**Appendix 5.1**).

Interim and Long-term Target Flows

The BO requires Reclamation to meet interim and long-term target flows at two locations on the mainstem. The objective of the flows is to improve summer rearing habitat conditions for *O. mykiss* in the upper mainstem below Bradbury Dam to the Highway 154 bridge, as well as in lower Hilton Creek. The target flows are produced by a combination of natural runoff and releases from Lake Cachuma. Continuous flows are to be provided in all but the driest years to Highway 154 (a distance of 2.9 miles). In years with spills exceeding 20,000 acre-feet and the year following such a spill year, flow is maintained between the dam and Alisal Road (a distance of 10.5 miles).

Under Reclamation's operating plan, the long-term target flows for each year depend on the amount of water stored in Lake Cachuma and the extent to which Lake Cachuma spills. When Lake Cachuma spills at least 20,000 acre-feet, the long-term target flow at the Highway 154 Bridge is 10 cfs. When Lake Cachuma spills less than 20,000 acre-feet, or does not spill at all, but storage is at least 120,000 acre-feet, the target flow at the Highway 154 Bridge is 5 cfs. When storage drops below 120,000 acre-feet, the target flow at the Highway 154 Bridge is 2.5 cfs. When storage drops below 30,000 acre-feet, no long-term target flow exists. Instead, Reclamation anticipates that 30 acre-feet per month would be available to provide refreshing flows to the Stilling Basin and Long Pool below Bradbury Dam. In addition, Reclamation must reinitiate consultation with NMFS to determine what actions, if any, will be taken for *O. mykiss* in the mainstem under these conditions. Long-term target flows at the Alisal Road Bridge are 1.5 cfs in years when Lake Cachuma spills at least 20,000 acre-feet and *O. mykiss* are present in the Alisal reach of the Santa Ynez River and in the water year following any such year.

Long-term target flows are summarized in **Table 5.1-2, Long-Term Santa Ynez River Rearing Target Flows**. According to the FMP,[72] this action will result in year-round flows with good quality *O. mykiss* rearing habitat in the upper mainstem to the Highway 154 bridge and Hilton Creek. The SYRTAC (2000) estimates that flows at Highway 154 would meet or exceed 2.5 cfs about 98 percent of the time, and that flows at Alisal Road would meet or exceed 1.5 cfs about 75 percent of the time.

72 Santa Ynez River Consensus Committee, *Lower Santa Ynez River Fish Management Plan (FMP)*, 2000. 3-9.

Table 5.1-2
Long-Term Santa Ynez River Rearing Target Flows

Lake Storage Conditions (acre-feet)	Reservoir Spill	Long Term Target Flow (cfs)	Long Term Target Site
> 120,000	Spill > 20,000	10	Highway 154
> 120,000	Spill > 20,000	1.5*	Alisal Road
> 120,000	No spill or < 20,000 spill	5	Highway 154
< 120,000	No spill	2.5	Highway 154
< 30,000	No spill	Periodic release; < or = 30 acre-feet/month	Stilling Basin & Long Pool
> 30,000	No spill or < 20,000 spill	1.5*	Alisal Road**

Source:
Santa Ynez River Consensus Committee, Lower Santa Ynez River Fish Management Plan, 2000, Table 3-2.
* *Only if steelhead are present in the Alisal Reach.*
** *This target will be met in the year immediately following a > 20,000 acre-feet spill year.*

The target baseflow releases were indexed to the hydrologic cycle via storage levels in Lake Cachuma and vary in response to yearly changes in precipitation and runoff (water year type) within the watershed. Populations of *O. mykiss* respond to the variable hydrologic conditions with a boom-bust cycle, with abundance increasing during and following wet years when migration, spawning, and rearing habitat expands, and contracting during dry years. The BO recognizes this yearly variability, and baseflow targets are designed to take advantage of the boom years by extending flow following spill events as well as maintaining suitable aquatic habitat by target flows of 2.5-5.0 cfs, which have been maintained yearly since 2000 in compliance with the BO at Highway 154. These flows support suitable oversummering habitat conditions in the Highway 154 reach and provide ancillary benefits of improved habitat conditions extending downstream to pool habitats within the Refugio and Alisal reaches.

Flows are very stable just downstream of the Refugio Bridge under fish flow operations compared with historical conditions.[73] This is due to the constant source of stream percolation provided by the releases for fish upstream.

Fish Passage Flows

The BO also requires Reclamation to maintain a Fish Passage Account for purposes of providing flows in order to increase the number of days that migration would be possible in the mainstem of the river for steelhead to reach tributaries near Bradbury Dam. The water will be released in the period January

[73] Stetson Engineering, Inc., *Draft Technical Memorandum No. 6: Additional Alternative Analyses – New Wells Downstream of Alisal Bridge*, (2011) Table 6. (**Appendix 5.1**).

through May to extend the receding limb[74] (downward curve portion) of naturally occurring storm hydrographs once the sandbar at the mouth of the river has been naturally breached. Storms are defined as flows of 25 cfs or greater at the Solvang US Geological Survey (USGS) gauge location. Releases would be made to supplement a natural recession after a storm has ended and flows have receded to 150 cfs at Solvang. In the event that storms do not produce 150 cfs at Solvang, but flows exceed 25 cfs, then releases would be made to reach 150 cfs and continue a pattern of natural recession. The combination of natural flows and the Fish Passage Account releases will provide an average of 14 days or more of passable flows to facilitate steelhead migration to the mainstem and tributaries above Alisal Road.

As with long-term target flows, under Reclamation's operating plan for implementation of the Fish Passage Account was contingent upon implementation of the 3-foot surcharge of Lake Cachuma, which was achieved in 2005. In addition, whether water is credited to the account depends on whether the reservoir surcharges. The Fish Passage Account has been allocated 3,200 acre-feet in years when the reservoir surcharges to 3 feet. Though the reservoir surcharged to 2.47 feet in 2005, the full 3,200 acre-feet was allocated to the Fish Passage Account. Water is released to facilitate passage beginning in the year following a surcharge year, and in subsequent years until the account is depleted. The account is not subject to evaporation or seepage losses, and can be carried over to subsequent years. However, the account is reset when the reservoir surcharges.

Restrictions on State Water Project Water Releases

The BO[75] described restrictions on the delivery of SWP water to the reservoir. SWP water will not exceed 50 percent of the amount of water released from Bradbury Dam at any given time. In addition, SWP water will not enter the stilling basin with a temperature over 18 degrees Celsius. Finally, the BO requires that releases of SWP water to the mainstem in conjunction with water rights and fish enhancement releases shall not occur during the migration period of December through June, unless flow in the mainstem is discontinuous. This requirement has been met since 2001.

5.1.4.4 Groundwater Basins

The groundwater basins downstream of Bradbury Dam have been divided[76] into the Above Narrows Alluvial Groundwater Basin, and the Below Narrows Groundwater Basin. The former extends along the

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74 A typical storm runoff hydrograph consists of three distinct components: the approach limb, the rising limb and the receding limb. The receding limb begins with the decrease in the amount of or the cessation of surface flow to the channel and represents discharge due to drainage of water stored in the channels and floodplains. The receding limb also includes withdrawals from bank storage and interflow through surface soils.

75 Reclamation and the NMFS, *Biological Opinion for the US Bureau of Reclamation operation and maintenance of the Cachuma Project on the Santa Ynez River*, (2000) 10.

76 Santa Ynez River Consensus Committee, *Lower Santa Ynez River Fish Management Plan*, 2000. 2-8.

Santa Ynez River from Bradbury Dam to the Narrows, located east of Lompoc Valley, as shown in **Figure 5.1-2, Lower Santa Ynez River Groundwater Basins.** It consists of coarse-grained unconsolidated sand and gravel river channel and younger alluvium deposits, with a length of 35 miles and a variable width of 0.2 to 1.5 miles. The depth ranges from 150 feet at the Narrows to about 50 feet near Bradbury Dam. It is underlain with non-water bearing shales.

The Above Narrows Alluvial Groundwater Basin is divided into three subareas based on geographic characteristics: Santa Ynez Subarea (Bradbury Dam to Alisal Road in Solvang, 11 river miles); Buellton Subarea (Alisal Road to 3 miles west of Buellton, 7.4 river miles), and Santa Rita Subarea (west of Buellton to the Narrows, 19 river miles).

The alluvial basins are replenished through percolation of surface water and subsurface flow from geologic units surrounding the aquifer. Depletions occur through extractions by riparian vegetation (phreatophytes) and by wells within the alluvial basin as well as subsurface discharge at the Narrows. Underflow in the alluvial basin is assumed to move parallel to the Santa Ynez River. It moves from east to west from one subarea to another and flows through the Lompoc Narrows to the Lompoc basin. There is virtually no underflow into the eastern most end of the alluvial basin due to the construction of Bradbury Dam (which extends approximately 70 feet into bedrock below the stream bed and cuts off underflow beneath the dam.)

The Below Narrows Basin consists of the Lompoc Plain Groundwater Basin underlying the center of the Lompoc Valley. Flows in the river percolate through channel alluvium into the underlying basin. Most of the percolation occurs in the Lompoc Plain Forebay, which consists of the eastern 4 miles of the river beginning at the Robinson Road Bridge.

As provided in Order WR 73-37 and Order WR 89-18, the inflow to Lake Cachuma is credited to the Above Narrows Account to the extent there is no visible flow (live stream) at designated locations in the river from Bradbury Dam to Floradale Avenue in the Lompoc Valley. Water credited to the Above Narrows Account remains stored in Lake Cachuma until it is released at the request of SYRWCD or lost by spill. The SYRWCD may request releases from the Above Narrows Account once dewatered storage, or unused storage capacity, in the Above Narrows Alluvial Groundwater Basin exceeds 10,000 acre-feet. The monthly balance in the Above Narrows Account may not exceed the total dewatered storage within the Above Narrows Alluvial Groundwater Basin. The Above Narrows Account is not subject to evaporative losses in the lake, but is deemed the first water spilled to the extent that the dewatered storage is reduced by such spills.

The Below Narrows Account is based on the difference between the actual percolation below the Narrows and the estimated percolation that would have occurred if river flows were not impounded by

Lake Cachuma. Reclamation calculates monthly "constructive" flows and percolation, and estimates the difference using two percolation curves adopted in Order WR 89-18. The two curves reflect different flow-percolation relationships based on groundwater levels in the Lompoc Plain. Reclamation has been using the upper curve until such time sufficient well data have been collected to determine which curve should be used to determine the differences in percolation with and without the Cachuma Project. In general, use of the upper curve provides a higher rate of credit accrual in the Below Narrows Account. Pursuant to the Settlement Agreement,[77] CCRB, ID No. 1, SYRWCD, and the City of Lompoc have agreed that the upper curve should continue to be used for purposes of establishing BNA credits, but under certain conditions, a portion of the credits should be set aside for the Cachuma Member Units' use during dry conditions.

Dewatered storage capacity in the groundwater basin allows for additional percolation of rainfall and tributary runoff below Bradbury Dam. Water releases to recharge downstream groundwater basins are made in average and dry years, based on the amount of dewatered storage in the Above Narrows Alluvial Groundwater Basin and the extent of percolation from tributary flows in the Below Narrows Basin. In very wet years, downstream basins are full and do not require recharge to satisfy downstream water rights. In dry years, releases are typically made in the summer and early fall to recharge the upper reaches of the Above Narrows Alluvial Groundwater Basin. In normal and some dry years, combined releases to satisfy the Above Narrows Alluvial Basin and the Below Narrows Basin are made in the summer and fall. Typically, these releases are made when the river is dry with an initial rate of about 150 cfs for a period of 10 to 15 days until the water reaches the Lompoc Basin Forebay. At that time, the releases are reduced for several weeks to months, to rates such as 50 to 70 cfs, depending upon percolation rates.

5.1.4.5 Project Area Conditions

The Water System Master Plan Update project area includes the entire service area of the City of Solvang as shown in **Figure 2.0-3**. As discussed in the project description, various elements of the proposed project will occur throughout the City.

The project area also includes the area under consideration for locating new wells along the Santa Ynez River. This area extends downstream (west) along the Santa Ynez River from the Alisal Bridge and includes the Additional Reach of Diversion as shown in **Figure 2.0-4**. Proposed future wells would be located in Well Sites A and B as illustrated on **Figure 2.3-5**.

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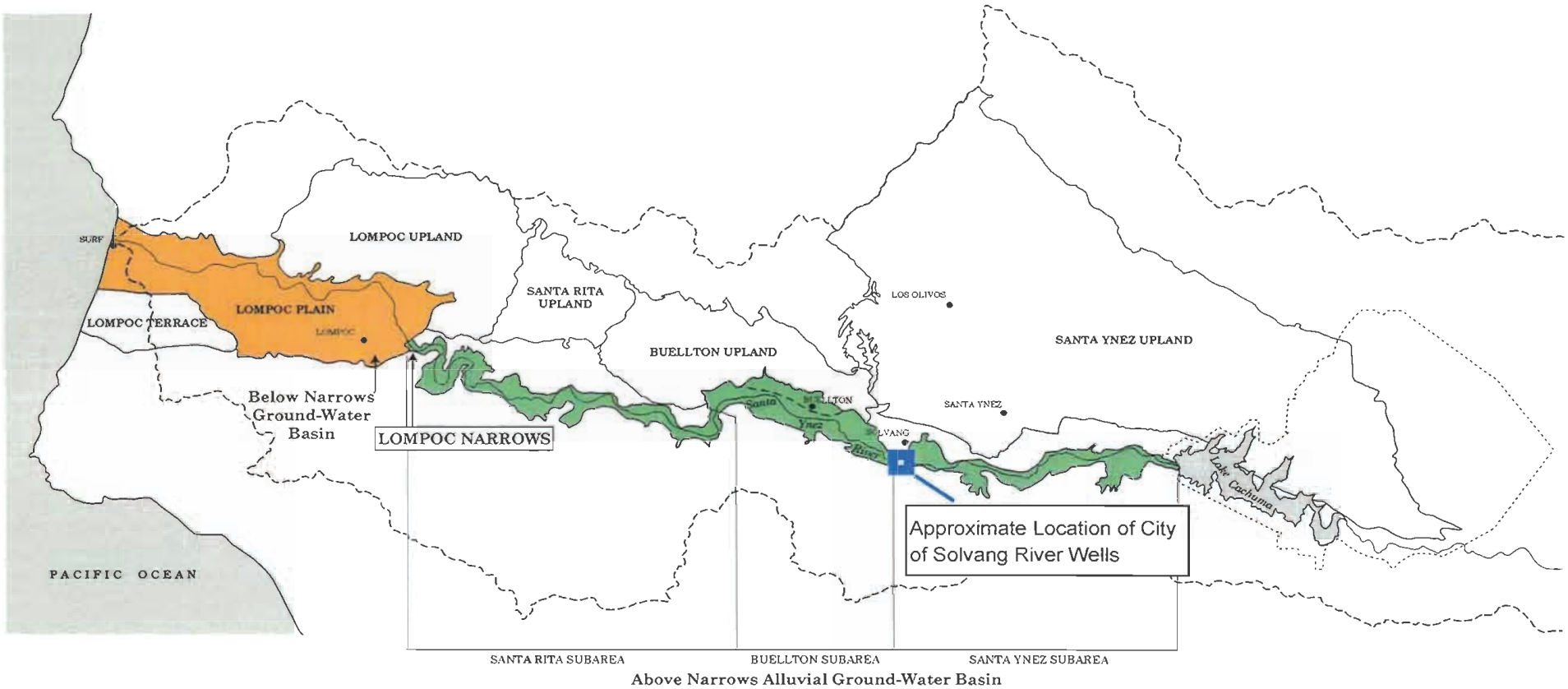
77 Cachuma Conservation Release Board, Santa Ynez River Water Conservation District, Santa Ynez River Water Conservation District Improvement District No. 1, City of Lompoc, *Settlement Agreement Relating to Operation of the Cachuma Project*, 2002.



Legend

- Santa Ynez River Basin Boundary
- Ground-Water Basins
- Above Narrows Alluvial Ground-Water Basin
- Below Narrows Ground-Water (Lompoc Plain)

6 3 0 6

APPROXIMATE SCALE IN MILES

SOURCE: Stetson Engineers, Inc., Technical Memorandum No. 2: Water Quality Impact Analysis - May 2004

FIGURE **5.1-2**

Meridian Consultants

Lower Santa Ynez River Groundwater Basins

001-001-12

Specifically, Wells Sites A and B include:

- Well Site A - Located on the north bank of the River between Alisal Bridge and the gravel mining operation.
- Well Site B - Located on the north bank of the river downstream of the gravel mining operations.

The Safety Element illustrates that the portions of proposed Well Sites A and B within the City's jurisdiction are located within a 100-year flood hazard zone. However, as reported by Stetson, both of the sites are located outside the present active flood channel but in close proximity to the river for recharge.[78]

Hydrogeologic Setting

A general hydrogeologic review of the Santa Ynez River alluvium and adjacent deposits extending about 1 and ½ miles downstream of Alisal Bridge was conducted for the purpose of finding an appropriate site for an expanded 5 cfs well field for the City's diversion permit.[79] Although both the stream channel deposits in the active River channel and adjacent valley and floodplain deposits were studied, the targeted source of water was the valley and floodplain deposits present north of the River. These deposits underlie lands elevated above the present floodplain of the River. Facilities installed on these higher lands are less likely to be subjected to flood damage. **Figure 2.0-5** shows two discreet areas (A and B), both above the active river channel, that were specifically targeted for study. Area A occupies the north bank area from Alisal Bridge downstream to the gravel mining operation. Area B, also located on the north bank, extends downstream of the gravel mining operations.

The alluvium in the general area of the proposed Well Sites A and B consists of stream channel deposits (Qg) and valley and floodplain deposits (Qa)**.** Outcrops of older alluvium (Qoa) and consolidated essentially non-water bearing rocks bound and underlie the more permeable stream channel, valley, and floodplain deposits.

The geology just north of the floodplain deposits includes consolidated shale beneath a relatively thin veneer of older alluvium. Wells in this area yield relatively little water and may not be hydraulically connected to the floodplain and stream channel deposits in the vicinity of Well Site B.

The stream channel deposits (Qg) of the Santa Ynez River that run from east to west at a location south of Well Site B range in thickness from about 40 to 70 feet and may be thinnest near the upstream area of Alisal Bridge. The floodplain deposits south of the stream channel deposits near Well Site B are likely to

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78 Stetson Engineers, Inc., *Technical Memorandum – New City of Solvang Well Field*, May 14, 2010. (**Appendix 5.1**)

79 Ibid.

have lithologic and water-bearing characteristics similar to those in the vicinity of Well Site B. Driller's logs or other lithologic data was not available for that area. The bedrock south of the river near Well Site B consists of hard fractured shale that is non-water bearing.

The general area includes surficial sediments comprised of stream channel deposits (Qg) and valley and floodplain deposits (Qa). Outcrops of older alluvium (Qoa) and consolidated essentially non-water bearing rocks bound and underlie the more permeable stream channel, valley, and floodplain deposits. The targeted sources of water are the valley and flood plain deposits (Qa) located on the north bank of the river downstream of Alisal Bridge. Although the deposits of the active stream channel (Qg) which consist of gravel, sand, and silt are generally the most permeable deposits with the potential for the highest well yields

The floodplain alluvium in the vicinity of Well Site B is likely to be unconfined due to its shallow and coarse nature. The hydraulic conductivity of alluvium near Well Site B is estimated to range from about 200 feet per day (ft/day) to 600 ft/day based on specific capacity data from driller's tests.[80] North of Highway 246, the alluvium has an estimated range of about 80 to 120 ft/day in hydraulic conductivity based on driller's tests. These test data may be considered somewhat rough since driller's tests are not rigorous aquifer tests and the method used to convert a well specific capacity to a transmissivity of hydraulic conductivity has a wide range of uncertainty. However, the method has been used as a rule of thumb by hydrogeologists for decades, in the absence of more detailed aquifer test data. For this study, a hydraulic conductivity of 300 ft/day is assumed to represent all of the Santa Ynez River alluvium units downstream of the Alisal Bridge. An average saturated thickness of river alluvium in the area of 70 feet was also assumed for the impact analysis. The stream channel deposits upstream of the Alisal Bridge contain a hydraulic conductivity estimated at about 500 ft/day based on test data from drillers logs in that area (as discussed in **Appendix 5.1**).

The stream channel deposits and adjacent floodplain deposits are recharged by seepage from the flows of the Santa Ynez River, as well as flows that reach the Santa Ynez River alluvium from nearby tributaries, with a minor amount contributed by direct precipitation. Well Site B is also recharged by underflow from the underlying Paso Robles formation and Careaga sand located adjacent to the north side of the Santa Ynez River.[81]

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80 Stetson Engineering, Inc., *Draft Technical Memorandum No. 6: Additional Alternative Analyses – New Wells Downstream of Alisal Bridge*, (2011) 7 (**Appendix 5.1**).

81 Wilson, H.D., *Ground-water Appraisal of Santa Ynez River Basin, Santa Barbara County California, 1945-52*, (US Geological Survey Water-Supply Paper 1467), 1959.

Groundwater Conditions

Long term groundwater level data is available from two shallow monitoring wells in the vicinity of the existing City well field. Water levels are measured by Reclamation on a monthly basis. Two monitoring wells (one located within the southeastern portion of Well Site B and the other monitoring well location north by northeast along Highway 246), were used to determine the water level measurements from 1959 to early 2010. Water levels in the Santa Ynez river alluvium in this area declined about 10 to 20 feet from the late 1970s to 1990 due, in part, to scour in the river channel and to the drought of 1988 – 1991.[82] Water levels have recovered somewhat and are more stable due to more frequent releases under Permit 89-18,as well a some fish water releases.

The SYRHM was used to determine areal recharge to the groundwater model. The simulated stream flow was calculated by the SYRHM and input at the upstream boundary, which is located downstream of Highway 154 Bridge. It should be noted that operation of water rights releases is conjunctive with fish releases. The groundwater budget for model calibration indicates an annual reduction in storage of up to 1,200 acre-feet, and groundwater storage recovers each year on average. The net recharge from the river was simulated to average about 3,800 afy, most of which can be attributed to pumping and evapotranspiration losses. The monthly averages showed that the maximum stream recharge occurs in summer when pumping is greatest, rather than in winter when Santa Ynez River flow is greater.[83]

Under the actual conditions for the three years from 2000 to 2002 (600 afy of gross pumping by Solvang with the Cachuma reservoir surcharge at 0.75), the water levels in the vicinity of the City well field decreased by an average of about 1 to 3 feet.[84] During the driest period, water levels were modeled to decline from 10 to 17 feet. These results are comparable to those for historical conditions.

The declines are greatest in the upstream end of the City well field due to the close proximity of ID No. 1's 6 cfs well field and Alisal River Ranch wells. November 1990 had the largest drawdowns for the simulation period due to low stream flows in late 1990. The largest water level declines from a full aquifer condition occur in the vicinity of the ID No.1 6-cfs well field. The maximum drawdown of about 20 feet occurs near the 6-cfs well field. Near the downstream boundary of the model, the drawdown during the entire simulation is minimal on average. At the upstream portion of the model area there is almost no

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82 Stetson Engineers, Inc., *Technical Memorandum No. 6. Additional Alternative Analyses for City of Solvang's CEQA Environmental Document for Time Extension for Water Right Permit 15878 – New Wells Downstream of Alisal Bridge*, January 24, 2011. **(Appendix 5.1).**

83 Ibid.

84 A one-foot decrease in groundwater elevation is simulated to occur approximately 2,500 feet downstream of the Solvang well field center. A 3-foot decrease is simulated to occur approximately 2,000 feet upstream of the Solvang well field center.

drawdown since pumping is less in this area and any recharge available from the river flow occurs in this area first.

The Stetson groundwater model indicated that the drawdown during the simulation is minimal near the downstream boundary of the model (located in between Well Site A and B).[85] This is due to the wider alluvium downstream of the Alisal Bridge and the distance from other wells that minimizes well interference. The Buellton Subbasin also receives additional underflow, which the Santa Ynez Subbasin does not, from the underlying Paso Robles formation and Careaga sand located adjacent to the northside of the Santa Ynez River.[86] At the upstream portion of the model area below the Highway 154 Bridge, there is almost no drawdown since pumping is less in this area and any recharge available from the Santa Ynez River flow occurs in this area first.

Water Quality

The focus of water quality in the Santa Ynez River watershed is on the total dissolved solids (TDS) concentration of the Santa Ynez River flow at the Lompoc Narrows. The TDS concentration of the groundwater in the central and western Lompoc Plain has increased from less than 1,000 milligrams per liter in the 1940s to greater than 2,000 milligrams per liter in the 1960s.[87]

5.1.4.6 City of Solvang Water Operations

The City currently receives water from two primary sources, SWP water and via wells from the Santa Ynez River groundwater underflow with a backup supply from SYRWCD ID No. 1. As shown on **Figure 2.0-3**, the City has two active river wells (3 and 7A) that supply domestic water to its customers. These wells are located on the banks of the Santa Ynez River upstream and downstream of Alisal Bridge. The City also has an operational well (Well 4) located near City hall. External sources of water are the No. 1 and SWP supplies.

Existing 2-inch diameter water lines are considered substandard. Other piping within the City's municipal water system are also substandard (as described in **Section 2.0, Project Description**). The City has a total of approximately 1.24 million gallons (mg) of gross water storage in above ground water tanks.

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85 Stetson Engineers, Inc., *Technical Memorandum No. 3, Solvang Groundwater Modeling*, 2004, Table 3. (**Appendix 5.1)**.

86 Wilson, H.D., *Ground-water Appraisal of Santa Ynez River Basin, Santa Barbara County California, 1945-52*, (US Geological Survey Water-Supply Paper 1467), 1959.

87 Stetson Engineers, Inc., *Technical Memorandum No. 2. Water Quality Impact Analyses for City of Solvang's CEQA Environmental Document for a Time Extension for Water Right Permit 15878*, May 10, 2004. (**Appendix 5.1**).

The Master Plan Update indicates that the roof of Reservoir 1 has been experiencing problems and has become deteriorated.

The levels of the City's reservoirs determine the run time of the wells. The wells operate on set points (level of water in the reservoir). The movement of the water level in the reservoirs is determined by the demand in the system and the demand is driven by the weather.

The City uses the existing operational wells as make-up or back–up water supply to their SWP water allotment. In years that the SWP allotment was high, the City would use less river water and in years that the SWP allotment was low, the City would use more river water.

Depending on time of year, the weather, and the SWP allotment daily well run times could be from a minimum of zero hours per day up to a maximum of 20 hours per day or more. The average well run time is approximately 11 hours per day. Operation of the wells usually occurs early in the morning until demand relaxes, depending on the climatic conditions. Wells usually operate every day during the summer months and do not often operate during the winter months. The City currently extracts 1,053 afy of Santa Ynez River underflow for beneficial use (used as the baseline for potential impacts). The City's existing river wells (3 and 7A) currently operate at a combined capacity of approximately 450 gallons per minute (gpm) and Well 4, located near City Hall, operates at a maximum of 320 gpm.

The City drilled two upland wells (Wells 21 [inactive] and 22 [no current pump capability]) to determine if water quality in the Santa Ynez Uplands Groundwater Basin is acceptable for municipal use. Both wells are currently inactive due to water quality concerns.

5.1.5 THRESHOLDS OF SIGNIFICANCE

In order to assist in determining whether a project would have a significant effect on the environment, the *State CEQA Guidelines* identify criteria for conditions that may be deemed to constitute a substantial or potentially substantial adverse change in physical conditions.

Specifically, Appendix G of the *State CEQA Guidelines* (Environmental Checklist Form) lists the following thresholds under which a project may be deemed to have a significant impact on hydrology, water supply and water quality if it would:

- Violate any water quality standards or waste discharge requirements.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site.
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- Otherwise substantially degrade water quality.
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows.
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Substantially increase the risk of inundation by seiche, tsunami, or mudflow.

5.1.6 ENVIRONMENTAL IMPACTS

The environmental impact analysis presented below is based on determinations made in the Notice of Preparation (NOP) for issues that were determined to be potentially significant with mitigation incorporated, or for issues identified by reviewing agencies, organizations, or individuals commenting on the NOP that made a reasonable argument that the issue was potentially significant (see Responses to NOP, **Appendix 1.0**).

5.1.6.1 Violate any water quality standards or waste discharge requirements.

Impacts

Construction

Master Plan Update

During construction of the proposed Master Plan Update's various components, groundwater quality could potentially be impacted. The development of the proposed Master Plan Update would involve construction activities on the project area over the duration of project development (approximately 10 to 15 years). Proposed grading and construction activities would involve earth movement and the use of heavy equipment. Although the project area is essentially flat and the potential for soil erosion is considered to be relatively low, peak stormwater runoff could result in short-term sheet erosion within areas of exposed or stockpiled soils. Additionally, the compaction of soils by heavy equipment may reduce the infiltration capacity of soils and increase runoff and erosion potential. Given the above,

pollutants such as soil, sediments, and other substances associated with construction activities (e.g., oil, gasoline, grease, and surface litter) could directly enter the Santa Ynez River or filter into the local groundwater, during project construction.

As discussed under the California Water Quality Control Board (**subsection 5.1.3.2, State Regulations**), dischargers whose projects disturb one or more acres of soil or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity Construction General Permit Order 2009-0009-DWQ. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

The proposed Master Plan Update would disturb an acre or more of land over the course of implementation. Therefore, the City would be required to obtain a General Permit for discharges of storm water associated with construction activity. The General Permit requires an SWPPP which identifies potential sources of pollution and specifies runoff controls, or BMPs, during construction to minimize the discharge of pollutants in stormwater from the construction area. In addition, the SWPPP must identify post-construction control measures and a monitoring plan. Consequently, the construction phases of the proposed Master Plan Update would result in less than significant groundwater quality impacts.

The construction activities which will occur during implementation of the proposed Master Plan Update would not impact the exercise of any existing water right on the river. The water quality in the groundwater basin would not be altered and would not impair the beneficial uses. Impacts would be less than significant to groundwater quality in the basin.

Proposed Wells and Water Treatment Facilities

As described above, the construction of wells and the water treatment plant would be subject to the City's SWPPP. The SWPPP identifies construction BMPs as well as post-construction control measures and monitoring plan. The implementation of the BMPs would result in less than significant groundwater quality impacts.

Operation

Operation of the components of the proposed Master Plan Update would involve the extraction of Santa Ynez River underflow and distribution through the City's municipal water system. Water extracted from the Santa Ynez River would be pumped to the proposed water treatment plant. There the water would be

treated to California Department of Public Health (CDPH) standards for surface water treatment. Chemicals anticipated to be utilized at the treatment plant include a coagulant, such as aluminum sulfate, and liquid sodium hypochlorite for disinfection. Therefore, water diverted from the Santa Ynez River would be suitable for the City's municipal use. Impacts would be less than significant.

Mitigation Measures

No mitigation is required.

Residual Impacts

Impacts would be less than significant impacts (Class III).

5.1.6.2 Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).

Impacts

Construction

Construction of the components of the proposed Master Plan Update would span 10 to 15 years (i.e., replacement of 8-inch waterline in Kronborg Drive with a 12-inch waterline). Construction would not require substantial amounts of water. Therefore, water use for construction would not substantially increase pumping. Impacts would be less than significant.

Upon completion of well construction, each well must be developed to allow the wells to produce ultimate yield. The fluids generated during well development will be discharged to open areas of the floodplain and allowed to percolate. Up to 10,000 gallons of groundwater will be produced by each well during well development.

After well development is complete, each well will be subject to several days of pump testing, which would occur on a 24-hour basis. Pumped groundwater will be discharged to open areas in the floodplain near the well site in such a manner as to avoid erosion. It is estimated that well testing will occur for one to two days for each well, at up to 800 gpm and total production of about 300,000 gallons (or 0.92 acre-foot) per well.

Well drilling, completion, development, and testing will require about seven days at each well site. Work will likely be coordinated so that one well is being drilled while another is being developed and tested. Pump testing will occur immediately after well installation. The water lines and electrical conduits will be installed after well testing. The proposed well installation will be completed in a phased approach.

The release of the water pumped from each well and discharged to the open areas of the floodplain would include any fine-grained materials from the well. The water quality of the pumped groundwater would be similar to the flows within the river and the materials of discharge would be similar to the surrounding soil. As the well testing water is similar in nature to the surrounding environment, potential water quality impacts would be considered less than significant during well release.

Operation

As shown in the project baseline (see **Section 3.6, Existing Water Use and Project Baseline**), the City historically has extracted 1,053 afy of Santa Ynez River underflow for beneficial use (used as the baseline for potential impacts).

The City operates two wells (River Wells 3 and 7A—River Well 5 is not currently used as it was damaged in prior floods) to extract water from the Santa Ynez River, two upland wells (Wells 21 and 22 that are inactive due to water quality concerns), and one central well (Well 4) located near City Hall. The current combined pumping capacity of River Wells 3 and 7A total approximately 450 gpm, while Well 4 operates at a maximum of 320 gpm. The City's goal is to have a pumping capacity of 5 cubic feet per second (cfs) from the Santa Ynez River to serve the City's peak demand. This will be achieved by a combination of renovating Wells 3 and 7A, installing new wells and, potentially, renovating and equipping Well 5. New wells will be on the City's supervisory control and data acquisition (SCADA) system and run off of set points tied to reservoirs levels. System production will be dictated by demand on the system.[88]

Water levels in the Santa Ynez River underflow in the vicinity of the City's existing wells indicate that after extreme dry periods, water levels recover the following winter.[89] This response is due to resumption of Santa Ynez River flows associated with storm runoffs and resulting recharge to the river alluvium.

The operation of the proposed Master Plan Update would increase the diversion of Santa Ynez River underflow from 1,053 afy at an extraction rate of 1.85 cfs, to 1,980 afy diverted from the Santa Ynez River at up to a maximum peak extraction rate of 5 cfs. The increase in diversion to 1,980 afy from the

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88 Correspondence with Mr. Craig Martin, City of Solvang Water Services Division, October, 14, 2011.

89 Stetson Engineering, Inc., *Draft Technical Memorandum No. 4: Additional Alternative Analyses*, 2004. 13 (**Appendix 5.1**).

underflow of the Santa Ynez River provides the City the opportunity to rely less on SWP water which has become both less reliable and more costly, as described in **Section 5.1.3.2**, **State Water Project**.

Stetson[90] evaluated the potential impact of combined pumping from wells at Well Site B at an annual rate of 2,400 afy. This is considered a conservative analysis, as the proposed Master Plan Update would pump 1,980 afy (less than 2,400 afy which was evaluated in Technical Memorandum No. 6) and Stetson's evaluation does not include the minimum flows required under the BO and FMP for *O. mykiss*. The groundwater basins downstream of Bradbury Dam have been divided into the Above Narrows Alluvial Groundwater Basin and the Below Narrows Groundwater Basin. Therefore, the groundwater impacts to the Above Narrows Riparian Aquifer are discussed below.

The Above Narrows Riparian Aquifer recovers to the same levels with the recharge of winter runoff under the baseline and proposed Master Plan Update conditions; the key differences in water levels occur during dry years.

Table 5.1-3, Monthly Total Dewatered Groundwater Storage at Well Sites A and B, shows statistics on monthly total dewatered storage for the Above Narrows Riparian Aquifer and for the three different sub-basins. It should be noted that the analysis considered pumping at 2,400 afy at an extraction rate of 5 cfs while the proposed Master Plan Update's withdrawal of 1,980 afy at a rate of up to 5 cfs would have less effects. As such as shown on **Table 5.1-3**, the proposed Master Plan Update would result in slightly more dewatered groundwater storage in the Above Narrows Riparian Aquifer (525 acre-feet). This would involve a decrease in the Buellton Riparian Subbasin (492 acre-feet), and approximately the same groundwater storage for the Santa Ynez (11 acre-feet) and Santa Rita (16 acre-feet) Riparian Subbasins when compared to baseline conditions for each. The Santa Ynez Subbasin includes Highway 154 and Alisal Bridge, which are the target sites under the BO for fish water releases. As indicated above in **Table 5.1-3**, the proposed Master Plan Update would increase dewatered storage space within the Above Narrows aquifer and the local riparian groundwater basins; in general, there is more total dewatered storage when the City's river well pumping increases.

Table 5.1-4, Monthly Average Groundwater Level Elevation at Wells Sites A and B, shows the monthly average of the groundwater level elevation of the Santa Ynez, Buellton and Santa Rita Subbasins. As noted previously, the analysis considered pumping at 2,400 afy at an extraction rate of 5 cfs. The proposed Master Plan Update's withdrawal of 1,980 afy at a rate of up to 5 cfs would have less effects. The Master Plan Update would result in similar groundwater levels as the baseline in the Santa Ynez

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90 Stetson Engineers, Inc., Technical Memorandum No. 6. Additional Alternative Analyses for City of Solvang's CEQA Environmental Document for Time Extension for Water Right Permit 15878 – New Wells Downstream of Alisal Bridge, January 24, 2011. (**Appendix 5.1**).

Subbasin but levels one to two feet lower in the Buellton Subbasin. As shown in **Table 5.1-4,** the proposed Master Plan Update would not change the groundwater level elevation for the Santa Ynez Riparian Subbasin or for the Santa Rita Subbasin. The proposed Master Plan Update would result in an average decrease in elevation of 1 foot to the Buellton Subbasin. **Table 5.1-4** illustrates that the proposed Master Plan Update would not decrease groundwater elevation to the groundwater basins above Alisal Bridge relative to baseline conditions.

Stetson's[91] analysis shows the impacts to water rights releases for the various alternatives as simulated by the SYRHM for hydrologic period 1918-1993 (76 years). The Above Narrows Account is dependent upon groundwater storage in the Above Narrows Riparian Aquifer because the account cannot be larger than the dewatered storage. The analysis indicates that WR89-18 releases would be increased as a result of increased pumping by Solvang. For example, the average annual release would increase by about 183 acre-feet when extracting 2,400 afy downstream of Alisal Bridge when compared to baseline; as the proposed Master Plan would withdraw 1,980 afy, impacts would be less. Therefore, other water right holders withdrawing water from these basins would not be influenced by the proposed Master Plan Update, and it would result in less than significant impacts on water rights releases.

Table 5.1-5, Calculated Drawdown North of the Proposed Well Sites A and B at 2,400 afy, and **Table 5.1-6, Calculated Drawdown Upstream or Downstream of Proposed Well Sites A and B at 2,400 afy**, show the calculated drawdown due to the proposed pumping of 2,400 afy from the proposed Well Sites A and B at various times, distances, and directions. The analysis was simulated for 24 months with no river or other inflows to the area to determine the potential drawdowns in the vicinity of the proposed wells that may occur over a summer period or during a drought with no flow in the river. The focus is on summer drawdowns because those are expected to occur when water levels in the area are at their lowest, particularly if there is no flow in the river.

As shown in **Table 5.1-5**, calculated drawdowns toward the northern alluvial boundary range from a maximum of approximately 9 feet at a distance of 1,000 feet to approximately 7 feet at a distance of 3,000 feet from the proposed well fields in September. This calculation is based on no river or other inflows to the area.

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91 Stetson Engineers, Inc., Technical Memorandum No. 6. Additional Alternative Analyses for City of Solvang's CEQA Environmental Document for Time Extension for Water Right Permit 15878 – New Wells Downstream of Alisal Bridge, January 24, 2011. Table 17. (**Appendix 5.1**).

Table 5.1-3
Monthly Total Dewatered Groundwater Storage at Well Sites A and B
(acre-feet)

	Average	Median	Minimum	Maximum
Above Narrows Riparian Aquifer				
Baseline Conditions	10,473	10,218	2,333	31,591
Proposed Master Plan Update	10,998	10,710	2,471	33,149
Increase (Decrease) in Total Monthly Dewatered Storage	525	492	138	1,558
Santa Ynez Riparian Subbasin				
Baseline	1,832	1,692	2	8,825
Proposed Master Plan Update	1,843	1,705	6	8,879
Increase (Decrease) in Total Monthly Dewatered Storage	11	13	4	54
Buellton Riparian Subbasin				
Baseline	5,520	5,479	2,164	10,952
Proposed Master Plan Update	6,018	5,958	2,309	12,242
Increase (Decrease) in Total Monthly Dewatered Storage	497	478	146	1,289
Santa Rita Riparian Subbasin				
Baseline	3,121	2,973	0	12,057
Proposed Master Plan Update	3,137	2,993	0	12,252
Increase (Decrease) in Total Monthly Dewatered Storage	16	20	0	195

Source:
*Stetson Engineers, Inc., Technical Memorandum No. 6. Additional Alternative Analyses for City of Solvang's CEQA Environmental Document for Time Extension for Water Right Permit 15878 – New Wells Downstream of Alisal Bridge, January 24, 2011., Tables 10 through 13 (**Appendix 5.1).***
Note: The analysis used for comparison between baseline conditions and proposed Master Plan Update conditions was 2,400 acre-feet per year, not the City requested amount of 1,980 afy.

Table 5.1-4
Monthly Average Groundwater Level Elevation at Wells Sites A and B
(above mean sea level)

	Average	Median	Minimum	Maximum
Santa Ynez Subbasin				
Baseline	460	460	443.4	464
Proposed Master Plan Update	460	460	443.2	464
Increase (Decrease) in Total Monthly Dewatered Storage	0	0	(0.2)	0
Buellton Subbasin				
Baseline	304	304	295	310
Proposed Master Plan Update	303	303	293	309
Increase (Decrease) in Total Monthly Dewatered Storage	(1)	(1)	(2)	(1)
Santa Rita Subbasin				
Baseline	176	176	165	180
Proposed Master Plan Update	176	176	164	180
Increase (Decrease) in Total Monthly Dewatered Storage	0	0	(1)	0

Source:
*Stetson Engineers, Inc., Technical Memorandum No. 6. Additional Alternative Analyses for City of Solvang's CEQA Environmental Document for Time Extension for Water Right Permit 15878 – New Wells Downstream of Alisal Bridge, January 24, 2011., Tables 14 through 16 (**Appendix 5.1).***
Note: The analysis used for comparison between baseline conditions and proposed Master Plan Update conditions was 2,400 acre-feet per year, not the City requested amount of 1,980 afy.

Table 5.1-5
Calculated Drawdown North of the Proposed Well Sites A and B at 2,400 afy

	Distance North from Proposed Well Fields (feet)		
	1,000	2,000	3,000
Year 1			
March	1.8	1.2	0.9
June	4.4	3.2	2.5
Sept	6.7	5.2	4.3
Year 2			
March	5.8	5.2	4.8
June	7.5	6.2	5.4
Sept	9.1	7.6	6.7

Source:
*Stetson Engineers, Technical Memo No 6, Table 19 in **Appendix 5.1***
Note: The analysis used for comparison between baseline conditions and proposed Master Plan Update conditions was 2,400 acre-feet per year, not the City requested amount of 1,980 afy.

Table 5.1-6
Calculated Drawdown Upstream or Downstream of the Proposed Well Sites A and B at 2,400 afy

	Distance Upstream or Downstream from Proposed Well Fields (feet)		
	2,000	**4,000**	**6,000**
Year 1			
March	0.8	0.4	0.1
June	2.3	1.1	0.05
Sept	3.9	2.2	1.2
Year 2			
March	4.4	3.2	2.3
June	5.0	3.5	2.5
Sept	6.2	4.2	3.0

Source:
*Stetson Engineers, Technical Memorandum No 6, Table 20 (**Appendix 5.1**)*
Note: The analysis used for comparison between baseline conditions and proposed Master Plan Update conditions was 2,400 acre-feet per year, not the City requested amount of 1,980 afy.

Table 5.1-6 illustrates that in the upstream or downstream (east or west) direction, the calculated drawdown ranges from a maximum of approximately 6 feet at a distance of 2,000 feet to approximately 3 feet at a distance of 6,000 feet from the proposed well field in September. Again, this calculation is based on no river or other inflows to the area. It should be noted that these calculated drawdowns would be lower, near zero, within a distance of about 1,000 feet if the Santa Ynez River were flowing. The proposed Master Plan Update would result in lower drawdown of groundwater levels as the City would divert 1,980 afy, 420 afy less than the 2,400 afy used to model potential impacts as shown in the analysis in **Tables 5.1-5** and **5.1-6**. Even the extreme case represented by the modeling indicates that the impacts would be less than significant due to the depth of the alluvium downstream of Alisal Bridge.

Analyses of the proposed Master Plan Update with all of the City's new Santa Ynez River wells located downstream of Alisal Bridge indicates that development of a well field at this site would result in successful yields. The alluvial deposits are thicker and the yields are typically higher in this area compared with upstream of the Alisal Bridge. The reported performance of existing wells indicates that the aquifer would be able to meet both monthly average and peak demands of the City. Consequently, impacts to the groundwater level in the area of Alisal Bridge and upstream would be less than significant.

The increase in the amount of pumping from the Santa Ynez River would occur primarily during the summer months. Lake Cachuma operations generally release allocations of water for water right holders during the summer and fall months. During this time, water released from Lake Cachuma percolates and

replenishes the groundwater within the Above Narrows Alluvial Groundwater Basin. Precipitation during winter months also replenishes groundwater levels within the Above Narrows Alluvial Groundwater Basin. Therefore, the proposed Master Plan Update would not result in the lowering of groundwater levels to cause land subsidence. Impacts would be less than significant.

The City would have sufficient capacity with the proposed wells and existing Wells 3 and 7A to pump the proposed amount from a combination of those wells and would have the flexibility to manage local drawdowns. If water levels decline in excess of operational criteria, pumping could likely be shifted to other wells in response to local conditions.

As previously discussed, Lake Cachuma operations regulate the flow of the Santa Ynez River downstream of Bradbury dam. The BO and FMP require minimum flows at the Highway 154 Bridge and the Alisal Bridge for the endangered species *O. mykiss*. These requirements are listed in **Table 5.1-2**.

The Above Narrows Account is dependent upon groundwater storage in the Above Narrows Riparian Aquifer because the account cannot be larger than the dewatered storage. Implementation of the proposed Master Plan Update would increase pumping along the Santa Ynez River, which would increase WR 89-18 releases. Under baseline conditions, the simulated WR 89-18 releases would total 5,819 afy. Under the proposed Master Plan Update, assuming extraction of 2,400 afy (which is more than the 1,980 afy contained in the Master Plan Update) for a conservative analysis, the WR 89-18 releases would total 6,002 afy for an increase of 183 afy in WR 89-18 releases.[92] This is attributed to the level of dewatered storage in the Santa Ynez River alluvium from which the City would be pumping.

Shortages in water supply from the Cachuma project during droughts were also determined using SYRHM. The historical precipitation at Gibraltar Dam during the drought period from 1947 through 1951 was 35 percent to 60 percent below normal. The Cachuma Project Members all share water shortages.

The normal year annual Cachuma Project deliveries to Project Members is 25,714 acre-feet.[93] Under baseline conditions (based on year 2009/2010 demand levels), demand would exceed supply by 10,295 acre-feet. In 2020, demand would exceed supply by 22,556 acre-feet, taking into account the CCWA drought buffer and about 31,500 acre-feet of ground water pumping for three-year drought period.

As a result, baseline conditions for the critical dry year (1951) would be short approximately 40 percent of normal year conditions and under the critical drought period (1949-1951) would be short approximately

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92 Stetson Engineers, Inc., Technical Memorandum No. 6. *Additional Alternative Analyses for City of Solvang's CEQA Environmental Document for Time Extension for Water Right Permit 15878 – New Wells Downstream of Alisal Bridge*, January 24, 2011. Table 17. (**Appendix 5.1**).

93 Cachuma Project Water Rights Hearing Final EIR, December 2011, *Section 4.3.2.5 Comparison of Member Units Demand and Supply from All Sources*, pp. 4.3-23 to 24.

27 percent of normal year conditions.[94] Therefore, the Cachuma Project Members would share the shortages accordingly (40 percent during a critical drought year and the 27 percent during the critical drought period).

The shortages to water supply under the proposed Master Plan Update conditions during the critical drought year (1951) would be similar to the baseline conditions as the proposed Well Sites A and B would be located downstream from the Alisal Bridge. As with baseline conditions (see discussion above), the proposed Master Plan Update conditions for the critical dry year (1951) would also be short approximately 40 percent of normal year conditions and under the critical drought period (1949-1951) would be short approximately 27 percent of normal year conditions. The proposed Master Plan Update would result in similar water supply impacts as compared to baseline conditions based on the proposed well sites being located downstream from the Alisal Bridge.

Lake Cachuma is the primary local water source for South Coast communities, and an increase in years with shortages will require greater reliance on alternative sources of supply (primarily imported state water) which is less desirable due to higher costs. The Master Plan Update would result in an increase of 927 afy above the baseline conditions to reach 1,980 afy. If a one-for-one reduction (worst case) in water stored in Lake Cachuma for Cachuma Project members occurred, the resulting decrease would reduce the Cachuma Project Members available stored water in Lake Cachuma of 24,787 acre-feet to 23.951 acre-feet, or 3.7 percent.[95] However, as noted above, the WR 89-18 releases would total 6,002 afy for a decrease of 183 afy , or 0.7 percent. This decrease is not considered substantial and therefore, impacts would be less than significant.

An indirect environmental impact due to water supply shortages is considered significant if the Cachuma Project Member's make up for the shortage using a new source of water supply. Any potential indirect environmental impacts that may result from the acquisition of new sources of water supply to meet the Cachuma Project Member's future demand would be attributable to future growth in the Cachuma Project Member service areas, and would not be attributable to impacts to the Cachuma Project Member's Cachuma Project supply. Conversely, if the Cachuma Project Members can meet current demand in a critical drought year or drought period using existing sources of supply or by implementing drought contingency measures, no indirect environmental impacts would occur. In the case of the proposed

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94 Stetson Engineers, Inc., Technical Memorandum No. 6. Additional Alternative Analyses for City of Solvang's CEQA Environmental Document for Time Extension for Water Right Permit 15878 – New Wells Downstream of Alisal Bridge, January 24, 2011. Table 18. (**Appendix 5.1**).

95 ID No. 1 currently participates in a water exchange program with other Cachuma Project Member Units. Under the program, South Coast Member Units purchase SWP water, which is then delivered directly to ID No. 1 from the CCWA pipeline near Santa Ynez. The South Coast Member Units then take an equivalent amount of water from the Cachuma Project in exchange. This program allows the Member Units to avoid the cost of pumping SWP water to Lake Cachuma and then conveying the water downstream to ID No. 1.

Master Plan Update, water supply impacts for the Cachuma Project are similar to the baseline conditions based on the proposed well sites being located downstream of the Alisal Bridge. Therefore, there would be no indirect environmental impacts on Cachuma Project Member Units from the Proposed Project compared to baseline conditions.

Mitigation Measures

The following mitigation shall be implemented:

HYD-1 The Water Division of the Public Works Department of the City of Solvang will actively advertise, promote, and implement their Water Management Program to conserve water, reduce consumption and the need for water pumping during summer and fall, and during droughts.

Residual Impacts

Residual Impacts

Construction impacts would result in less than significant construction related impacts (Class III). Operation impacts would be less than significant (Class III).

Project level water supply impacts would be considered less than significant with the incorporation of mitigation measures (Class II). Despite the fact that the Member Units already have implemented a number of conservation measures, it may be possible to implement additional drought contingency measures identified as part of the Member Units' urban water supply contingency analysis in order to make up for a temporary water supply shortage in a critical drought year or period.

5.1.6.3 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

Impacts

Construction

Master Plan Update

Figure 5.1-3, 100-Year Floodplain, illustrates that some portions of the proposed Well Sites A and B are located within a 100-year flood hazard zone.

Construction of the components located outside of the 100-year floodplain of the Santa Ynez River would not reduce stream flow sufficiently to substantially alter the existing drainage pattern of the site or area.

As discussed above under **Impact 5.1.8.1**, the City would be required to implement a SWPPP, according to SWRCB requirements, which would implement construction and post-construction Best Management Practices (BMPs) to minimize stormwater runoff. Therefore, the proposed Master Plan Update would result in less than significant impacts.

Proposed Wells and Water Treatment Facilities

The only components of the proposed Master Plan Update that would have the potential to reduce stream flow during construction would be the proposed wells along the Santa Ynez River. Development of the proposed water treatment plant would not interfere with stream flows as it would be located outside of the Santa Ynez River channel. Construction of the proposed six new wells will require access by construction equipment, trucks, and a drilling rig. Access to the new wells would be provided by existing roadways along the north side of the river channel. Existing informal dirt roads on the floodplain would also be used to access wells. Wells would not be accessed from the west because the bridge over Alamo Pintado Creek is not rated for large trucks or drilling rigs.

At each well site, a 2,500-square-foot area (about 50 by 50 feet) will be cleared and graded to a flat surface. The well will be installed within this area, which will also be used for the drilling rig, stockpiling, and other equipment parking. It may be necessary for construction trucks to also temporarily park along the existing dirt roads at each well site.

SOURCE: County of Santa Barbara, Planning & Development, Santa Ynez Valley Community Plan - 2009

FIGURE **5.1-3**

Meridian Consultants

100-Year Floodplain

001-001-12

Well drilling, completion, development, and testing would require about seven days at each well site. The construction timeframe of the wells is temporary and short term in nature and will be completed when water flow is low. Therefore, construction of the river wells would not sufficiently reduce stream flow to the Santa Ynez River to substantially alter the existing drainage pattern of the site or area. Impacts would be less than significant.

Operation

The proposed Master Plan Update would increase the City's maximum annual pumping from 1,053 afy at an extraction rate of 1.85 cfs, to 1,980 afy at a maximum peak extraction rate of 5 cfs of Santa Ynez River water. Releases of water from Lake Cachuma are made to supply water right holders located downstream of Bradbury Dam. In addition, water is released to maintain suitable habitat for *O. mykiss* as well as to anticipate winter storms and to prevent flooding downstream of Bradbury Dam.

In order to determine potential impacts to the flow of the Santa Ynez River, a hydrologic analysis based on the SYRHM, was used to assess impacts on Santa Ynez River flows, as well as on Cachuma Project operations, groundwater storage in the Above Narrows Riparian Aquifer, and water right releases.[96]

Under baseline conditions, the average annual stream flows[97] at the Highway 154 Bridge are 45,734 afy, 48,649 afy at Alisal Bridge, and 65,182 afy at the Lompoc Narrows.[98]

As provided in the BO and Settlement Agreement (see **Table 5.1-2**), in years when storage conditions in Lake Cachuma are greater than 120,000 acre-feet and the Cachuma Reservoir spills 20,000 acre-feet or more, a target flow of 10 cfs will be maintained at the Highway 154 Bridge and 1.5 cfs will be maintained at the Alisal Bridge only if steelhead are present in the Alisal Reach. In years when Cachuma Reservoir has greater than 120,000 acre-feet of storage and does not spill or spills less than 20,000 acre-feet, the Highway 154 target flow will be 5 cfs. When storage is less than 120,000 acre-feet, flows of 2.5 cfs shall be maintained at the Highway 154 Bridge. Only periodic releases to refresh the Stilling Basin and Long Pool will be made when storage is less than 30,000 acre-feet.

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96 Stetson Engineers, Inc., Technical Memorandum No. 6. Additional Alternative Analyses for City of Solvang's CEQA Environmental Document for Time Extension for Water Right Permit 15878 – New Wells Downstream of Alisal Bridge, January 24, 2011. (**Appendix 5.1**).

97 It should be noted that the average annual stream flow statistic can be influenced by infrequent, extremely large storm events. These flows have been simulated and were based on the historical period between 1918 and 1993.

98 Stetson Engineers, Inc., Technical Memorandum No. 6. Additional Alternative Analyses for City of Solvang's CEQA Environmental Document for Time Extension for Water Right Permit 15878 – New Wells Downstream of Alisal Bridge, January 24, 2011. Table 6. (**Appendix 5.1**).

The flows at Alisal Bridge under the proposed Master Plan Update are very similar to the baseline flows. This would be due to the proposed Well Sites A and B being located downstream from the Alisal Bridge. Under the proposed Master Plan Update, the average annual flows predicted by the SYRHM at Highway 154 Bridge would be 45,759 afy, 48,701 afy at the Alisal Bridge, and 64,863 afy at the Lompoc Narrows. Under the Master Plan Update, flows would increase slightly on average by 25 and 52 afy at the Highway 154 Bridge and the Alisal Bridge when compared to baseline conditions due to a minor increase in releases from Lake Cachuma for water rights releases by about 183 afy.

Table 5.1-7, Median Monthly Flow of the Santa Ynez River, illustrates the median monthly flows at the Highway 154 Bridge and the Alisal Bridge locations along the Santa Ynez River.

As shown in **Table 5.1-7**, the median monthly flows at Highway 154 would largely be unchanged from the baseline except when increases of 5.5 cfs and .75 cfs would occur in November and December, respectively; a slight decrease (.5 cfs) would occur in January. At the Alisal Bridge, median monthly flows would remain similar for the majority of the year (January to September; within 0.25 cfs of the baseline) with increases occurring in October (.75 cfs) and November (1.75 cfs); a slight decrease occurs in December (.75 cfs). Median monthly flow at the Lompoc Narrows would remain essentially the same as the baseline from December through March with decreases occurring from April through November.

The BO recognizes this yearly variability, and baseflow targets are designed to take advantage of the "boom" years by extending flow following spill events as well as maintaining suitable aquatic habitat by target flows of 2.5 to 5.0 cfs, which have been maintained yearly since 2000 in compliance with the BO at Highway 154. These flows support suitable oversummering habitat conditions in the Highway 154 reach and provide ancillary benefits of improved habitat conditions extending downstream to pool habitats within the Refugio and Alisal reaches. The resulting changes in flows resulting from the Water System Master Plan Update pumping proposed downstream of Alisal Bridge (as modeled by Stetson) would be largely within this recognized fluctuation as changes in flow would vary from decreases of .75 cfs to increases of 5.5 cfs. Impacts would be less than significant.

Both the BO and FMP provide for a target flow of 1.5 cfs at Alisal Road Bridge in years with spill greater than 20,000 acre-feet and the first year after such spill years if steelhead are present. In addition, under the BO and FMP, specific volumes of water are dedicated for the "Fish Passage Account" (3,200 acre-feet) and for the "Adaptive Management Account" (500 acre-feet) for a total of 3,700 acre-feet. This passage account water is released in the months of January through May on top of naturally occurring storms.

Table 5.1-7
Median Monthly Flow of the Santa Ynez River (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Baseline Conditions												
Highway 154 Bridge	6	5	5	5	7.75	10.25	5	5	5	9.75	17.75	20
Alisal Bridge	1.5	1.5	1.5	3.25	13.3	20.75	7.25	4.75	2.5	6	8.5	8.5
Lompoc Narrows	0	0	0.75	4.25	25.3	34.5	19	4.75	2	1.5	0.75	0
Proposed Master Plan Update Conditions												
Highway 154 Bridge	5.5	5	5	5	7.75	10.25	5	5	5	9.75	23.25	20.75
Alisal Bridge	1.5	1.25	1.5	3	13.3	20.5	7.25	5	2.5	6.75	10.25	7.75
Lompoc Narrows	0	0	0.75	4	24.8	34	18.3	4.5	1.75	1.5	1	0
Increases (Decreases) in Flow												
Highway 154 Bridge	(.5)	0	0	0	0	0	0	0	0	0	5.5	.75
Alisal Bridge	0	(.25)	0	(.25)	0	(.25)	0	.25	0	.75	1.75	(.75)
Lompoc Narrows	0	0	0	(.25)	(.5)	(.5)	(.7)	(.25)	(.25)	(.75)	.25	0

Source:
Stetson Engineers, Technical Memo No 6, Table 7, Table 8 and Table 9 of ***Appendix 5.1***
Note: The analysis used for comparison between baseline conditions and proposed Master Plan Update conditions was 2,400 acre-feet per year, not the City requested amount of 1,980 afy.

Table 5.1-7 shows that depending on the month, flows at Highway 154 would meet or exceed 5 cfs every month under proposed Master Plan Update conditions, and that flows at Alisal Road would meet or exceed 1.5 cfs about 92 percent of the time. These flows would be slightly less or more than baseline conditions depending on the month but would still meet the requirements of the BO. The proposed Master Plan Update would result in less than significant impacts to stream flow of the Santa Ynez River.

Proposed Wells and Water Treatment Facilities

The City has not determined what percentage of the total proposed diversions from the Santa Ynez River may be developed downstream of the Alisal Bridge. The proposed revision to the existing water right permit 15878 will increase diversions from 1,053 afy (baseline) afy to 1,980 afy. Until the City completes wells at the proposed downstream sites and performs well tests, the potential yield from the wells will

not be determined (as shown in **Figure 2.0-6** and **Figure 2.0-7**). It is anticipated based on modeling that impacts will be less than significant.

Mitigation Measures

No mitigation is necessary.

Residual Impacts

Impacts would be less than significant (Class III).

5.1.6.4 Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Impacts

As previously discussed, during construction of the proposed Master Plan Update's various components, groundwater quality could potentially be impacted. The development of the proposed Master Plan Proposed grading and construction activities would involve earth movement and the use of heavy equipment. Given the above, pollutants such as soil, sediments, and other substances associated with construction activities (e.g., oil, gasoline, grease, and surface litter) could directly enter the Santa Ynez River or filter into the local groundwater, during project construction.

As discussed under the California Water Quality Control Board (**subsection 5.1.3.2, State Regulations**), dischargers whose projects disturb one or more acres of soil or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity Construction General Permit Order 2009-0009-DWQ. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

The proposed Master Plan Update would disturb an acre or more land over the course of implementation. Therefore, the City would be required to obtain a General Permit for discharges of storm water associated with construction activity. The General Permit requires an SWPPP which identifies potential sources of pollution and specifies runoff controls, or BMPs, during construction to minimize the discharge of pollutants in stormwater from the construction area. In addition, the SWPPP must identify

post-construction control measures and a monitoring plan. Consequently, the construction phases of the proposed Master Plan Update would result in less than significant groundwater quality impacts.

Mitigation Measures

No mitigation measures are required.

Residual Impacts

Impacts would be in less than significant (Class III).

5.1.6.5 Otherwise substantially degrade water quality.

Impacts

Construction

Implementation of the proposed Master Plan Update would occur over a span of 10 to 15 years, as indicated in the Capital Improvement Plan. As such, the amount of water needed for construction, including well development, would be approximately 6 acre-feet, or less than 1 percent of Lake Cachuma storage capacity.[99] Construction is considered short term and temporary in nature. Therefore, construction related impacts of the proposed Master Plan Update would not substantially reduce reservoir levels or storage to substantially impair designated beneficial uses.

Operation

The Santa Ynez River flows are controlled by operation of the Lake Cachuma reservoir. As such, the proposed Master Plan Update will analyze potential impacts to Lake Cachuma reservoir levels as a result of the increase in the water right diversion. The proposed Master Plan Update would request an increase in water right diversion from baseline conditions of 1,053 afy at an extraction rate of 1.85 cfs, to 1,980 afy at a maximum extraction rate of 5 cfs. Under baseline conditions, the average annual values from SYRHM illustrates that the inflow[100] into Lake Cachuma would be 85,768 afy with the total outflow[101] of 85,672 afy for an increase in the storage level of 96 afy (as shown in Table 4 of **Appendix 5.1**).

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99 0.92 acre-foot per well * six wells = 5.52 acre-feet. 6 acre-feet/ 168,000 acre-feet (average storage in April of Lake Cachuma) would be less than 1.0 percent.

100 Total inflow would consist of water runoff, precipitation and SWP water.

101 Total outflow would consist of evaporation, spills/leakage, project deliveries, water right releases, fish/habitat releases, SWP Exchange and SWP deliveries to the South Coast customers.

The period utilized to determine the average annual amount of water which passes through Lake Cachuma was between 1918 and 1993, a total of 76 years. The average annual amount of water which passes through Lake Cachuma by spills and releases totals 43,890 afy with an average of 78 spill months, 25 spill water years and 15 years in which spills totaled 20,000 acre-feet. The minimum storage level (minimum pool) is set to 12,000 acre-feet, which would occur under the critical drought of water years 1947 through 1951.

Under the baseline conditions, Lake Cachuma' s average amount of storage is 154,462 acre-feet in February, 168,003 acre-feet in April, 153,027 acre-feet in July and 135,997 acre-feet in November. The average annual Lake Cachuma elevation is 734.46 feet with average elevations of 738.04 ft in February, 734.93 feet in August, and 730.60 feet in November (as shown in Table 5 of **Appendix 5.1**).

For a conservative analysis, Stetson Engineers (see Technical Memorandum No. 6, **Appendix 5.1**) estimated the City's diversion from the proposed Well Sites A and B using an amount of 2,400 afy (which is greater than the proposed 1,980 afy) in the SYRHM. The average annual values under proposed Master Plan Update conditions indicated by the SYRHM illustrate that the inflow into Lake Cachuma would be 85,759 afy with the total outflow of 85,663 afy for an increase in the storage level of 96 afy; those values are consistent with baseline conditions as shown in **Table 5.1-8, Surface Water Budgets for Lake Cachuma**.

Under proposed Master Plan Update conditions, the average annual amount of water that passes through Lake Cachuma by spills and releases totals 43,915 afy with an average of 78 spill months, 25 spill water years and 15 years in which spills totaled 20,000 acre-feet. As illustrated in the SYRHM, proposed Master Plan Update conditions would have a less than significant impact to the storage level and mean elevation of Lake Cachuma.

Stetson Engineers performed a water quality impact analyses for the proposed Master Plan Update. The focus of this water quality analysis was on the total dissolved solids (TDS) concentration of the Santa Ynez River flow at the Lompoc Narrows. As described above in **Existing Conditions**, the Lompoc Narrows is located approximately 23 miles downstream of the proposed river well site locations. The Santa Ynez River passes through the Lompoc Narrows and flows across the Lompoc Plain, where the Lompoc Plain ground water basin is located.

As provided in the Settlement Agreement, the Cachuma Project Members agreed to maximize the delivery by the CCWA of SWP water with lower concentrations of TDS into the outlet works at Bradbury Dam during WR 89-18 water right releases subject to the BO requirement. This would be accomplished through the commingling of SWP water with Cachuma water in the outlet works of Bradbury Dam when downstream water right release are being made. Generally, SWP water delivered by CCWA has lower

Table 5.1-8
Surface Water Budgets for Lake Cachuma

Average Annual Values from SYRHM, Simulation Period 1918-1993 (76 years)
(acre-feet per year)

	Condition	
	Baseline (1,053 afy)	**Increased Pumping Downstream at 2,400 afy**
Inflow		
Runoff	74,171	74,171
Precipitation	3,934	3,925
SWP Water[1]	7,663	7,663
Total Inflow	85,768	85,759
Outflow		
Evaporation	11,066	11,041
Spills/Leakage	35,350	35,227
Project Deliveries (no tunnel)[2]	23,053	23,045
WR 89-18 releases	5,819	6,002
Fish/habitat releases	2,721	2,686
SWP Exchange[3]	(2,512)	(2,512)
SWP deliveries to South Coast	10,175	10,175
Total Outflow	85,672	85,663
Change in Storage	96	96

Source: Stetson Engineers, Technical Memorandum No, 6 (2011), Table 4.
Notes:
1 - Includes SWP deliveries in outlet works and into Lake Cachuma.
2 - Does not include Tecolote Tunnel infiltration which averages about 2,050 acre-feet/year.
3 - Includes SWP exchange with SYRWCD ID No 1.

TDS than Lake Cachuma water. The objective of such commingling operations is to maximize the delivery of SWP water to lower the TDS in the lower Santa Ynez River including at the Lompoc Narrows.

The TDS concentration of the groundwater in the central and western Lompoc Plain has increased from less than 1,000 milligrams per liter (mg/L) in the 1940s to greater than 2,000 mg/L in the 1960s.[102] The surface water flow of Santa Ynez River reaching the Lompoc Narrows is a significant source of recharge for the Lompoc Plain aquifer. Therefore, the proposed Master Plan Update would result in a potentially significant water quality impact if TDS concentrations in the river water reaching the Narrows become substantially greater than baseline conditions.

[102] Bright, D.J., Nash, D.B., and Martin, P., *Evaluation of Groundwater Flow and Solute Transport in the Lompoc Area, Santa Barbara County, California*; US Geological Survey Water-Resources Investigations Report 97-4065. 1997

The simulated conditions, based on data from 1942 through 1993, shows that the TDS concentration of the surface water at the Lompoc Narrows ranges from approximately 500 milligrams per liter (500 mg/L) in winter months when there is natural runoff to approximately 1,000 mg/L in summer and fall when flows are minimal. Imports of SWP water, originating from snow melt runoff, generally have much lower salinity than local water.

The proposed Master Plan Update would increase diversions from the baseline condition of 1,053 afy at an extraction rate of 1.85 cfs, to 1,980 afy at a maximum extraction rate of 5 cfs of Santa Ynez River water. Stetson Engineers[103] used the SYRHM model to analyze the potential impact of TDS concentrations of Santa Ynez River flows at the Lompoc Narrows under pumping conditions greater than the proposed Master Plan Update (2,400 afy which is greater than the proposed 1,980 afy).

According to the Stetson Engineers,[104] the primary effect of the proposed Master Plan Update on the flow at the Lompoc Narrows is a decrease in the early fall flows. However, this is the period in which the TDS concentrations the Santa Ynez River flows near Lompoc are high, so the impact on TDS concentrations in the Lompoc groundwater basin is minimal or none due to minor changes in loading (increased TDS concentrations associated with reduced flows). In addition, water right releases would increase under the proposed Master Plan Update compared to baseline conditions as discussed further in **Section 5.1.6.6**, which would help improve water quality at the Lompoc Narrows. The average differences in TDS concentrations in the Lompoc groundwater basin would be very small relative to the total TDS levels in the Lompoc wells (800 to 2,500 mg/L). Consequently, the proposed Master Plan Update would result in less than significant impacts on surface water quality.

Proposed Wells and Water Treatment Facilities

Proposed Well Sites A and B would be located within the Santa Ynez River 100-year floodplain. As a result, there would be times when the river is at higher flows when surface water could be located within 150 feet of a proposed well. However, based on DPH regulations, water cannot be produced from a well while surface water is within 150 feet unless the water is filtered and meets the standards of the Surface Water Treatment Rule.[105] Water produced from existing Wells 3 and 7A and from the proposed new river wells must meet the requirements of the current and proposed regulations including the

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[103] Stetson Engineers, Inc., Technical Memorandum No. 2. Water Quality Impact Analyses for City of Solvang's CEQA Environmental Document for a Time Extension for Water Right Permit 15878, May 10, 2004. (**Appendix 5.1**).

[104] Ibid.

[105] California Code of Regulations, Title 22, Division 4, Chapter 17, "Surface Water Treatment."

Disinfectants/Disinfection By-Products Rule[106] and the Surface Water Treatment Rule[107] promulgated by the DPH.

As described in **Section 2.0**, the proposed Master Plan Update provides for the construction of a water treatment plant to treat water from the proposed wells along the Santa Ynez River to meet DPH standards for drinking water. Chlorination for disinfection would be utilized to supplement filtration for virus removal, up to 2-log virus inactivation. DPH requires disinfection inactivation of Giardia (0.5-log) and virus (2-log) independent of filtration membranes for surface water treatment plants. With construction of the water treatment plant, the City would be able to meet DPH standards for surface water pumped from the Santa Ynez River. Impacts would be less than significant.

As part of the proposed Master Plan Update, water lines, pump stations and storage tanks would be constructed to help facilitate more efficient means of delivering water to City customers. The 2011 Master Plan Update recommends that the treatment plant also include construction of a backwash system to contain filter backwash water and allow for recovery of most of the backwash water. The remaining backwash water must be discharged to the sewer system. The Plan recommends that treated water from the treatment plant be introduced into the City's piping network in two locations to improve water distribution throughout the service area. Impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts

Impacts would be less than significant (Class III).

5.1.6.6 Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

Impacts

The proposed project does not provide for any housing, as such no housing would be placed in the 100-year flood zone. There would be no impact.

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106 California Code of Regulations, Title 22, Chapter 15.5, "Disinfectant residuals, Disinfection Byproducts, and Disinfection Byproduct Precursors."

107 Ibid, Chapter 17, "Surface Water Treatment."

Mitigation Measures

No mitigation measures are required.

Residual Impacts

There would be no impact (Class III).

5.1.6.7 Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

Impacts

Figure 5.1-3 illustrates that the portions of areas of proposed Well Sites A and B within the City's jurisdiction are located within a 100-year flood hazard zone. According to the City's Municipal Code Flood Control chapter,[108], the proposed Master Plan Update would be required to design the proposed wells to minimize or eliminate infiltration of floodwaters to the systems and discharge from the systems into floodwaters. Therefore, impacts related to the potential for water infiltration are less than significant.

Portions of Well Sites A and B are located within the 100-year floodplain of the Santa Ynez River, as shown in **Figure 5.1-3.** As a result, proposed well heads and surface infrastructure have the potential to be damaged by river flows during a 100-year flood event. Loss of production in future wells would limit the City's ability to provide its residents adequate water supplies. Consequently, any wells constructed within the designated floodplain would need to be protected from potential flood damage. These impacts would be potentially significant.

Mitigation Measures

The following mitigation measures shall be implemented to minimize flood damage to wells within a 100-year floodplain:

HYD-2 New wells constructed located within the 100-year floodplain shall be adequately anchored and constructed to resist flood damage. Wells shall be equipped with a watertight casing that extends from 1 foot above grade to 20 feet below grade. The casing could be ductile iron pipe which would be strong enough to resist debris impact or a commercially available protective well cover (e.g., metal boxes or cylinders).

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108 City of Solvang Municipal Code, Title 13, "Flood Control."

Residual Impacts

Impacts would be less than significant with mitigation (Class II).

5.1.6.8 Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

Impacts

The proposed Water System Master Plan Update would not place people or structures, at risk of flooding except as noted under **Impact 5.1.6.7** . Impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts

There would be no impact (Class III).

5.1.6.9 Substantially increase the risk of inundation by seiche, tsunami, or mudflow?

Impacts

The proposed project is not in an area subject to seiches, tsumanis or mudflows. There would be no impact.

Mitigation Measures

No mitigation measures are required.

Residual Impacts

There would be no impact (Class III).

5.1.7 CUMULATIVE ANALYSIS

5.1.7.1 Cumulative Impacts

As discussed above, the proposed Master Plan Update would result in less than significant project impacts. Cumulative impacts within the City limits were analyzed upon full General Plan buildout conditions. To evaluate cumulative impacts, this EIR examined baseline and proposed water diversions within the Santa Ynez River from Bradbury Dam to the 101 bridge in Buellton. **Section 4.0, Cumulative Scenario**, lists the existing water right holders and pending applications within the watershed.

Water Rights

The purpose of operating the downstream water right releases in conjunction with the fish water releases, as provided in the Settlement Agreement, is to reduce the impacts on the Cachuma Project water supply while meeting the target rearing flows described in the BO. The downstream water right releases contributing to the conjunctive use operations consist of either release from the Above Narrows Account or combined releases from the Above and Below Narrows Accounts.

Under the current Master Contract, Reclamation delivers an annual amount to the Member Units that does not exceed the "Available Supply." The latter represents the maximum amount of Lake Cachuma water that is available after Reclamation has met all requirements for water for other purposes under current and future state and federal laws, permits, orders, and requirements. Hence, Available Supply does not include water released pursuant to SWRCB Orders WR 89-18 and WR 94-5 for downstream groundwater replenishment, or water released under WR 94-5 for fish and to meet the requirements of the BO of NMFS for the endangered southern steelhead. The maximum Lake Cachuma allocation, or available supply, is 25,714 afy for Member Units.

The Settlement Agreement ensures that rights of water users downstream of Bradbury Dam would be protected. As such, cumulative water right impacts would be considered less than significant.

Surface Water Hydrology

The flows of the Santa Ynez River were analyzed at three key locations based on existing monitoring gauges. The flow locations analyzed were at the Highway 154 Bridge, Alisal Bridge and at the Lompoc Narrows. Project flows were analyzed from Bradbury Dam downstream to the proposed Well Site B location. Flows within the Santa Ynez River would increase slightly under cumulative conditions as additional requests for water releases would be made during the summer and early fall months. Conditions further downstream at the Buellton Bridge are similar to the impacts at Alisal Bridge, except attenuated by the additional tributary and groundwater contributions below Alisal Bridge. Impacts from

increased City river pumping attenuates even further downstream near the Salsipuedes Creek confluence and at the Lompoc Narrows.

Potential impacts to surface water quality were analyzed under **Impact 5.1.6.5** as TDS concentrations were measured from Bradbury Dam downstream to the Lompoc Narrows. Historic TDS concentrations were found to be cyclical with seasonal hydrologic conditions. Higher concentrations of TDS typically occur in summer and fall months when flows are minimal. Higher flows during the winter months results in lower TDS concentrations. An increase in river flows due to the increase in water rights releases would lower TDS concentrations during the summer and late fall months. Cumulative surface water quality impacts would be less than significant.

Groundwater Hydrology

As shown in **Table 5.1-3**, average dewatered groundwater storage in the Above Narrows Aquifer would increase with implementation of the proposed Master Plan Update. Under cumulative conditions, surface water flows would increase during the summer and early fall months as a result of additional water right releases. These additional flows would allow for groundwater recharge and percolation into the aquifers along the river. Therefore, cumulative groundwater impacts to the Above Narrows Aquifer would be less than significant.

However, if water levels decline in excess of operational criteria (as described in **Section 2.0, Project Description** for well operation) as a result of simultaneous pumping; potentially significant impacts would occur to the City's wells and adjacent well users. This scenario would only occur during low flow periods of the Santa Ynez River.

The primary area of concern would be the well fields upstream of Alisal Bridge which would include the City's well 7A, Alisal Ranch wells and, further upstream, the ID No. 1, 6 cfs well field.

As described in **Section 5.1.3.3**, the agreement between ID No. 1 and Alisal Ranch determines that once the groundwater elevation of well 22F1 reaches an elevation of 375 feet, ID No. 1 shall have to stop pumping groundwater, or supply water to Alisal Ranch. The City would operate the proposed wells downstream of Alisal Bridge to minimize potential environmental impacts upstream of Alisal Bridge. As discussed above, the proposed Master Plan Update would result in less than significant groundwater elevation impacts. Therefore, cumulative groundwater elevation impacts would be less than significant.

Water Supply

As indicated in **Impact 5.1.6.2**, critical dry and drought periods would result in shortages in water supply from the Cachuma Project to Member Units. The proposed Master Plan Update was determined to result

in similar water supplies within Lake Cachuma compared to baseline conditions, as discussed in Section 5.1.6.6. However, shortages would still occur with or without the implementation of the proposed Master Plan Update.

5.1.7.2 Cumulative Mitigation Measures

Mitigation measure **HYD-1** shall be implemented.

5.1.7.3 Residual Cumulative Impacts

Cumulative surface hydrology impacts would be less than significant (Class III) as the request for water releases by water right holders along the Santa Ynez River would be met with releases from Bradbury Dam.

Water right releases and releases as a result of flows for the BO would be made during the summer to fall period when groundwater levels would need to be replenished. Cumulative groundwater impacts would be less than significant (Class III).

As discussed under **Impact 5.1.6.2**, project level water supply impacts would be reduced to less than significant impacts. As project level impacts would be less than significant, cumulative water supply impacts would be considered less than significant with the incorporation of mitigation measures (Class II). Despite the fact that the Member Units have already implemented a number of conservation measures, it may be possible to implement additional drought contingency measures identified as part of the Member Units' urban water supply contingency analysis in order to make up for a temporary water supply shortage in a critical drought year or period.