City of Santa Cruz
Water Supply Assessment

SPHERE OF INFLUENCE AMENDMENT

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COMMON ABBREVIATIONS AND ACRONYMS

ADT – average daily trips
AFY – acre-feet per year
AMBAG – Association of Monterey Bay Area Governments
cfs – cubic feet per second
CEQA – California Environmental Quality Act
CESA – California Endangered Species Act
CII – Commercial, industrial, and institutional
CWD – Central Water District
CUWCC – California Urban Water Conservation Council
DWR – California Department of Water Resources
EIR – Environmental Impact Report
FESA – Federal Endangered Species Act
FTE – full-time equivalent
ft bgs – feet below ground surface
HCP – Habitat Conservation Plan
IWP – Integrated Water Plan
LAFCO – Local Agency Formation Commission
LRDP – Long-Range Development Plan
mgd – million gallons per day
mgy – million gallons per year
MOU – Memorandum of Understanding Regarding Urban Water Conservation in California
MWM – Maddaus Water Management
NCP – North Coast Pipeline
NCS – North Coast System
SOI – Sphere of Influence
sq ft – square feet
SqCWD – Soquel Creek Water District
SWRCB- State Water Resources Control Board
UCSC – University of California, Santa Cruz
UWMP – Urban Water Management Plan
WSA – Water Supply Assessment
WTP – Water Treatment Plant

1. EXECUTIVE SUMMARY

In 2001, Senate Bills 610 and 221 ("SB 610" and "SB 221") amended California State Law to improve the linkage between land use decisions made by cities and counties and water supply availability. Pursuant to SB 610, a Water Supply Assessment ("WSA") is now required for projects that are subject to the California Environmental Quality Act ("CEQA") and that meet certain size thresholds. This WSA has been prepared to support the City of Santa Cruz's ("City's" or "Santa Cruz's'") application to the Santa Cruz Local Agency Formation Commission ("LAFCO") to amend the City's Sphere of Influence ("SOI"). The SOI amendment project ("Project") has been proposed for the purpose of providing extraterritorial water and sewer services to a 374-acre portion of the University of California Santa Cruz ("UCSC") main campus (see Figure 1). UCSC plans to develop this area as part of its 2005 Long Range Development Plan ("2005 LRDP"). The Draft 2005 LRDP was originally prepared in January 2005. Following environmental review, the final version of the 2005 LRDP ("Final 2005 LRDP") was adopted by the University of California Regents ("Regents") in September 2006. Subsequent litigation of the 2005 LRDP Final Environmental Impact Report ("EIR") resulted in a settlement agreement ("Settlement Agreement") that was reached by parties involved in the litigation of the 2005 LRDP Final EIR. The "Project," as defined for this WSA, includes all new development proposed by UCSC within the SOI amendment area (i.e., outside of the City's current SOI, shown in Figure 2) as identified in the Final 2005 LRDP and the Settlement Agreement. For the purpose of this WSA, the development described in the Final 2005 LRDP and the provisions of the Settlement Agreement are referred to collectively as the "modified 2005 LRDP."

As part of a WSA, the public water supplier for a proposed project must evaluate whether there are sufficient supplies to meet the demand of the proposed project over the next 20 years, in addition to the public water system's existing and planned future uses. As the water supplier for UCSC, the City is responsible for the preparation of a WSA for the Project. This WSA describes the City's historical water demand, anticipated future water demand (including that associated with the Project) and water supply sources, and provides a comparison of the City's expected water supply and demand through the year 2030 (including the demand of the Project). Information from the City's 2005 Urban Water Management Plan ("2005 UWMP") is incorporated throughout this WSA, supplemented by information from other studies that have been performed by the City and other agencies (such as the neighboring Soquel Creek and Central Water Districts), and by recent information provided by the City's Water Department, Planning Department, and EIR consultant.

1.1. WATER DEMAND

Projections of water demand for the Project are presented herein based on analyses that were conducted as part of UCSC's 2005 LRDP Draft EIR, updated to incorporate revisions made in the 2005 LRDP Final EIR and the Settlement Agreement.

Water demand for the City's entire water service area (shown in Figure 3) is presented herein based on water demand projections included in the 2005 UWMP, revised to

include the updated water demand estimates for UCSC, including the Project, presented in this WSA pursuant to the 2005 LRDP Final EIR and the Settlement Agreement (i.e., the "modified 2005 LRDP"). Projections for the City's entire service area were developed for two separate demand scenarios to reflect the estimated range in water use associated with potential development that may occur in the next 20 years (as estimated by the City's Water Department). These projections of water demand were updated from the 2005 UWMP for the following two reasons: (1) in order to extend the projections out to the year 2030 (as is required by SB 610) and (2) to incorporate changes to UCSC's future demand projections in accordance with the modified 2005 LRDP (i.e., pursuant to the 2005 LRDP Final EIR and the Settlement Agreement).

The two demand projections presented for the City's water service area, referred to herein as *Updated UWMP Scenario 1* and *Updated UWMP Scenario 2,* are meant to reflect the high-end and low-end of plausible water demand growth within the entire service area (including the Project Site). *Updated UWMP Scenario 1* represents the higher-end of the potential range in water demands, while *Updated UWMP Scenario 2* represents the lower-end of the potential range in water demands. The primary difference between these two scenarios is the assumed growth rate of new development within the City's service area. *Updated UWMP Scenario 1* anticipates a 0.8% annual increase in the City's three largest customer classes (residential, business, and irrigation), which is consistent with general plans for the City's service area.[1] *Updated UWMP Scenario 2* anticipates a 0.4% annual increase in these customer classes, which is consistent with historical trends in growth.[2] Actual decisions regarding the planning and approval of any future development within the City's service area will be determined by the appropriate land planning agencies.

This WSA projects that water demand for the Project at full buildout will be 100 million gallons per year ("mgy") and that this water demand will be realized by 2020 (see Table 1). The City's Water Department estimates that total water demand for the entire service area in 2030 (including the Project) will range from 4,222 mgy to 4,356 mgy (*Updated UWMP Scenarios 2* & *1*, respectively; see Table 2). As such, water demand associated with other development planned within the City's service area (i.e., not including the Project) is expected to increase by between 222 mgy and 356 mgy by 2030.

1.2. WATER SUPPLY

Water served by the City originates from rainfall, surface runoff, and groundwater infiltration occurring within watersheds located in Santa Cruz County. The City's four current water sources include:

(1) Surface water diversions from creeks and natural springs on the North Coast,

[1] The 0.8% annual growth rate is from the 2005 UWMP and based on general plans that were approved for the City, Santa Cruz County, and the City of Capitola at the time that the 2005 UWMP was prepared. The City is currently in the process of updating its general plan and will evaluate changes to its water demand projections related to the new general plan in its forthcoming 2010 UWMP update.
[2] The 0.4% annual growth is based on actual residential growth rates presented in the 2005 UWMP experienced between 1997 and 2004.

(2) Surface water diversions from the San Lorenzo River,

(3) Surface water from Loch Lomond Reservoir (which is used primarily to collect and store water from the Newell Creek watershed, but also stores water from the San Lorenzo River), and

(4) Groundwater produced by the Live Oak Wells (which is extracted from the Purisima Formation).

The City does not import water from outside of Santa Cruz County.

These four water supplies provide the City with approximately 4,314 mgy during normal hydrologic years. The percentage of total supply that is available from the City's four water supply sources is: 25% from the North Coast Stream Diversions, 47% from the San Lorenzo River, 24% from the Loch Lomond Reservoir, and 4% from the Live Oak Wells.[3] Table 3 lists the City's future water supply availability for normal and dry years from these local sources based on the City's 2005 UWMP. Historical production from these supplies is shown in Table 4.

1.3. WATER SUPPLY RELIABILITY

The primary water reliability problem currently facing the City's water supply system is the lack of adequate water supply during droughts. This problem stems from two factors: (1) a wide range in the yield of surface water sources from year to year, and (2) limited surface water storage capacity. Furthermore, as a coastal system, the City's groundwater supply is particularly vulnerable to seawater intrusion. Although there appears to be no immanent threat to the City's groundwater supply under normal operating conditions, if all users continue to pump groundwater at the present cumulative rate, the City's future use of groundwater to meet peak demands during dry years may be compromised.

In normal and wet years when rainfall and runoff are abundant, base flows in the coast watershed and associated river sources are restored by winter rains, and Loch Lomond Reservoir is typically replenished to full capacity with runoff from the Newell Creek watershed (Santa Cruz, 2006). The water system, however, is vulnerable to shortage in drought years when the San Lorenzo River and North Coast sources run low. In single dry years, the system relies heavily on water stored in Loch Lomond to satisfy demand, which draws down the reservoir level lower than usual and depletes available supply in the event of a subsequent dry year. In multiple dry year, or critical drought conditions, the combination of very low surface flows in the North Coast streams and San Lorenzo River combined with depleted supply stored in Loch Lomond Reservoir reduces the City's available supply to a level which cannot support average dry season demands, even with an increase in groundwater production.

[3] Note that these percentages reflect the potential capacity of each of the City's four water supply sources, which is different from the percentage of the City's actual supply that is currently produced by each source.

1.4. NORMAL YEAR SUPPLY AND DEMAND COMPARISON

This WSA concludes that in a normal year the City's supplies are sufficient to meet the demands of the Project and the City's existing and planned future uses through at least the year 2025. However, depending upon the rate of water demand growth, the City's water supplies may, during a normal year, be insufficient to fully support the demands of the Project and the City's other existing and planned future uses after 2025. The evaluations presented herein indicate that if water demand increases as is projected in *Updated UWMP Scenario 1*, which anticipates a 0.8% annual increase in the City's three largest customer classes and is consistent with general plans for the City's service area, the City will not be able to meet the demand of the Project and the City's existing and planned future uses beyond 2025 in a normal year. However, even under this high-end water demand growth rate, the magnitude of projected shortfall represent less than 1% of the City's total projected demand in 2030, or 42 mgy during a normal year.

If water demand increases as is projected in *Updated UWMP Scenario 2*, which anticipates a 0.4% annual increase in customer classes, and is consistent with historical trends in growth, the City will be able to meet the demands of the Project and other existing and planned future uses through the year 2030 (i.e., the 20 year evaluation horizon for this WSA).

1.5. DRY YEAR SUPPLY SHORTFALL

This WSA concludes that the City does *not* have sufficient water to meet current or future projected water demand during dry years, irrespective of development of the Project. This finding is consistent with the 2005 UWMP findings and the conclusions presented in the 2003 Integrated Water Plan ("IWP"), which state that: *"The City's water system is grossly inadequate to meet current demand under drought conditions."* (Gary Fiske & Associates, 2003). It is important to note that the discussion below focuses on annual water supply shortfalls, and does not address peak season cutbacks, which can be significantly greater than the annual supply shortfall due to seasonal variations in demand and supply, and limitations on the City's water storage facilities.

Supply deficits projected in this WSA for the City's water system (including the Project and other planned development throughout the service area) are projected to be the greatest during the second year of a multiple year drought. Supply deficits projected for 2010 range from 30% (*Updated UWMP Scenario 2*) to 31% (*Updated UWMP Scenario 1*). In 2030 this shortfall is projected to range from 36% (*Updated UWMP Scenario 2*) to 38% (*Updated UWMP Scenario 1*). Thus the maximum projected supply shortfall presented in this WSA occurs in the year 2030 under *Updated UWMP Scenario 1*, with a total supply deficit of 1,656 mgy. Compared to the Project demand of 100 mgy and a maximum estimated future development demand of 356 mgy (*Updated UWMP Scenario 1*), it is evident that most of the City's dry year supply shortfall is due to existing uses. Even in the "worst-case scenario" multiple year drought in 2030, (i.e., *Updated UWMP Scenario 1*), implementation of the Project accounts for only 6% of the supply shortfall (100 mgy out of 1,656 mgy), while other new development accounts for 21% of the supply shortfall (356 mgy out of 1,656 mgy) and existing users account for

72% of the supply shortfall (1,200 mgy out of 1,656 mgy). Thus the demand of the Project would increase the City's 2030 waters supply shortfall by up to 2% of the total demand (100 mgy out of 4,356 mgy).

1.6. ALTERNATIVE WATER SUPPLIES

The City has been actively considering possible new water supplies for many years. In 2003, the City produced an IWP that evaluated potential water supply strategies. The IWP identified three preferred strategies for managing the City's water supply and demand to address the current supply deficit during dry years. These strategies include: (1) water conservation, (2) curtailment of water demand up to 15% during drought conditions, and (3) desalination of seawater. As of the 2005 UWMP, the City had achieved 153 mgy of conservation toward its goal of 282 mgy in 2010. The City has also recently completed testing of a one-year pilot desalination project (in April 2009) and will begin environmental review of the full-scale desalination plant in Fall 2009.

While these three strategies will provide additional dry year supplies for current customers, they do not entirely address additional future water supply shortfalls that would result from new growth within the service area due to the Project and/or to other planned development within the City's service area. For example, the desalination plant included in the IWP is designed to alleviate dry year supply shortfalls for existing customers, however the plant could conceivably be expanded to provide normal year or dry year water for new development. Thus strategies to address potential future water supply deficits due to additional growth within the City's service area (e.g., from the Project and/or other development) were considered as part of the IWP, but all final decisions related to water supplies for new customers were left for consideration by future decision-makers on an as-needed basis. If the Project and/or other new development results in increased demand on the City's water system, the City will need to develop new dry year water supplies or accept increased cutbacks during dry years up to 7% (or 456 mgy) in 2030 under *Updated UWMP Scenario 1*. As discussed above, depending on actual development within the City's service area through the year 2030, the City may also face a supply deficit during normal years of up to 42 mgy under *Updated UWMP Scenario 1*. Potential supply alternatives that could be evaluated to support new development and to limit future curtailment at a maximum level as demand grows in the future could include:

- Expanded desalination capacity,
- Water recycling,
- Groundwater recharge,
- Reservoir expansion,
- Aquifer storage and recovery, and
- Off-stream storage.

The City has evaluated over 30 different supplemental water supply options in the past, including many of those in the list above, and has previously determined them to be inadequate, infeasible, or too costly. However, these and other supply alternatives may need to be re-evaluated in the future to avoid increased dry year cutbacks due to new

development (including the Project), and potentially to augment the City's water supplies if future development is approved at a rate greater than can be accommodated by the City's existing normal year water supply.

2. INTRODUCTION

2.1. REGULATORY BACKGROUND

In 2001, Senate Bills 610 and 221 ("SB 610" and "SB 221") amended California State Law to improve the linkage between land use decisions made by cities and counties and water supply availability.

SB 610, in particular, requires that a Water Supply Assessment ("WSA") be prepared by a water supplier and incorporated into environmental documentation for a proposed project if, among other things:

(1) The project is subject to the California Environmental Quality Act ("CEQA"), and

(2) The project is a proposed development including more than 500 residential units, 500,000 square feet ("sq ft") of retail space, 250,000 sq ft of office space, or if the project is expected to use an equivalent amount of water.

Pursuant to SB 221, a Water Supply Verification ("WSV") must also be completed prior to a city or county's approval of a tentative map, parcel map, or development agreement for a subdivision of 500 dwelling units or more. Thus, the local planning agency may not approve a proposed residential development unless the water supplier has verified that sufficient water is available to support the project.

The intent of SB 610 and SB 221 is to promote collaborative planning between local water suppliers and cities and counties. Both statues require that detailed information regarding water availability be documented and submitted to the decision-making body prior to approval of specified large development projects. Furthermore, SB 610 and SB 221 require that this information be included in the administrative record that serves as the evidentiary basis for an approval action by the city or county on such projects. In this way, WSAs and WSVs link water supply reliability with land use planning.

2.2. PRIOR EVALUATION OF THE ABILITY TO SUPPORT FUTURE DEVELOPMENT

In response to the passage of SB 610 and 221, the City of Santa Cruz ("City" or "Santa Cruz") prepared a study *Adequacy of Municipal Water Supplies to Support Future Development in the City of Santa Cruz Water Service Area* (Santa Cruz, 2004). The purpose of this study was to provide a broad assessment of the adequacy of the Santa Cruz water system, which is widely acknowledged as already at risk of shortage in dry years, to continue to support the type and amount of future development being envisioned by the land planning agencies within the City's water service area.

A comparison of the City's current water supplies to the existing demand at that time showed that, during normal years, the City has approximately 300 million gallons per year ("mgy") of remaining capacity to support future development (Santa Cruz, 2004). However, significant discussion was given in the City's 2004 study to the issue of dry year supplies and how the known dry year supply deficits should factor into decisions

regarding future growth. Two methods were proposed for evaluating the City's supply sufficiency during dry years. The first approach focused on defining a "Maximum Acceptable Level of Shortage," taking into account the worst-case scenario drought and the probability of occurrence over different time periods (i.e., the recurrence interval). The second proposed method focused on the "Annual Use of Loch Lomond," which is the City's only major water source that is not presently being used at maximum capacity. Loch Lomond Reservoir is also the City's only surface water reservoir and thus is critical to meeting dry year demands.

Based on the second approach listed above, "Annual Use of Loch Lomond," combined with historical water supply and demand information, the City determined that the water system could accommodate approximately 300 mgy growth in demand before reaching the maximum capacity of the current supply system.[4] The City acknowledged that this increased demand would increase future drought hardships on existing customers, but that these effects may be acceptable depending on the City's tolerance for drought cutbacks. The issue of maximum acceptable level of shortage was not resolved as part of the *Adequacy of Municipal Water Supplies to Support Future Development in the City of Santa Cruz Water Service Area* study and is something that may be evaluated by the City at some time the future.

2.3. PROJECT BACKGROUND

This WSA has been prepared pursuant to Water Code Section 10910 et. seq. to support the City's application to the Santa Cruz Local Agency Formation Commission ("LAFCO") to amend the City's Sphere of Influence ("SOI"). The SOI amendment project ("Project") has been proposed for the purpose of providing extraterritorial water and sewer services to a 374-acre portion of the University of California Santa Cruz ("UCSC") main campus (see Figure 1). UCSC plans to develop this area as part of its 2005 Long Range Development Plan ("2005 LRDP"). The Draft 2005 LRDP was originally prepared in January 2005. Following environmental review, the final version of the 2005 LRDP ("Final 2005 LRDP") was adopted by the University of California Regents ("Regents") in September 2006. Subsequent litigation of the 2005 LRDP Final Environmental Impact Report ("EIR") resulted in a settlement agreement ("Settlement Agreement") that was reached by parties involved in the litigation of the 2005 LRDP Final EIR. The "Project," as defined for this WSA, includes all new development proposed by UCSC within the SOI amendment area (i.e., outside of the City's current SOI, shown in Figure 2) as identified in the Final 2005 LRDP and the Settlement Agreement. For the purposes of this document, the term "modified 2005 LRDP" will be used to identify the current long-range development plan as modified by the Final 2005 LRDP and the provisions of the Settlement Agreement.

[4] The estimated 300 mgy was based on a five year average historical water demand of approximately 4,000 mgy between 1999 and 2003. Using the historical relationship between system demand and production from Loch Lomond, the City estimated the water system capacity to be approximately 4.3 billion gallons per year, which correlated with the maximum withdrawal from Loch Lomond allowed by the current State Water Resources Control Board license.

This section describes the Project, the City's existing SOI and water service area, the Project location, and the need for water service within the Project Site.

2.3.1 Project Definition

The "Project" is defined as the SOI amendment project. The Project is being undertaken in accordance with the provisions of the Settlement Agreement (i.e., pursuant to the "modified" 2005 LRDP, as referred to herein)[5]. In order to provide water service to this portion of the UCSC main campus that is located outside of the current SOI, the City must expand its SOI to include the new development area. This new development area is referred to by UCSC as the "North Campus" area and referred to herein as the "Project Site". Thus, the "Project," as defined for this WSA, includes all development planned for the North Campus area in the current version of the 2005 LRDP.

2.3.2 City of Santa Cruz Sphere of Influence and Water Service Area

LAFCOs were created by state law, in 1963, to regulate the boundaries of cities and special districts. The purpose of establishing LAFCOs were to promote the orderly development of local government agencies and efficient provision of services, to guide development away from prime agricultural land, and to discourage urban sprawl. One of Santa Cruz LAFCO's many responsibilities is to develop and determine an SOI for each local governmental agency within Santa Cruz County. The SOI is a plan for the probable future physical boundaries and service area of a local governmental agency. The City's current SOI is shown in Figure 2.

In 2006, Santa Cruz LAFCO adopted a water service boundary map for the City that included all properties within the City or County urban service areas that received water service from the City's water system. The City's water service area (shown in Figure 3) is approximate 30 square miles and includes all lands within City limits, adjoining unincorporated areas of Santa Cruz County, a small part of the City of Capitola, and coastal agricultural lands north of the City (Santa Cruz, 2006). As shown on Figures 2 and 3, the City's water service area covers a larger geographical area than the current SOI.

Water service is provided by the City's Water Department throughout its water service area to approximately 21,000 residential accounts, 2,200 commercial, industrial, and institutional accounts, and 500 irrigation accounts (Santa Cruz, 2006). Water service is also provided to the existing developed portions of the UCSC main campus.

2.3.3 Project Location

Santa Cruz is located on the central coast of California, along the northern border of Monterey Bay, and approximately 75 miles south of the City of San Francisco.
The UCSC main campus in located in northwestern Santa Cruz and is bisected by the City's northern boundary. The UCSC main campus is divided into four areas: the North Campus, the Upper Campus, the Central Campus, and the Lower Campus. The Lower

[5] As mentioned above, the term "modified" 2005 LRDP is used within this WSA in reference to the current adopted long-range development plan (UCSC, 2006a), including the provisions specified in the 2005 LRDP Final EIR (UCSC, 2006b) and the Settlement Agreement.

Campus and Central Campus are both mostly developed and are located within the Santa Cruz city limits. The North Campus and Upper Campus are primarily undeveloped and are located within unincorporated Santa Cruz County.

The 374-acre site included in the Project (Assessor Parcel Numbers 061-321-40 and 062-041-49), referred to as "Site" or "Project Site" herein, is located north of the existing developed portions of the UCSC main campus, as shown on Figure 1. The Project Site covers most of the North Campus area to the east of Empire Grade and is bordered by the developed UCSC campus to the south, the City-owned Pogonip property to the east, the undeveloped Upper Campus to the north, and existing residential development to the west. The Project Site is located outside of the City's jurisdictional limits, and no annexation is proposed as part of this Project (Santa Cruz, 2009a).

The Project Site is primarily undeveloped and presently contains mostly forested lands. Small portions of UCSC's Colleges 9/10 and Crown Merrill Apartment complex are located within the Project Site. The Project Site also contains a network of UCSC constructed fire break gravel roads, underground water lines, a water system pump station, fire hydrants, and abandoned water tanks. Campus development and expansion that is planned for this area is described in UCSC's Final 2005 LRDP, as further discussed below (Santa Cruz, 2009a). The Project Site is not located within the City's current SOI.

2.3.4 UCSC's 2005 Long Range Development Plan

On 21 September 2006, the University of California Regents ("Regents") adopted the Final 2005 LRDP for the UCSC campus after certification of the 2005 LRDP Final EIR. The Final 2005 LRDP identifies UCSC's campus goals and development objectives and provides a map of the proposed campus land uses through the year 2020. The Final 2005 LRDP is a planning framework for the development that is anticipated to accommodate the academic, research, student, and faculty services through the academic year 2020-2021. As part of the Final 2005 LRDP, UCSC campus enrollment is expected to reach approximately 19,500 students by the year 2020 (current enrollment is approximately 15,000 students). In order to provide for this increased enrollment, the 2005 LRDP Final EIR allowed for a total of 9,556 on-campus housing units (or beds) for students, faculty and staff, and approximately 8,242,400 gross sq ft of building area (UCSC, 2006a).[6] These plans were approximately 22% lower than the original plans included in the 2005 LRDP Draft EIR. Litigation of the 2005 LRDP Final EIR resulted in a comprehensive settlement agreement ("Settlement Agreement") that was reached by all parties in the lawsuit. The provisions of this agreement, described below, are referred to herein as the "modified 2005 LRDP."

2.3.5 Comprehensive Settlement Agreement

The 2005 LRDP Final EIR was legally challenged in 2007 by several entities, including the City of Santa Cruz. A ruling by the Santa Cruz County Superior Court in *City of Santa Cruz et al. v. Regents of the University of California et al.* (CV 155571,

[6] Values from UCSC (2006a) volume IV; available online at http://lrdp.ucsc.edu/final-eir.shtml.

consolidated with Case No. CV155583) concluded that additional analyses relating to water supply, housing, and traffic mitigation were required. In August 2008, a Settlement Agreement was executed by all parties to resolve the lawsuits. The Settlement Agreement was entered as a final judgment of the Court, thereby superseding the previous court ruling.

The following key provisions of the Settlement Agreement will be implemented by UCSC and the City in connection with future development under the 2005 LRDP (Santa Cruz, 2008). A copy of the Settlement Agreement is included in Appendix A. As mentioned above, for the purposes of this document, the term "modified 2005 LRDP" will be used to identify the Final 2005 LRDP as modified by the provisions of the Settlement Agreement.

- ***Enrollment:*** Enrollment of full-time equivalent ("FTE") on campus 3-quarter average (e.g., fall, winter, and spring) undergraduate students will not exceed 17,500. Total on-campus combined graduate and undergraduate enrollment will not exceed 19,480 in academic year 2020-2021.
- ***Housing:*** UCSC will provide 7,125 beds for student enrollment up to 15,000 and will provide additional housing to accommodate 67 percent of new-student enrollment above 15,000. This results in provision of a total of 10,125 available beds at UCSC and a total enrollment of 19,500.
- ***Water and Sewer Services:*** The City and UCSC will concurrently apply to the Santa Cruz LAFCO for an SOI amendment and for extraterritorial water and sewer services for the North Campus area (shown on Figure 1) to allow for the development of 3,175,000 gross sq ft of additional building space as described in the modified 2005 LRDP. The City's application is for the SOI amendment. UCSC's application is for extraterritorial water and sewer services for the North Campus area. The Settlement Agreement stipulates the following four conditions:
    - UCSC will pay a fee for increased water use (equivalent to the City's "system development charges") to cover its proportional share of the City's development of new sources of water supply;
    - UCSC will implement 19 high priority water conservation projects (MWM, 2007) within five years of adoption of the Settlement Agreement;
    - UCSC will comply with service area-wide water restrictions and mandatory use curtailment imposed by the City in response to declaration of a water shortage emergency; and
    - If the City establishes a service area-wide moratorium on new connections because of a water shortage emergency condition, UCSC will not increase its water demand on the City's water system from any UCSC-owned properties, with the exception of UCSC housing projects already under development, while the moratorium remains in effect.
- ***Traffic:*** UCSC will pre-pay its proportional share of roadway infrastructure improvements associated with the addition of 3,900 average daily trips ("ADT") to

the main campus (for a total of 28,700), generated by the 2005 LRDP. UCSC will also pay for existing ADT related to its 2300 Delaware Avenue property, and for new ADT at the Marine Sciences campus as ADT generating development is approved at the rate then in effect. The ADT will be based on the City's Traffic Impact Fee program and will be equal to the fee paid by private developers.

- ***2005 LRDP EIR:*** UCSC will not rely on the 2005 LRDP EIR water or housing analyses for purposes of approving projects implementing the 2005 LRDP. The City understands this portion of the settlement only to prohibit reliance on the 2005 LRDP EIR housing analysis as it relates to off-site housing. The adequacy of traffic mitigation is resolved by the Settlement Agreement.

Pursuant to the provisions of the Settlement Agreement, the City submitted an application to amend the City's SOI to Santa Cruz LAFCO in October 2008.

2.3.6 Need for Water Services within the Project

The Project Site has an existing point of connection with the City water system, which is presently used for fire protection and to serve water to the College 9/10 and Crown-Merrill Apartments. Development of the land uses called for in the modified 2005 LRDP will require additional City water service to support the mix of college, housing, physical education and protected landscape/resource land uses proposed by the modified 2005 LRDP.

The area proposed for inclusion in the City's SOI (e.g., the Project Site) is in the exclusive control of UCSC. All development and infrastructure facilities necessary to accommodate the Project will be approved, designed and constructed by UCSC.

UCSC's application to the Santa Cruz LAFCO states that, while UCSC does not intend to commence immediately, construction of specific development for the Project Site, the modified 2005 LRDP has been approved by the Regents as an appropriate land use plan to accommodate the academic, research and student/faculty services for a projected campus enrollment of 19,500 full-time students by 2020. Implementation of the modified 2005 LRDP contemplates that incremental development of the Project Site will be needed to support the enrollment growth and will occur throughout the modified 2005 LRDP planning horizon based on space demand. At this time, there are no UCSC-proposed site-specific development plans for the Project Site or plans to extend infrastructure to the Site.

3. PREPARATION OF A WATER SUPPLY ASSESSMENT

3.1. APPLICABILITY OF SENATE BILL 610 TO THE PROJECT

Water Code Section 10910

(a) Any city or county that determines that a project, as defined in Section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part.

Water Code Section 10912

For the purposes of this part, the following terms have the following meanings:

(a) "Project" means any of the following:

(1) A proposed residential development of more than 500 dwelling units.

(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.

(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.

(4) A proposed hotel or motel, or both, having more than 500 rooms.

(5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.

(6) A mixed-use project that includes one or more of the projects specified in this subdivision.

(7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

The City is currently in the process of preparing an EIR for the Project as required by CEQA. The Project consists of provision of extraterritorial water and sewer service to the North Campus of UCSC that would allow development including up to 3,175,000 gross sq ft of development and approximately 3,400 new housing units / beds.[7] The water demand for the Project is projected to be approximately 100 mgy by the year 2020 (see Table 1). Because the Project is: (a) subject to CEQA, and (b) expected to demand a volume of water greater than the amount of water required by a 500 dwelling unit project (i.e., approximately 40 mgy[8]), a WSA is required for the Project.

3.2. RESPONSIBILITY FOR PREPARATION OF THE WSA

Water Code Section 10910

(b) The city or county, at the time that it determines whether an environmental impact report, a negative declaration, or a mitigated negative declaration is required for any project

[7] New beds are based on Table 1B from ARUP (2006). New development is rounded up from the value listed in Table 1C from ARUP (2006); see Appendix B.
[8] This estimate is based on the average use in Santa Cruz of about 80,000 gallons per home per year.

subject to the California Environmental Quality Act pursuant to Section 21080.1 of the Public Resources Code, shall identify any water system that is, or may become as a result of supplying water to the project identified pursuant to this subdivision, a public water system, as defined in Section 10912, that may supply water for the project. If the city or county is not able to identify any public water system that may supply water for the project, the city or county shall prepare the water assessment required by this part after consulting with any entity serving domestic water supplies whose service area includes the project site, the local agency formation commission, and any public water system adjacent to the project site.

Water supplied to UCSC is delivered through the City's existing water system. Water demand for the Project is expected to be met by water supplied by the City through its existing water system. As such, the City is responsible for the preparation of a WSA for the Project. Erler & Kalinowski, Inc. ("EKI") has prepared this WSA on behalf of the City, pursuant to an agreement dated 16 June 2009. This WSA is not intended to be relied upon by any party or entity other than the City without the express written consent from EKI.

According to the Final 2005 LRDP (UCSC, 2006a), UCSC may, if necessary, augment water supplied by the City with groundwater produced from wells located on the UCSC main campus or other non-potable supplies such as recycled water or rainwater to support the Project. These potential additional water supplies are not included in the water supplies evaluated as part of this WSA as they will not be supplied by the City and are therefore not required to be evaluated pursuant to SB 610.

3.3. RELIANCE ON THE URBAN WATER MANAGEMENT PLAN

Water Code Section 10910

(c) (1) The city or county, at the time it makes the determination required under Section 21080.1 of the Public Resources Code, shall request each public water system identified pursuant to subdivision (b) to determine whether the projected water demand associated with a proposed project was included as part of the most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610).

(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

Future UCSC water demands (including demands for the Project) accounted for in the City's 2005 Urban Water Management Plan ("2005 UWMP") were based on the Draft 2005 LRDP that envisioned 21,000 total students, which was later revised as part of the environmental review process (see Section 2.3.4). As such, information from the 2005 UWMP has been used in this WSA to fulfill requirements outlined in Water Code Section 10910 (d), (e), (f), and (g). Information from the City's 2005 UWMP has been supplemented by additional details from the Integrated Water Plan ("IWP") and other relevant documents prepared by the City other agencies, and updated with new information provided by City staff. Modifications to the water demand for the Project

and the City's entire service area that were made as part of this WSA are described in Sections 4 and 5.

3.4. COMPONENTS OF A WATER SUPPLY ASSESSMENT

The primary purpose of a WSA is to evaluate whether sufficient water is available to meet projected future demands within a water supplier's service area, including demands associated with the proposed project. The WSA must assess the sufficiency of water supplies during normal and dry hydrologic years. The following information provides the basis for a WSA:

- Projected water demands associated with the proposed project,
- Total water demands projected for the entire service area of the water supplier over the next 20 years, and
- Total projected water supplies available to the water supplier over the next 20 years.

In order to assess the sufficiency of the City's water supplies to meet the demands of the Project, in addition to the City's existing and future planned uses, the following information is included in this WSA:

- Water Demand: Projected demand on the City's water system attributed to the Project, in addition to the City's existing and future planned uses, in 5-year intervals over a 20 year period;
- Water Supply Entitlements: Identification of the City's water supply entitlements;
- Historical Supply: Historical water supply volumes for the City's water system;
- Groundwater Supply:
    - A description of the groundwater basins that will be used to supply the Project,
    - A summary of the California Department of Water Resources' determination regarding overdraft of the groundwater basin,
    - Historical groundwater production by the City's water system,
    - Future anticipated groundwater production by the City's water system, and
    - An analysis of the sufficiency of groundwater supplies to meet the Project's demand;
- Projected Supply: Projected water supply volumes for the City's water system during normal years, single dry years, and multiple dry year periods, in 5-year intervals over a 20 year period;
- Supply Sufficiency Determination: A determination of the sufficiency of supply to meet the projected demands on the City's water system, including the demands of the Project,; and

- Additional Supply: Plans for acquiring additional water supplies and the measures that are being undertaken to develop these supplies.

These elements are discussed in Section 4 through 9 below.

4. CITY OF SANTA CRUZ SERVICE AREA WATER DEMAND

The City's 2005 UWMP presented three different water demand projections for the City's service area based on the *Water Demand Investigatio*n (MWM, 1998) and two other plausible scenarios of potential water demand growth between 2005 and 2020. All three of these projections included estimates for future water use by UCSC, including that associated with the Draft 2005 LRDP (e.g., as reported in the 2005 LRDP Draft EIR, prior to completion of environmental review and the Settlement Agreement). A brief summary of each of these three water demand projections for the City's water system is provided below, followed by a discussion of the updated demand forecasts used for the purpose of this WSA ("*Updated UWMP Scenarios 1 & 2*").

4.1. WATER DEMAND INVESTIGATION PROJECTIONS

In 1997, the City contracted with Maddaus Water Management ("MWM") to prepare a long-range water demand forecast for the City's service area. The product of this study, the *Water Demand Investigation*, was completed in 1998. To project future growth in the City's water customer accounts, the *Water Demand Investigation* utilized then-current information on local population and employment trends published by the Association of Monterey Bay Area Governments ("AMBAG"), and demographic data and land use information from the existing general plans (from the City of Santa Cruz, Santa Cruz County, and the City of Capitola). MWM analyzed water use records maintained by the City and estimated water savings due to recent plumbing code changes in order to project future water use for each of the City's customer categories. The resulting water demand projection estimated that total annual water demand for the City's service area would reach more than 4.8 billion gallons in 2005 and increase to over 5.3 billion gallons in 2030 (Santa Cruz, 2006).

4.2. URBAN WATER MANAGEMENT PLAN PROJECTIONS

As part of the 2005 UWMP, the City compared the total water demand projected for 2005 by MWM (1998) to actual measured water use within the City's service area in 2005. This comparison showed that the MWM projections had overestimated 2005 water demand by 952 mgy (or 24%). In order to reconcile this difference, the 2005 UWMP presented two additional projections (i.e., scenarios) of potential water demand growth between 2005 and 2020:

(1) *Scenario 1* assumed that the City's accounts for the three largest customer classes (residential, business, and irrigation) would grow at an annual rate of 0.8% (i.e., in proportion to the amount of growth envisioned in existing housing elements from general plans for the City and County of Santa Cruz and the City of Capitola), and that water use at UCSC would increase by 2020 as predicted in the draft 2005 LRDP (UCSC, 2005a).

(2) *Scenario 2* assumed that the City's accounts would increase at a lower annual rate of 0.4% (based on actual growth rates experienced since 1997), and that water use at UCSC would increase at ***half*** the rate predicted in the Draft 2005 LRDP (UCSC, 2005a).

Both of the 2005 UWMP scenarios included 130 mgy of projected conservation savings through the year 2010, in accordance with the conservation savings estimated as part of the City's *Water Conservation Plan* (Gary Fiske & Associates, 2000). Neither of the 2005 UWMP scenarios extended beyond the year 2020, as the City considered these projections to be too speculative at that time.

For the purpose of evaluating the sufficiency of Santa Cruz's water supplies to meet future demand, the 2005 UWMP used the more conservative of these two scenarios (*UWMP Scenario 1*), which assumed the higher growth rate of 0.8%. The comparison of the City's water system supply and demand provided in the 2005 UWMP showed that the City would be capable of meeting total annual water needs under normal water conditions through the year 2015, but that, at some time between 2015 and 2020, the City's water demand was expected to exceed the system's capacity. This same comparison during dry years showed that the City's demands were already exceeding dry year supplies in 2005 (by 3% in a single dry year and by 31% in a multiple dry year situation), and that the deficit was expected to increase over time (Santa Cruz, 2006). Note that this 31% estimated supply deficit in 2005 represents the annual ***average*** of supply versus demand, and that ***peak*** season deficits would be on the order of 46% (Santa Cruz, 2006)

4.3. UPDATED DEMAND PROJECTIONS FOR THE CITY'S ENTIRE SERVICE AREA

To meet the requirements of a WSA, water demand for the public water system must be projected in 5-year increments over the next 20 years, from the current year. Because the scenarios in the 2005 UWMP (*UWMP Scenarios 1* & *2*) did not extend to the year 2030, as is required for this WSA pursuant to Water Code Section 10910 et. seq., new revised demand projections were developed for the City's service area as part of this WSA. In addition to extending the UWMP scenarios out by 10 years (i.e., to the year 2030), two additional modifications were made to the 2005 UWMP scenarios as part of this WSA. These modifications include:

(1) The incorporation of changes to Draft 2005 LRDP water demand projections pursuant to the 2005 LRDP Final EIR and the Settlement Agreement, and

(2) The inclusion of the ***full*** volume of the projected water use for UCSC for the lower-end scenario (*Scenario 2*), instead of just ***half*** of the UCSC water demand, as was assumed in the 2005 UWMP.

These updated water demand projections are referred to herein as "*Updated UWMP Scenario 1*" and "*Updated UWMP Scenario 2.*" Table 2 lists the *Updated UWMP Scenarios 1 & 2* projected water demands for the City's service area (including the Project) in 5-year increments of the next 20 years. The difference between these two updated scenarios is the assumed annual growth rate for new development within the City's service area. *Updated UWMP Scenario 1* assumes an annual growth rate of 0.8% in the City's major water using accounts, while *UWMP Scenario 2* assumes an annual growth rate of 0.4% for the City's major water using accounts. Just as in the original 2005 UWMP scenarios, the 0.8% annual growth rate in *Updated UWMP Scenario 1* is based on future development consistent with the general plans for the City, Santa Cruz

County, and the City of Capitola, while the 0.4% growth rate in *Updated UWMP Scenario 2* is based on actual historical growth rate.[9]

4.3.1 Revised to Include the Updated 2005 LRDP Environmental Review and Settlement Agreement

At the time that the 2005 UWMP was prepared, UCSC was in the midst of completing its 2005 LRDP environmental review. As such, future water demand for UCSC included in the 2005 UWMP projections did not incorporate modifications to the Final 2005 LRDP from the 2005 LRDP Final EIR or provisions stipulated in the Settlement Agreement. Specific details of the 2005 LRDP Final EIR and the Settlement Agreement are presented in Section 2.3.4 and 2.3.5, and include the following changes that effect water demands for the Project:

(1) A reduction of enrollment and new development of 22% (from the Draft 2005 LRDP to the Final 2005 LRDP),

(2) The addition of 935 new bed spaces at the UCSC main campus (as a result of the Settlement Agreement), and

(3) The implementation of 19 high-priority water conservation measures within the existing UCSC main campus (as a result of the Settlement Agreement).

Updates to the City-wide water demand projections due to these changes result in a *reduction* to UCSC's water demand for the "higher-end" scenario (*Scenario 1)* and an *increase* in UCSC's water demand for the "lower-end" scenario (*Scenario 2).* Thus, adjustments to UCSC's water demands shown in Table 2 are negative values for *Updated UWMP Scenario 1* and positive values for *Updated UWMP Scenario 2.*

Details regarding how these changes effect the projected water demand for the Project specifically, are discussed in Section 5.

4.3.2 Projected between 2020 and 2030

In order to extend the City's demand projection out to the year 2030, the City looked at the updated AMBAG (2009) population projection recently adopted by the City Council and multiplied this additional growth by the average per capita water use projected for 2010 through 2020 in the *UWMP Scenarios 1 & 2*. These extended water demands are shown for both scenarios in Table 2 under "Extension from 2020 to 2030."

AMBAG's updated population projection (published in 2009) accounts for estimated growth within the City's water service area, including estimated growth at UCSC. Since the estimated growth at UCSC is included in AMBAG's population projections, the "UCSC adjustments" shown in Table 2 are flat between 2020 and 2030. Instead, it is

[9] The 0.8% annual growth rate is based on general plans that were approved for the City, Santa Cruz County, and the City of Capitola at the time that the 2005 UWMP was prepared. The City is currently in the process of updating its general plan and will evaluate changes to its water demand projections related to the new general plan in its forthcoming 2010 UWMP update. The 0.4% annual growth is based on actual residential growth rates presented in the 2005 UWMP experienced between 1997 and 2004.

assumed that any increase in water demand at UCSC between 2020 and 2030 is included in the population-based per-capita projections.

With a population of 106,454 projected in 2020 for the City's water service area and estimated per capita water uses of 114 gpd/person for *Updated UWMP Scenario 1* and 108 gpd/person for *Updated UWMP Scenario 2*, the total projected demand on the City's water system in 2030 is estimated to be between 4,356 mgy and 4,222 mgy, respectively. These future water demand projections are estimated to reflect the "potential" future water use based on a reasonable estimate of potential future population, and are not meant to indicate approval for any future development within the City's service area, including any future development at UCSC. Such approval must be obtained through the appropriate planning process.

5. ESTIMATED PROJECT WATER DEMAND AT BUILDOUT

Water Code Section 10910

(c) (2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

(3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

As described above in Section 2.3.1, the "Project" is defined in this WSA as the SOI amendment project. The City is expanding its SOI in order to provide water service to portions of the UCSC campus that are currently outside of the City's SOI, but which are planned for development as part of the Final 2005 LRDP. This area is referred to in the modified 2005 LRDP as the North Campus area and is part of the UCSC main campus (see Section 2.3.3). Thus, the water demand for the Project is the water demand associated with development located in the North Campus area (i.e., the SOI amendment area, or the "Project Site").[10]

In order to understand the water demands associated with the Project, Sections 5.1 and 5.2 describe the development of water demand projections for the UCSC main campus over the past decade. These demand projections include estimated water use for all of the UCSC main campus, including areas that are located both within the City's current SOI and within the SOI amendment area (i.e., the Project Site), through the year 2020. Following this background information on total UCSC water use, Section 5.3 discusses the methodology used to identify the incremental water demand specifically associated with the Project (i.e., the SOI amendment area).

Water demand projections for all of UCSC (including the UCSC main campus) have been prepared or updated on the following four occasions in the last 11 years:

(1) As part of the City's *Water Demand Investigation* (MWM, 1998),

(2) As part of the 2005 LRDP Draft EIR (UCSC, 2005b),

(3) As part of the 2005 LRDP Final EIR (UCSC, 2006b),

(4) As a result of the Settlement Agreement (2008).

[10] As part of the Settlement Agreement, UCSC has committed to implement 19 high-priority conservation measures. Because this commitment is a direct result of the Project, it has been incorporated into the Project water demands presented in this WSA.

As discussed in Sections 3.3 and 4.2 above, water demands for UCSC (including the UCSC main campus and therefore the Project, as well as other UCSC-owned facilities) were included in the City's 2005 UWMP. More specifically, the 2005 UWMP scenarios were based on water demand projections for UCSC from the 2005 LRDP Draft EIR, which is higher and, therefore, the most conservative of the three most recent demand projections. As discussed in Section 4.3, the lower-end scenario included in the 2005 UWMP (*UWMP Scenario 2*) included only ***half*** of the water demands for UCSC. As part of this WSA, however, both the lower-end and the higher-end scenarios (*Updated UWMP Scenarios 2 & 1*, respectively) include the ***full*** estimated increase in water use by UCSC based on the modified 2005 LRDP. Although these savings will be achieved within the existing UCSC main campus, they are a direct result of the Project and therefore have been included as part of the Project water demand in this WSA.

5.1. WATER DEMAND INVESTIGATION

Water demand projections prepared as part of the *Water Demand Investigation* (MWM, 1998) included up to 408 mgy of water use by UCSC, an increase of 87 mgy over the 2005 water use of 321 mgy projected for UCSC by MWM (1998). As described in Section 4.1, this projection was based on local population and employment trends published by AMBAG in 1997, demographic data and land use information from the City and County of Santa Cruz and the City of Capital general plans, and estimates of water conservation savings from recent plumbing code changes. This projection proved to be a high estimate of demand growth, with UCSC's actual water use in 2005 averaging approximately 205 mgy instead of the projected 321 mgy (Santa Cruz, 2006).[11] The reason for this overestimation was primarily due to the 1988 LRDP population projections, which assumed a "maximum housing scenario" that envisioned over 12,000 population residing on campus by 2010.

5.2. 2005 LRDP EIR PROJECTIONS AND THE SETTLEMENT AGREEMENT

Based on the original 2005 LRDP land use plans, the 2005 LRDP Draft EIR estimated a total water demand of 365 mgy for the UCSC main campus (UCSC, 2005b). This represents an incremental increase of approximately 159 mgy over the then-current demand of 206 mgy (in 2003).[12] Following the public review and comment period for the 2005 LRDP Draft EIR, the enrollment growth and the new building space development was reduced by approximately 22%, resulting in a reduced water demand of 328 mgy for the UCSC main campus (UCSC, 2006b). Based on these modifications, the incremental increase in demand at the UCSC main campus associated with the 2005 LRDP Final EIR was estimated to be 122 mgy (see Section 5.3. and Appendix B).

[11] Note that the average water demand reported in the 2005 UWMP for all UCSC-facilities for 2005 was an average between 2002 and 2004. This value is very similar to the water demand for the UCSC main campus in 2003 (used in the 2005 LRDP projections). This is because demand on the main campus experienced an increase in water use of 13% between 2002 and 2003. Demand at other UCSC-owned facilities was relatively steady around 8 mgy between 2002 and 2004 (MWM, 2007).
[12] See prior footnote.

Concerns related to the 2005 LRDP traffic, housing, and water elements resulted in a multi-party lawsuit against UCSC, which was resolved by adoption of the Settlement Agreement in 2008. As described in Section 2.3.5, key provisions of the Settlement Agreement included the addition of 935 new student beds and the implementation of 19 high priority conservation measures within the existing area of the main campus, identified as part of the *UC Santa Cruz Water Efficiency Survey* (MWM, 2007). As shown in Table 1, these 935 new beds are estimated by UCSC to result in an increase in water demand by approximately 14 mgy. Conservation savings estimated to be achieved from the 19 high-priority conservation measures are estimated by MWM (2007) to be approximately 30 mgy.

A summary of the Project water demand is included in Table 1. Water demands associated with other future UCSC facilities (such as 2300 Delaware and the Marine Science Campus) are also listed in Table 1 in order to provide a complete estimate of future increases in UCSC's water use for the purpose of updating the City's service area-wide demands (see Section 4.3). Because a portion of the demands for the UCSC main campus associated with the modified 2005 LRDP are expected to occur outside of the SOI amendment area (i.e., outside of the Project Site), they are subtracted from the total Project water demand shown in Table 1 and shown instead as "Additional UCSC Demand." Additionally, and incremental increase of 10 mgy has been added to the Project's water demand to account for an increase in summer session students, which may potentially occur within the Project Site (Santa Cruz, 2009a).

As shown in Table 1, the projected 2020 demand for the Project is estimated to be 100 mgy. The total increase in water use by 2020 for all of the UCSC properties is projected to be 126 mgy. This demand is in addition to UCSC's existing water use, which has ranged from approximately 200 mgy to 206 mgy in recent years.

5.3. METHODOLOGY FOR PROJECTING WATER DEMAND FOR THE PROJECT

Water demands projected for the Project are based on demand projections for the UCSC main campus, which were prepared for the 2005 LRDP Draft EIR (ARUP, 2005), and revised on two occasions: (1) as part of the 2005 LRDP Final EIR (ARUP, 2006), and (2) as a result of the Settlement Agreement.

The methodology used by ARUP to project future water demand was based on the areas of new land uses proposed in the Draft and Final 2005 LRDP and using water use factors derived from historical water use at UCSC. Water demand projections were prepared for eight major water demand categories, including the following: irrigation, office and classroom, science labs, library, athletic facilities, housing and apartments, mechanical and cooling, and other miscellaneous uses. The average water use factor for each of these categories is listed in Appendix B, calculated by ARUP from UCSC's 2003 water use records. New developments in water use efficiency were incorporated into UCSC's Draft and Final 2005 LRDP water demand projections through assumptions regarding the achievable water savings from the use of low-flow fixtures. These savings were assumed to be 50% for the offices, classrooms and libraries, 25% for the athletic facilities, 20% for housing and apartments, 10% for science labs and other miscellaneous uses, and 5% for

irrigation. No additional mechanical or cooling facilities were considered by ARUP (205 or 2006); therefore, no conservation savings were attributed to new mechanical or cooling uses.

Water demand was projected by ARUP (2006) both for a "baseline" scenario and for the "proposed" scenario. Baseline demands were based on the average water use factors derived from 2003 water use data. Proposed demands were based on the estimated water use factors for low flow fixture buildings, which were calculated using the 2003 average water use factor and the assumed savings per category, as listed above. These water use factors for each of the water demand categories are shown in Table B-1 based on ARUP (2006).

In order to update the Final 2005 LRDP water demand based on the Settlement Agreement, UCSC applied ARUP's proposed demand factors to the number of new beds stipulated by the Settlement Agreement.[13]

5.4. COMPARISON OF CONSERVATION SAVINGS ASSUMED FOR THE PROJECT TO CONSERVATION SAVINGS ESTIMATED BY OTHERS

The total conservation savings estimated by ARUP (2006) to be achieved within the Final 2005 LRDP development projects is approximately 13.4 mgy, or 10% of the baseline demand. Several studies have been conducted by others that relate measured water uses at various types of commercial, industrial, and institutional ("CII") accounts to certain factors, such as square footage or the number of employees. Additional studies have been conducted in the residential sector related to conservation savings from the use of high-efficiency plumbing fixtures and appliances. Although these studies are not necessarily analogous to a university setting, they provide examples of reasonable water conservation savings for other, similar non-residential categories. In order to give context to the conservation savings estimated by ARUP, this section of the WSA compares the water conservation savings estimated for the Final 2005 LRDP by ARUP (2006) to the following conservation savings estimates prepared to others:

(1) Total percentage of potential water savings estimated for CII uses by the Pacific Institute (2003), and

(2) Residential indoor water use measured for homes with efficient plumbing fixtures and appliances (Aquacraft, 2000, 2001, and 2003).

5.4.1 Comparison with the Pacific Institute Study in California

Studies performed by the Pacific Institute (2003) concluded that implementation of standard CII water conservation measures would result in a 28 percent to 52 percent reduction in water demand, with 39 percent as a "best estimate" of potential water savings. The water conservation measures considered by the Pacific Institute (2003) included, among other things, the following:

[13] Projected water demands for the new beds allowed by the Settlement Agreement, the summer session, 2300 Delaware, and the Marine Science Campus were prepared by UCSC and were provided by the City to EKI on 16 June 2009.

- Improvements to irrigation systems through technologies such as drip irrigation, auto-shutoff nozzles, and moisture sensors, and through reducing use of irrigation intensive landscaping;
- Installation of ultra low flush toilets and urinals in restrooms, faucet aerators, and low flow showerheads;
- Improvements to cooling systems by installation of conductivity controllers, addition of chemical treatments to improve the concentration ratio, and improved energy efficiency of other mechanical components; and
- Use of other technologies specific to end-uses such as kitchens, laundries, and industrial processes.

Although the water use categories evaluated by the Pacific Institute (2003) are not exactly analogous to a university setting, they do provide a general context for evaluating potential non-residential water conservation savings. The range in conservation estimated by ARUP includes 50% savings in office, classrooms and libraries on the high end, and 5% savings for irrigation on the low end, with an average of 10% savings across all uses, which is within the general range of savings estimated by the Pacific Institute (2003) for individual uses, and below the "best estimate" of conservation savings for average uses.

5.4.2 Comparison with EPA Studies for Residential Indoor Water Use

Between 2000 and 2003, the U.S. EPA and three water agencies within the United States teamed up to evaluate the effects of plumbing fixtures and appliances retrofits on residential indoor water use. These agencies were the East Bay Municipal Utility District ("EBMUD") in the eastern San Francisco Bay Area, the Seattle Public Utilities District ("Seattle PUD") in Washington state, and the Tampa Water Department ("Tampa WD") in Florida. For each of the three studies, water use was measured at a selected subset of homes for two weeks (to establish baseline water use data), followed by an additional two weeks of measurements after the homes were retrofitted with water efficient toilets, clothes washers, showerheads, and faucets.

The results of these three studies showed that per capita water use within these homes dropped between 37% and 50% as a result of the fixture retrofits. The average per capita indoor water use at the three study sites before retrofitting ranged from 64 gallons per day per person ("gpd/person") to 86 gpd/person. Following the retrofits, average per capita indoor water use dropped from 64 to 40 gpd/person in the Seattle PUD study, 77 to 39 gpd/person in the Tampa WD study, and 86 to 53 gpd/person in the EBMUD study (Aquacraft, 2000, 2001, and 2003). Although the EPA studies were conducted for single-family homes, they demonstrate the approximate range in water conservation savings that can be achieved through the use of water-efficient residential plumbing fixtures.

In comparison, water use associated with housing and apartments on the UCSC main campus was measured, in 2003, and averaged approximately 38 gallons per day bed ("gpd/bed"). Based on the estimated number of housing and apartment areas that were fitted with low-flow versus non-low flow fixtures in 2003 (58% to 42%, respectively),

ARUP (2006) estimated that the range in per capita water use at the UCSC main campus was 43.4 gpd/bed for non-low flow fixtures and 34.7 gpd/bed for low-flow fixtures (a savings of approximately 20%).

Although the total gpd/bed estimated by ARUP is less than the total gpd/person measured in the EPA retrofit studies, the percent savings estimated by ARUP is considerably less (20% per bed compared with between 37% to 50% per person for typical residential settings). These differences may be due to a variety of factors, including (1) that the EPA retrofit studies were conducted in single-family dwellings, which tend to have higher overall indoor water use than multifamily dwellings, (2) that occupancy on the UCSC campus fluctuates throughout the year (e.g., during summer and winter breaks), and (3) fixtures and appliances replaced as part of the EPA retrofit studies may have had higher flow rates than those on the UCSC main campus and, therefore, have a greater potential for savings. On the basis of this comparison, the ARUP projections appear to be reasonable assumptions for conservation savings in a residential setting (i.e., savings due to the use of water-efficient plumbing fixtures).

5.5. INCREASE IN OFF-CAMPUS HOUSING AS A RESULT OF THE PROJECT

In addition to increasing water demand at the main campus (e.g., including demand associated with the Project), the modified 2005 LRDP is anticipated to result in increased water use at additional UCSC facilities (such as at 2300 Delaware and the Marine Science Campus, which are located adjacent to the Natural Bridges State Park). Water demands at these facilities were estimated as part of the 2005 LRDP Final EIR to be 19.8 mgy and 3.4 mgy, respectively. Table 1 lists these major water using facilities / areas owned by UCSC under the subtotal for "Additional UCSC Demand."

The total water demand projected for the City's service area included in this WSA does not explicitly identify the increase in water use associated with non-UCSC development that may occur as a result of the Project (i.e., demand increases at facilities / areas that are not owned and operated by UCSC). For example, pursuant to the Settlement Agreement, UCSC has agreed to provide on-campus housing for 67% of student enrollment between 15,000 students (the current enrollment) and 19,500 students (the maximum 2020 enrollment), while the remaining 33% of students (approximately 1,485 students) would be housed off-campus at non-UCSC facilities either within the City of Santa Cruz, Capitola, or in other neighboring areas. The total population increase within the City's service area (including UCSC) is projected by AMBAG (2009) to be 10,115 people between 2005 and 2020 (see Table 2). Thus, new students who will not be provided beds by UCSC represent approximately 15% of this new population. For the purpose of this WSA, water used by these off-campus students is assumed to be accounted for in the 0.4% or 0.8% annual demand growth included in the *Updated UWMP Scenario 1 & 2* projections (based on Santa Cruz, 2009a).[14]

[14] Note that some students may also choose not to reside in the City's service area, but may instead commute to UCSC from other areas.

6. CITY OF SANTA CRUZ WATER SUPPLY

Water Code Section 10910

(d) (1) The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts.

(2) An identification of existing water supply entitlements, water rights, or water service contracts held by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall be demonstrated by providing information related to all of the following:

(A) Written contracts or other proof of entitlement to an identified water supply.

(B) Copies of a capital outlay program for financing the delivery of a water supply that has been adopted by the public water system.

(C) Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply.

(D) Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.

Water served by the City originates from rainfall, surface runoff, and groundwater infiltration occurring within watersheds located in Santa Cruz County. The City's four current water sources include:

(1) Surface water diversions from creeks and natural springs on the North Coast,

(2) Surface water diversions from the San Lorenzo River,

(3) Surface water from Loch Lomond Reservoir (which is used primarily to collect and store water from the Newell Creek watershed, but also stores water from the San Lorenzo River), and

(4) Groundwater produced by the Live Oak Wells (which is extracted from the Purisima Formation).

The City does not import water into the service area from any of the major regional or State-wide water conveyance systems, such as the State Water Project or the Central Valley Project.

These four water supplies provide the City with approximately 4,314 mgy during normal hydrologic years. The percentage of this supply that is potentially available from the City's four water supply sources is: 25% from the North Coast Stream Diversions, 47% from the San Lorenzo River, 24% from the Loch Lomond Reservoir, and 4% from the Live Oak Wells.[15] Table 3 lists the City's future water supply availability for normal and

[15] These percentages reflect the potential capacity of each of the City's four water supply sources, which differs from the percentage of the City's actual supply that is currently produced by each source.

dry years from these local sources based on the City's 2005 UWMP. Historical production from these supplies is shown in Table 4.

Prior to service to the City's customers, the local surface water supplies are treated at the Graham Hill Water Treatment Plant ("WTP"), while groundwater from the Live Oak Wells is treated at the Live Oak Treatment Plant. Once treated, the City's water is either transferred for temporary storage at the Bay Street Reservoir or fed by gravity directly into the City's distribution system.

Additional information is presented for each of these water supplies below based on the City's 2005 UWMP and supplemental information from other recent City documents and recent discussions with members of the City's Water Department.

6.1. SURFACE WATER SUPPLY SOURCES

The City relies on surface flows from the North Coast Diversions and the San Lorenzo River for approximately 75% of its annual water supply needs. The yield of these sources in any given year is directly related to the amount of rainfall received and runoff generated during the winter season. Water stored in Loch Lomond Reservoir is used mainly in the summer and fall seasons, when the flows in the coast and river sources decline and additional supply is needed to meet dry season demands (Santa Cruz, 2004).

A summary of the City's surface water supply sources and entitlements is included in Table 5. Copies of the City's permit and licenses for the City's San Lorenzo River supplies, issued by the State Water Resources Control Board ("SWRCB"), are included in Appendix C.

6.1.1 North Coast Stream Diversion

The North Coast Stream Diversions include surface water from three coastal steams and one natural spring, located between six and eight miles northwest of downtown Santa Cruz. These supply sources include Laguna Creek, Reggiardo Creek, Majors Creek, and Lidell Spring. The City has been using the North Coast Stream Diversions as water supply sources since 1890. Because the City has been using the North Coast Stream Diversions since before 1914, the City holds pre-1914 appropriative rights to the water in the amount that was used in 1914. Therefore, diversions from these sources are limited primarily by available flows (Santa Cruz, 2006).

The North Coast Stream Diversions and their transmission system are referred to collectively as the North Coast System ("NCS"). The NCS includes diversion facilities located on the East Fork of Liddell Creek, Reggiardo Creek, Laguna Creek and Majors Creek. Water is passively diverted and conveyed by gravity through four pipeline segments from the diversions to the North Coast Pipeline ("NCP"). The NCP runs along the Highway 1 corridor from Laguna Creek to the eastern extent of Wilder Ranch State Park. It then traverses several private and commercial properties, City Open Space, and runs through City streets to the Coast Pump Station located on River Street at the San Lorenzo River (EDAW, 2005).

6.1.2 San Lorenzo River

The San Lorenzo River is the City's largest water supply source. The City diverts water from the San Lorenzo River at two locations (1) the Tait Street Diversion, near the City limits just north of Highway 1, and (2) the Felton Diversion located about six miles upstream from the Tait Street Diversion. The City is the largest user of water from the San Lorenzo River basin; however, three other water districts, several private water companies, and numerous individual property owners share the San Lorenzo River watershed as their primary source for drinking water supply (Santa Cruz, 2006).

6.1.2.1 Tait Street Diversion

The drainage area above the Tait Street Diversion is 115 square miles. The Tait Street Diversion is the primary diversion from the San Lorenzo River and dates back to the 1920s. Two shallow auxiliary wells located across the river (referred to as the "Tait Street Wells") are used by the City to supplement water from the Tait Street Diversion. Because the Tait Street Wells are hydraulically connected to the San Lorenzo River, water produced by the wells is tied to the City's appropriative rights for surface diversion (Santa Cruz, 2006). Under SWRCB Permit 2738 and License 7200, the Tait Street Diversion is subject to a 12.2 cubic feet per second ("cfs") maximum diversion rate per year (Gary Fiske & Associates, 2003).

6.1.2.2 Felton Diversion

The Felton Diversion is an inflatable dam and intake structure built in 1974, and located approximately 6 miles upstream from the Tait Street Diversion on the San Lorenzo River. Water is pumped from the Felton Diversion through the Felton Booster Station up to Loch Lomond Reservoir (Santa Cruz, 2006). The inflatable dam is used seasonally as discussed below.

Under the City's current SWRCB permits (16123 and 16601), the City may divert up to 3,000 acre-feet per year ("AFY;" or 977 mgy) of water from the San Lorenzo River at the Felton Diversion between September and May (Santa Cruz, 2006). However, pursuant to the current permits, this water must be diverted to the Loch Lomond Reservoir and cannot be sent directly to the Graham Hill WTP. Thus, the City's ability to utilize water from the Felton Diversion is dependent on the volume of available storage in Loch Lomond Reservoir. As a result, the Felton Diversion is operated only intermittently, as needed to augment storage in Loch Lomond Reservoir when natural inflow from Newell Creek to the reservoir is low. These diversions from Felton typically occur during the winter months of dry years (Santa Cruz, 2006).

The City's SWRCB permits for the Felton Diversion also restrict diversions based on minimum instream flow requirements and first flush requirements. In order to protect fish habitat in the San Lorenzo River, diversions at Felton may occur only when instream flow exceeds the prescribed flow. These minimum average daily flow requirements for instream flow are 10 cfs in September, 25 cfs in October, 20 cfs from November to May, and 0 cfs between June and August (Santa Cruz, 2006). Additionally, at the beginning of each autumn, the City operates the diversion at Felton only following two days of river flows that exceed 100 cfs. The purpose of this requirement is to allow for flushing of

debris that may have been introduced during the low-flow summer months (Gary Fisk & Associates, 2003).

6.1.3 Loch Lomond Reservoir and the Newell Creek Watershed

Loch Lomond Reservoir is located near the town of Ben Lomond in the Santa Cruz Mountains. The reservoir provides surface water storage for the City and the San Lorenzo Valley Water District. The reservoir and surrounding watershed are also used for no-body-contact public recreation purposes, including fishing, boating, hiking, and picnicking (Santa Cruz, 2006). Loch Lomond Reservoir is fed by the Newell Creek watershed, which covers an area of approximately eight square miles upstream from the reservoir.

Loch Lomond Reservoir was constructed in 1960 and has an operational storage capacity of 2,800 mg. In normal and wet years, reservoir storage refills naturally to full capacity with runoff from the Newell Creek watershed. This runoff is supplemented with water pumped up from the San Lorenzo River via the Felton Booster Station during dry years when runoff from Newell Creek is below average.

The City's SWRCB license for Newell Creek (License No. 9847) allows for diversion of up to 5,600 AFY (1,825 mgy). Numerous restrictions on reservoir operations and the diversion of water from Newell Creek prevent the City from utilizing approximately 43% of its water rights, thus reducing the total usable volume of water Newell Creek from 1,825 mgy to 1,042 mgy (Santa Cruz, 2006). For example, the SWRCB does not allow the City to divert water from Newell Creek directly to the Graham Hill WTP. Instead, a 30-day "last-in-first-out" restriction prohibits the withdrawal of water from Loch Lomond Reservoir until 30 days following the most recent diversion into the reservoir from the same source (Gary Fiske & Associates, 2003). Furthermore, based on the historical use of the reservoir, licensed withdrawals from Loch Lomond Reservoir are restricted to 1,042 mgy. Of this total 1,042 mgy, the San Lorenzo Valley Water District is entitled to104 mgy (approximately 10%), although the district has taken no water in recent years and has no current plan to exercise its entitlement (Santa Cruz, 2006).

6.2. GROUNDWATER SUPPLY SOURCES

Water Code Section 10910

(f) If a water supply for a proposed project includes groundwater, the following additional information shall be included in the water supply assessment:

(1) A review of any information contained in the urban water management plan relevant to the identified water supply for the proposed project.

(2) A description of any groundwater basin or basins from which the proposed project will be supplied. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has the legal right to pump under the order or decree. For basins that have not

been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), of the efforts being undertaken in the basin or basins to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), for the past five years from any groundwater basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), from any basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(5) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project. A water assessment shall not be required to include the information required by this paragraph if the public water system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial and projected water demand associated with the project was addressed in the description and analysis required by paragraph (4) of subdivision (b) of Section 10631.

Although groundwater constitutes only 4% of the City's normal year water supply, it is a critical component for meeting peak season- and dry year demands.[16] A description of the City's groundwater supply is provided below, summarized from the 2005 UWMP and other relevant documents prepared by the City, the Soquel Creek Water District ("SqCWD") and Central Water District ("CWD"), and the California Department of Water Resources ("DWR").

The City currently produces water through the Live Oak Well System which extracts groundwater from one of the water bearing units of the Purisima Formation. The City overlies a basin that is referenced by DWR as the "Western Santa Cruz Terrace Groundwater Basin" (DWR Basin No. 3-26), as shown in Appendix D (Figure D-1). Although the City is the only public groundwater producer in the DWR-defined Western Santa Cruz Terrace Groundwater Basin, the Purisima Formation also underlies three other DWR-defined groundwater basins and provides drinking water for two adjacent water districts, SqCWD and CWD, as well as multiple private landowners. See discussion in Section 6.2.2 below regarding basin definitions.

[16] This percentage is based on the values shown in Table 3: 187 mgy of groundwater supply divided by 4,314 mgy total supply. Normal year water supply estimates are from the 2005 UWMP (Santa Cruz, 2006).

6.2.1 Live Oak Well System

The Live Oak Well System consists of three production wells and a treatment plant located in the southeast portion of the City water service area. The facilities were acquired by the City from the Beltz Water Company in 1964, and thus, the City's three wells are known as the "Beltz" wells (in addition to the "Live Oak" wells). Wells 8 and 9 were installed in 1998 as replacement wells for Wells 1 and 2, which were damaged in the 1989 Loma Prieta earthquake. Well 7 operated since 1974, but it was recently replaced by Well 10.[17] Water extracted from the Beltz wells is treated for iron and manganese removal at the Live Oak Treatment Plant. The Live Oak Treatment Plant was expanded in 1986 from its original capacity of 1 million gallons per day ("mgd") to a new capacity of 2 mgd (Santa Cruz, 2006). Additional upgrades to the City's groundwater treatment system are currently in design to help the City maintain 2 mgd of groundwater production during peak times in dry years when surface water supplies are reduced (Santa Cruz, 2009d).

The Beltz wells are normally operated by the City 150 to 200 days of the year during the dry season at a combined production rate of approximately 1.0 mgd. The total annual production, however, varies considerably from year to year, depending on hydrologic conditions and availability of water from the City's other sources. In general, groundwater production decreases in wet years and increases in dry years. Based on a thirty-year record from 1972 to 2002, groundwater production by the Beltz wells has ranged from approximately 91 mgy in wet years, to 260 mgy in critically dry years, with a long-term average of 157 mgy during this period (see Figure 4; Santa Cruz, 2006). The Live Oak Well System, including treatment, was operated at its full 2 mgd capacity at times during the 1987-92 drought, bringing the annual production from the wells to a high of 430 mgy (Santa Cruz, 2006). Recent groundwater production is presented in Table 4, while the City's historical groundwater production by water year type (i.e., wet year, normal year, dry year, and critically dry year) is shown in Figure 4.[18]

6.2.2 DWR Bulletin 118: West Santa Cruz Terrace Groundwater Basin

The West Santa Cruz Terrace Groundwater Basin, as defined by DWR (2003), includes most of the City of Santa Cruz and some area of unincorporated Santa Cruz County. The approximate boundaries of the basin are shown on Figure D-1 of Appendix D along with other adjacent DWR-defined groundwater basins. The West Santa Cruz Terrace Groundwater Basin is bounded to the south by Monterey Bay and to the north by a series of hills that define the contact of Quaternary deposits and the Pliocene Purisima Formation. The eastern boundary of the basin coincides with the western boundary of the SqCWD, and the DWR-defined Soquel Valley Groundwater Basin. Ground surface elevations within the basin range from near sea level to approximately 100 feet above sea level (DWR, 2003).

[17] According to the City Water Department staff, Well 10 began operation in July 2009.
[18] "Water Year Type" refers to normal, single dry, and multiple dry years as defined in the 2005 UWMP based on the hydrologic record. The 2005 UWMP calculates "normal year" supply based on the period between 1999 and 2003, "single dry year" supply based on the year 1994 (the most recent single dry year on record), and "multiple dry year" supply based on the two-year drought sequence from 1976 to 1977 (the most critical drought on record).

Water-bearing sediments within the West Santa Cruz Terrace Groundwater Basin consist of the Pliocene Purisima Formation, Quaternary terrace deposits, and alluvium along the San Lorenzo River and other streams crossing the basin. The Purisima Formation is the principal aquifer in the eastern portion of the basin, along the boundary with the Soquel Valley Groundwater Basin. The Purisima Formation, described in more detail below, is a thick sequence of highly variable sediments ranging from marine fossiliferous rocks near its base to continental deposits in its upper portion. The sediments are primarily poorly indurated, moderately permeable gravel, sands, silts and silty clays. The Quaternary alluvium and terrace deposits within the West Santa Cruz Terrace Groundwater Basin are thin and yield only minor quantities of groundwater (DWR, 2003).

According the DWR (2003), groundwater levels within the basin range from ground surface (e.g., artesian) to 400 feet below ground surface ("ft bgs"). Due to the variations in well construction and aquifer geology, depth to water across the basin is highly variable. No information was available from DWR (2003) regarding estimated groundwater storage within the basin. Recharge to the basin is from deep percolation of rainfall, especially near the upper watersheds of the San Lorenzo River, and other streams crossing the basin (DWR, 2003).

The West Santa Cruz Terrace Groundwater Basin is not adjudicated, and DWR has not designated the basin as overdrafted or projected that the basin will become overdrafted if present management conditions continue (Santa Cruz, 2006).

6.2.3 Purisima Formation

Groundwater produced by the City's Live Oak wells is extracted from the Purisima Formation. The Purisima Formation is the primary source of groundwater in the mid-Santa Cruz County region and supplies water to the SqCWD, CWD, and numerous private well owners in addition to the City of Santa Cruz. The approximate locations of groundwater production and monitoring wells operated by the City, SqCWD, and CWD are shown in Appendix D (see Figure D-2). Although SqCWD and CWD pump from a different DWR-defined basin than the City, the Purisima Formation is the primary water bearing formation for all three agencies. Figure D-3, also included in Appendix D, shows the approximate extent of the Purisima Formation as defined by the Central Coast Regional Water Quality Control Board in 2006. The Purisima Formation extends across four DWR-defined groundwater basins: West Santa Cruz Terrace, Soquel Valley, Santa Cruz Purisima Formation Highlands, and Pajaro Valley (SqCWD and CWD, 2007).

6.2.3.1 Hydrostratigraphy

The Purisima Formation has a total thickness of roughly 2,000 feet. The formation has been studied extensively in the past 40 years in an effort to define hydrostratigraphic boundaries and to model groundwater flow. The current hydrostratigraphic model of the formation was developed by Johnson et. al (2004) and defines nine units comprising regional aquifers and aquitards (SqCWD and CWD, 2007). The primary water-bearing units of the Purisima Formation consist of fine-to-coarse grained marine sands interbedded and confined by silt and sandy clay strata. The Purisima Formation

hydrostratigraphic units as defined by Johnson et. al (2004) are shown on Figure D-4 of Appendix D.

Beneath the City's water service area, the Purisima Formation is relatively shallow and dipping to the southeast, becoming deeper and thicker towards Capitola and Aptos and outcropping along the Monterey Bay shoreline. Groundwater produced by the City's wells is extracted from hydrostratgraphic units "A" and "AA" (see Figure D-5). The SqCWD also operates production wells within units A and AA within the Soquel Valley Groundwater Basin (DWR Basin No. 3-1).

6.2.3.2 Groundwater Production

The volume of groundwater produced from the Purisima Formation by the City, SqCWD, and CWD between 1986 and 2005 is summarized on Figure D-6 (SqCWD and CWD, 2007). Total groundwater production from the Purisima Formation by these agencies has ranged from a high of 1,530 mgy (4,700 AFY) in 1988 to a low of 1,140 mgy (3,500 AFY) in 2005 (SqCWD and CWD, 2007). Current annual extraction from the Purisima Formation by all pumpers is estimated to be 1,988 mgy (6,100 AFY). Of this total, the City currently produces about 167 mgy (8%), SqCWD produces approximately 1,075 mgy (54%), CWD pumps 18 mgy (1%) and private well production is estimated at about 728 mgy (37%) (Santa Cruz, 2006).

6.2.3.3 Groundwater Levels

Historical water levels reported by Johnson et. al. (2004) between 1998 and 2004 show fluctuations water levels throughout the Purisima Formation as a result of the seasonal and annual variations in groundwater production. Figure D-9a through 9c show water levels in SqCWD Purisima well SC-9 (screened in multiple water bearing units, including Unit A) and Figure D-10a through D-10c shows water levels in the City's Beltz wells over this period. These records show significant fluctuations in groundwater water levels as a result of variable groundwater production, indicating the ability of the aquifer to rebound from short term increases in production.

Water levels in the Purisima Formation near the neighboring SqCWD are characterized by a broad and persistent pumping trough surrounding the SqCWD production wells. Piezometric maps for the A unit of the Purisima Formation during Spring and Fall 2005 are shown on Figures D-7 and D-8. These two figures demonstrate that a drawdown trough persists in the A unit of the Purisima Formation throughout the year, centered approximately in the middle of the SqCWD service area (SqCWD and CWD, 2007).

Groundwater levels consistently below sea level in SqCWD wells (particularly in Unit B/C but also in Unit A) suggest that production may be "mining" freshwater in the deeper Purisima units offshore and exceeding the sustainable yield of the aquifer (SqCWD and CWD, 2007). Johnson et. al. (2004) estimates that total pumping from the Purisima Formation likely exceeds the sustainable yield of the aquifer by approximately 1,200 mgy (400 AFY). Although the positions of the freshwater-saltwater interfaces for the individual Purisima aquifers are largely unknown, Johnson et. al. (2004) concludes that these interfaces have probably moved inward in response to historical pumping.

6.2.4 Groundwater Reliability

As a coastal system, the Purisima Formation is vulnerable to seawater intrusion, especially in dry years when groundwater production typically increases by most users due to reduced surface water availability. Evidence of saltwater intrusion in Beltz Well 2 (i.e., increased chloride concentrations and electrical conductivity) following the City's peak groundwater production period during the 1987-92 drought, is indicative of this vulnerability.[19] Although all units of the Purisima Formation extend offshore, the Purisima Unit A outcrops in the vicinity of Pleasure Point in close proximity to the City's Live Oak well field. This outcrop provides a pathway for seawater to enter the Unit A aquifer, potentially threatening the City of Santa Cruz's existing wells (SqCWD and CWD, 2007). Although pumping at the City's facilities constitutes a relatively small proportion of the total extraction from the Purisima Formation, because the City's production wells are located close to the shoreline, they would be among the first impacted by saltwater intrusion (Santa Cruz, 2006). This potential for saltwater intrusion could reduce the City's dry year supply and exacerbate supply shortfalls during extended dry year periods.

In order to better understand how the Purisima Formation responds to pumping stresses and to detect potential seawater intrusion, the City maintains a network of 20 monitoring wells at 10 sites. The wells are monitored at regular intervals for water level and water quality, including chlorides, pH, total dissolved solids, general minerals, and other constituents (Santa Cruz, 2006). According to the Groundwater Management Plan developed by SqCWD and CWD (2007), seawater intrusion has not been detected recently in production wells in the Purisima Formation, but elevated chloride concentrations have been detected in the City's shallow monitoring wells at Moran Lake and Soquel Point (see Figure D-2), and in wells located in other water bearing Purisima Formation units operated by SqCWD.

The Groundwater Management Plan concludes that the combination of historical seawater intrusion and the low groundwater elevations currently observed in the SqCWD area suggest that future seawater intrusion is likely (SqCWD and CWD, 2007). According to the City's 2005 UWMP, there appears to be no imminent threat of seawater intrusion to Purisima Unit A under the City's normal operations. However, if all users continue to pump groundwater at the present cumulative rate, the City's future use of the Live Oak Well System at up to 2 mgd during peak times (as it has operated during past drought conditions) may potentially exacerbate conditions that could lead to seawater intrusion (Santa Cruz, 2006).

6.2.5 Agreement for Groundwater Management

The City has not prepared a groundwater management plan; however, as discussed in Section 6.2.3 above, a groundwater management plan has been prepared by neighboring water districts that extract water from the Purisima Formation in adjacent groundwater basins. This plan was originally prepared by SqCWD and CWD in 1996 and updated in 2007. In 2005, the City entered into an agreement for groundwater management of the

[19] Beltz Well 2 is also sometimes referred to as Beltz Wells 1 & 2 (Johnson et. al, 2004).

Soquel-Aptos area groundwater, along with the SqCWD, CWD, and the County of Santa Cruz (see Appendix E). The goals of the agreement are to establish common basin management objectives, undertake joint research projects, and improve interagency coordination to assure the safe production and protect the quality of the underground resource. To date, no additional work has been completed related to the agreement.

7. WATER SUPPLY RELIABILITY

This section of this WSA provides an overview of issues facing the City related to its water supply system reliability and operation during dry years, followed by a quantitative estimate of the City's water supply during normal hydrologic conditions, single dry years, and multiple dry years. The latter part of this section briefly discusses reliability issues related to the City's existing water rights and entitlements. Information for Sections 7.1 and 7.3 are largely taken from the 2005 UWMP.

7.1. OVERVIEW OF WATER SYSTEM RELIABILITY DURING DRY YEARS

The primary water management problem currently facing the City's water supply system is the lack of adequate water supply during droughts. This problem stems from two factors: (1) a wide range in the yield of surface water sources from year to year, and (2) limited surface water storage capacity. Furthermore, threats of saltwater intrusion into the Purisima Formation, discussed above in Section 6.2.4, could exacerbate the City's dry year supply problems.

In normal and wet years when rainfall and runoff are abundant, base flows in the coast watershed and associated river sources are restored by winter rains, and Loch Lomond Reservoir is typically replenished to full capacity with runoff from the Newell Creek watershed (Santa Cruz, 2006).

The water system, however, is vulnerable to shortage in drought years when the San Lorenzo River and North Coast sources run low. In single dry years, the system relies heavily on water stored in Loch Lomond to satisfy demand, which draws down the reservoir level lower than usual and depletes available supply in the event of a subsequent dry year. As discussed in the following sections, in multiple dry years or critical drought conditions the combination of very low surface flows in the North Coast streams and San Lorenzo River combined with depleted supply stored in Loch Lomond Reservoir reduces the City's available supply to a level which cannot support average dry season demands, even with an increase in groundwater production. Compounding the situation is the need to reserve some amount of storage in Loch Lomond to meet the following year water demands in the event drought conditions continue into the following year (Santa Cruz, 2006). The decision about whether supplies are adequate in the City of Santa Cruz for a given dry year are, thus, dependent not just on how much water is available in that year from the City's sources of supply, but also on the level of demand expected to be exerted by customers over the coming season and management's comfort level with predicted carry over storage (Santa Cruz, 2004).

7.2. PROJECTED WATER SUPPLY DURING NORMAL, SINGLE DRY, AND MULTIPLE DRY YEARS

Water Code Section 10910

(c) (2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in

preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

(3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

The City's anticipated water supplies for normal, single dry, and multiple dry years between 2005 and 2030 were projected in the 2005 UWMP. Since the duration of the water supply projections included in the 2005 UWMP are sufficient to meet the requirements of a WSA pursuant to SB 610, information from the 2005 UWMP is used herein to evaluate the sufficiency of the City's water supplies to meet future demand. Current and projected water supplies listed in the 2005 UWMP are summarized in Table 3 (Santa Cruz, 2006).

7.2.1 Normal Year Supply

During normal hydrologic years through 2030, the City expects to have a total of 4,314 mgy of reliable water supplies available for use annually. This includes 187 mgy from the Live Oak Well System, 1,077 mgy from the North Coast Streams, 2,008 mgy from the San Lorenzo River, and 1,042 mgy from Loch Lomond Reservoir.

7.2.2 Single Dry Year Supply

Supply reliability during a single dry year was estimated in the 2005 UWMP based on the amount of water that was available to the City in 1994, the most recent single dry year on record. Based on the 2005 UWMP's analysis, the City's cumulative water supplies are expected to be reduced from a normal year of 4,134 mgy to approximately 3,800 mgy during a single dry year. This represents a reduction of 12% from the City's normal year available supply. As shown in Table 3, the City will rely more heavily on water supplied by the San Lorenzo River and the Live Oak Well System during a single dry year, as production from these sources are planned to increase by 5% and 60%, respectively. Conversely, water from the North Coast streams and Loch Lomond are expected to be reduced by 54% and 14%, respectively, in comparison to a normal year.

7.2.3 Multiple Dry Year Supply

Supply reliability during a multiple dry year period was estimated in the 2005 UWMP based on the hydrologic record for 1976-1977. It is estimated that supplies available to the City during the second year of a two-year drought similar to what was experienced in 1976-1977 would be approximately 2,700 mgy, 37% less than the normal year supplies. This total supply reduction of 37% reflects reductions in water supplies from the San Lorenzo River, the North Coast Streams, and Loch Lomond by 10%, 72%, and 81%, respectively, and an increase in groundwater production from the Live Oak Well System by 114% (see Table 3; Santa Cruz, 2006).

7.2.4 Peak Season Reliability

The reductions in the City's water supply during single and multiple dry years, as discussed above and as summarized in Tables 3, reflect the average annual volume of available water and do not account for the City's ability to utilize this supply to meet peak demands during shorter intervals. Increased demand during summer months and constraints on the City's water rights and water storage facilities contribute to the greater supply shortages during the peak season.

According to the 2005 UWMP, peak-season water supplies during the second year of a multiple dry year period are currently estimated to be just over half of the City's peak water demands (Santa Cruz, 2006). As a result, customers will experience supply cutbacks during certain times of the year that are greater than the average annual cutback for the entire year. For example, the 2005 UWMP estimated that if the City were to experience a multiple dry year event in 2005, the City's total supply for that year would be 31% less than its total demand. However, the "peak season deficit" would be as high as 46%, meaning that customers would be required to cutback water use by 46% during certain times of the year even though over the entire year their total cutback would only be 31%. As discussed above, this higher peak season deficit is due to (1) increased demands during summer months, (b) the seasonal variation in the City's water supply availability and (c) limitations of the City's water supply storage facilities. In the event that the City is unable to increase groundwater production as planned during dry years to meet peak demands, these cutbacks could be even more severe.

Although this peak season analysis is not required by SB 610, and therefore not evaluated in this WSA, it is important to understand that the annual comparison of supply and demand shown above does not reflect the maximum supply cutback that will be experienced by customers throughout the year. The City's plan to meet these peak season deficits is laid out in its *Water Shortage Contingency Plan* (Santa Cruz, 2009b).

7.3. Reliability Issues Associated with Water Rights and Entitlements

There are several uncertainties regarding water rights and entitlements facing the City's existing water supply sources that have potential to reduce the City's water supply. These challenges are discussed below, as summarized from the City's 2005 UWMP and discussions with City Water Department staff, and include an Endangered Species Section 10 permit and habitat conservation plan for the all of the City's surface water diversions, a water rights conformance proposal to the SWRCB related to Newell Creek diversions, and an application to extend water rights diversions from the Felton Diversion along the San Lorenzo River.

7.3.1 Section 10 Permit

The City is presently undertaking a Section 10 Permit Program pursuant to the Federal Endangered Species Act ("FESA") and Section 2081 of the California Endangered Species Act ("CESA"). Pursuant to federal and state law, parties that engage in activities that are likely to result in a "take" of threatened or endangered species are required to obtain an "incidental take" permit and prepare and implement a habitat conservation plan

("HCP"). Because the City's surface water diversions reportedly result in what is referred to as a "take" as defined by FESA and CESA, the City must obtain incidental take permits and implement an HCP in order to minimize (and mitigate) the effects of the City's water management activities on the pertinent listed and other sensitive species. Implementation of the HCP, when finalized, may force the City to modify operation and management of its surface water diversions, potentially affecting the City's ability to fully utilize these supplies. The effects of these permits and the HCP, if any, are yet to be determined and may not be known for several years (Santa Cruz, 2006; Santa Cruz, 2009e).

7.3.2 Water Rights Conformance Proposal

As described above, the City is also in the process of developing and submitting filings to the SWRCB to rectify a historical deficiency in the City's water rights on Newell Creek. Based upon the original filings, which were thought to be adequate due to the anticipated use of Loch Lomond Reservoir, these water rights allow only for diversion to storage and not for direct diversion, i.e., into the City's water supply distribution system. This circumstance makes the water supply technically unavailable as a source for City use during times when, for example, the reservoir is receiving more inflow from Newell Creek than is released downstream. The water rights filings by the City are intended to correct this historical deficiency and bring the water rights and current operations into conformance.[20] The proposed direct diversion rights are limited to the same volume of water, purposes and places of use as the existing rights such that they match the existing rights to the extent possible while allowing direct diversion, consistent with historic practice (Santa Cruz, 2006). This petition is currently being protested by the California Department of Fish and Game and is awaiting decision from the SWRCB.

7.3.3 Felton Diversion Water Rights Time Extension Project

Pursuant to the City's permits to divert water at Felton for storage in Loch Lomond Reservoir, the City must put all 3,000 AFY (approximately 977 mgy) of its entitlement to full beneficial use by December 2006, in order to maintain its appropriative rights to the water. While the City has been diligently putting water from the Felton Diversion to beneficial use over the years, to date the City has used just half the permitted amount on an annual basis. In the future, however, the City expects to need the full 3,000 AFY and, therefore, has filed petitions with the SWRCB to extend the time allowed for putting the full 3,000 AFY to beneficial use. The water supplied from the Felton Diversion is considered critical to meeting the City's projected future demand, in particular during operational outages, changes in operations in response to environmental concerns, and during dry years (Santa Cruz, 2006). This petition is currently being protested by the California Department of Fish and Game and is awaiting decision from the SWRCB.

7.4. LIVE OAK WELLS SYSTEM RELIABILITY

As mentioned in Section 6.2, the ability to produce groundwater from the Live Oak Wells in drought years, and potentially all years, may be compromised by continued

[20] Official notice of the City's petitions to the SWRCB are included in Appendix C, from October 2008.

deterioration of groundwater basin conditions due to region-wide pumping of the Purisima aquifers (Santa Cruz, 2006).

8. COMPARISON OF SUPPLY AND DEMAND

Water Code Section 10911

(c) The city or county may include in any environmental document an evaluation of any information included in that environmental document provided pursuant to subdivision (b). The city or county shall determine, based on the entire record, whether projected water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses. If the city or county determines that water supplies will not be sufficient, the city or county shall include that determination in its findings for the project.

A comparison of the City's projected supply and demand (including the demand associated with the Project) evaluated as part of this WSA is presented in Table 6 for normal years, Table 7 for single dry years, and Table 8 for multiple dry years. These comparisons reflecting inclusion of the Project are shown for both of the *Updated UWMP Scenarios* presented in Section 4.3 in order to provide a range of potential supply and demand scenarios that reflect the estimated "high" and "low" potential overall water demand for the City's water service area. The City's actual future demand will depend on a number of factors, among them future decisions on land use and development made by the City Council, as well as future changes in state and federal regulations regarding water-efficient fixtures and devices. The comparisons provided in Tables 6, 7 and 8 are discussed below, and reflect the average supply shortfall over the course of one year. Total cutbacks required by the City's customers at any given time, however, are likely to fluctuate throughout the year, with peak season supply deficits being significantly greater than the annual averages presented below. The City's plan for meeting increased peak season deficits caused by seasonal variations in demand and supply and with limitations on the City's water storage facilities are addressed in the City's *Water Shortage Contingency Plan* (Santa Cruz, 2009b).

8.1. NORMAL YEAR SUPPLY VERSUS DEMAND

As shown in Table 6, during normal hydrologic years through 2030, the City expects to have sufficient water to meet its projected demands, including the Project, at least through the year 2025. Beyond 2025, however, it is uncertain whether the City's existing supplies will be sufficient to meet the projected demand of additional growth envisioned in the general plans for the City's service area.[21] If water use increases as projected by *Updated UWMP Scenario 1* (the "higher-end" projection), the City's demands would exceed the available normal year supplies by 42 mgy in 2030 (or approximately 1% of the 2030 demand). If water use increases as projected by *Updated UWMP Scenario 2* (the "lower-end" projection), however, the City would have sufficient normal year supplies to meet all the projected demands in 2030.

Demand for the Project is estimated to be 100 mgy while demand associated with other growth within the City's service area is estimated to be as low as 222 mgy in 2030 (for

[21] Demands associated with these general plans were estimated in the City's 2005 UWMP in February 2006.

Updated UWMP Scenario 2) and as high as 356 mgy in 2030 (for *Updated UWMP Scenario 1*). Full buildout for the Final 2005 LRDP is anticipated in 2020, and therefore additional demands between 2020 and 2030 are projected to result from other development within the City's service area (including at UCSC) that are not included in the Project. Based on this increase in water demand through 2030, the total projected demand for the City's service area, including the Project, is estimated to range from 3,875 mgy to 3,937 mgy in 2010 (for *Updated UWMP Scenario 2 & 1*,respectively) and from 4,222 mgy to 4,356 mgy in 2030 (for *Updated UWMP Scenario 2 & 1*, respectively). When compared to the City's normal year supply of 4,314 mgy, which is expected to remain constant between 2010 and 2030, it is evident that the City will not have sufficient supply to meet the total demand on the water system in 2030, including the demand of the Project, if future water use increases consistent with the higher of the two demand projections (i.e., *Updated UWMP Scenario 1*).

8.2. SINGLE DRY YEAR SUPPLY VERSUS DEMAND

As shown in Table 7, the City's drought year supplies are not sufficient to meet all of the City's projected demand now or through 2030, with or without the Project. The magnitude of estimated supply deficits during a single dry year ranges from an annual average of 2% to 3% in 2010 (for *Updated UWMP Scenarios 2 & 1*, respectively) and from 10% to 13% in 2030 (for *Updated UWMP Scenarios 2 & 1*, respectively). If the demand associated with the Project is subtracted from the total projected demands for the City's service area in 2030, the City would still face a single dry year supply deficit of between 8% and 11% in 2030 (for *Updated UWMP Scenarios 2 & 1*, respectively). This result indicates that water demand for the Project only would increase single dry year supply shortfalls in 2030 by only 2% of the total 2030 demand.

As discussed above in Section 7.2.4, this analysis reflects the average annual supply deficit and does not reflect peak season deficits, which are likely to be significantly greater during peak seasons.

8.3. MULTIPLE DRY YEAR SUPPLY VERSUS DEMAND

The magnitude of estimated supply deficits during the second year of a multiple dry year period ranges from an annual average of 30% to 31% in 2010 (for *Updated UWMP Scenario 2 & 1*, respectively) and from 36% to 38% in 2030 (for *Updated UWMP Scenario 2 & 1*, respectively). The estimated ranges in supply deficit for both scenarios during multiple dry years between 2010 and 2030 are shown in Table 8. Similar to single-dry year, if the demand associated with the Project is subtracted from the total demands for the City's service area in 2030, the City would still face significant multiple dry year supply deficits (between 35% and 37% in 2030 for *Updated UWMP Scenario 2 & 1*, respectively). This result indicates that the while the Project would increase supply deficits during a multiple dry year, it represents only a small portion of the total shortfall.

As discussed above in Section 7.2.4, this analysis reflects the average annual supply deficit and does not reflect peak season deficits, which are likely to be significantly greater during peak seasons.

9. ADDITIONAL POTENTIAL WATER SUPPLIES

Water Code Section 10911

(a) If, as a result of its assessment, the public water system concludes that its water supplies are, or will be, insufficient, the public water system shall provide to the city or county its plans for acquiring additional water supplies, setting forth the measures that are being undertaken to acquire and develop those water supplies. If the city or county, if either is required to comply with this part pursuant to subdivision (b), concludes as a result of its assessment, that water supplies are, or will be, insufficient, the city or county shall include in its water assessment its plans for acquiring additional water supplies, setting forth the measures that are being undertaken to acquire and develop those water supplies. Those plans may include, but are not limited to, information concerning all of the following:

(1) The estimated total costs, and the proposed method of financing the costs, associated with acquiring the additional water supplies.

(2) All federal, state, and local permits, approvals, or entitlements that are anticipated to be required in order to acquire and develop the additional water supplies.

(3) Based on the considerations set forth in paragraphs (1) and (2), the estimated timeframes within which the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), expects to be able to acquire additional water supplies.

The City has been actively considering possible new water supplies for many years. In 2003, the City produced an IWP that evaluated potential water supply strategies. The IWP identified three preferred strategies for managing the City's water supply and demand to address the current supply deficit during dry years. These strategies include: (1) water conservation, (2) curtailment of water demand up to 15% during drought conditions, and (3) desalination of seawater. As of the 2005 UWMP, the City had achieved 153 mgy of conservation toward its goal of 282 mgy in 2010. The City has also recently completed testing of a one-year pilot desalination project (in April 2009) and will begin environmental review of the full-scale desalination plant in Fall 2009.

While these three strategies will provide additional dry year supplies for current customers, they do not entirely address additional future water supply shortfalls that would result from new growth within the service area due to the Project and/or to other planned development within the City's service area. For example, the City's planned desalination plant is designed to alleviate dry year supply shortfalls for existing customers, but could also potentially be expanded to further augment the City's water supplies in the future. Thus strategies to address the projected future water supply deficits due to additional growth within the City's service area, e.g., the Project and other development, were considered as part of the IWP but all final decisions related to the development of additional supplies (i.e., subsequent phases of the desalination plant) were postponed for consideration by future decision-makers on as as-needed basis (Santa Cruz, 2006).

As noted in the City's 2005 UWMP, the timing and need for additional supply will depend largely on three factors: (1) the City's policies regarding land use, housing, and economic development to be included in the next General Plan Update, (2) the amount of growth at UCSC, and (3) the actual increase in water use that accompanies the allowed growth.

9.1. WATER CONSERVATION

One major goal of the IWP was to achieve the maximum practical water use efficiency through water conservation. Thus, as part of the IWP efforts, the City prepared a *Water Conservation Plan* (Gary Fiske & Associates, 2000) to identify and plan for future water conservation within the City's service area.[22] The goals of the *Water Conservation Plan* were to: (1) determine which conservation programs were most cost-effective and best suited to the City's customer base; (2) identify the potential water savings those programs could achieve and the estimated costs of implementation, and (3) develop an action plan to guide the City's efforts in the area of water conservation over the next ten years. Estimated annual costs for implementation of the *Water Conservation Plan* conservation programs (including staffing) ranged between approximately $600,000 and $1,000,000 throughout the planning period (e.g., through the year 2010; Gary Fiske & Associates, 2003). Funding for the City's water conservation program is budgeted in the City's Water Fund each year, which is supported by water rate revenues. A total of $870,000 is currently budgeted toward water conservation programs for the 2009-2010 fiscal year. As of the 2005 UWMP publication, the City had saved an estimated 153 mgy of water through implementation of its conservation programs, leaving an additional 130 mgy to be saved by 2010 (for a total of approximately 282 mgy of conservation savings; Santa Cruz, 2006)[23]. Funding for this remaining 130 mgy will continue to be provided by the City's Water Fund budgets similar to those approved in recent years.

The *Water Conservation Plan* identified several demand reduction programs that are expected to provide quantifiable water savings of 282 mgy by the year 2010 and provide a framework for increasing the City's efforts to reduce customer water demand. The programs included in the *Water Conservation Plan* apply to all major water customer categories and include financial incentives, new regulations, water audits, and distribution of water saving devices. Specific conservation measures included in the *Water Conservation Plan* include:

- ULFT rebates
- High efficiency clothes washer rebates
- Conservation kit distribution
- Plumbing fixture retrofit ordinance
- Residential water surveys
- Apartment building sub-meters

[22] Conservation measures for UCSC that were identified by MWM (2007) in the *UC Santa Cruz Water Efficiency Survey* include only minimal overlap with the conservation measures described in the Water Conservation Plan (Gary Fiske & Associates, 2000).
[23] See Table 6-3 of the 2005 UWMP (Santa Cruz, 2006). Note that values may not add due to rounding.

- New construction ordinance
- Commercial ULFT rebates
- CII water surveys
- Large landscape water use review
- Parks water use review
- Large landscape budget-based rates

Many of the programs included in the *Water Conservation Plan* overlap with conservation programs developed by the California Urban Water Conservation Council ("CUWCC") *Memorandum of Understanding Regarding Urban Water Conservation in California ("MOU")*, which was signed by the City in June 2001. The City has established programs to implement all fourteen best management practices contained in the MOU and plans to continue implementation of the *Water Conservation Plan* programs through 2010 in order to achieve the full savings estimated in the plan (Santa Cruz, 2006).

9.2. CURTAILMENT

In the process of developing the IWP and based on the results of the *Water Curtailment Study* (Gary Fiske & Associates, 2001), the City made the recommendation that it would not attempt to meet full demand in drought years when surface supplies fall short. Instead, the City plans to supply 85% of normal peak season demand during critical drought years, like the 1976-77 event, with the remaining 15% to be met through curtailments in water use from the City's customers. This curtailment would be achieved through temporary watering restrictions or rationing that target landscape irrigation and other outdoor uses and would be in addition to the water saved on a long-term basis through conservation programs (Santa Cruz, 2006).

The IWP assessed combinations of needed additional water supply sources in terms of three use curtailment scenarios, ranging from no curtailment up to a 25% system-wide reduction in water use under worst-case drought conditions. According to the 2005 UWMP, the planning decision to select 15% was based primarily on the fact that, while there was only a slight difference in overall cost between the 15% and 25% strategies, the difference in terms of the impacts and hardship to residential and business customers, as well as the frequency of cutbacks, between these two curtailment levels was much more substantial. The decision also recognized that water use per-capita is already very conservative, and that the ability of customers to make such cutbacks would become more difficult or costly over time because of the increase in efficiency achieved through additional conservation efforts (Santa Cruz, 2006).

Costs related to curtailment of demand during dry years are assessed in the City's *Water Shortage Contingency Plan* (Santa Cruz, 2009b). This plan estimates that potential additional staff positions needed during a water shortage of 15% would cost approximately $113,000 (Stage 2: Water Shortage Warning). Shortages that reduce water supplies by greater than 15% would require additional funds. In addition to increased staffing costs, curtailment would result in revenue losses for the City due to decreased customer purchases of water. Revenue losses from a 15% curtailment are

estimated to be on the order of $1.65 million per year. Options for funding additional staff and recovering lost revenue include:

- Seeking funding from the City's Water Department's Rate Stabilization Fund (currently $2.2 million),
- Deferring planned capital improvements, and
- Considering possible rate adjustments or surcharges.

Given that the City anticipates occasional shortages of up to 15%, the *Water Shortage Contingency Plan* recommends that the Rate Stabilization Fund be maintained at least at a level that would fully mitigate expected revenue losses associated with that level of curtailment. Currently, the fund would fully cover revenue losses of a 15% curtailment lasting one year (Santa Cruz, 2009b).

9.3. DESALINATION

9.3.1 IWP Recommendation for Desalination

Several possible options for development of alternative water supplies were evaluated by the City as part of the IWP, including drilling more wells, upgrading the North Coast system and treatment facilities, and implementing a water transfer involving exchange of groundwater with recycled wastewater for agricultural use on the state park lands north of the City. The IWP identified a regional seawater desalination plant as the preferred alternative for a backup supply of drinking water in times of drought (Santa Cruz, 2006).

9.3.2 Establishment of a Regional Desalination Cooperative

In response to the City Council's direction to pursue to IWP, the cooperative $SCWD^2$ was established by the City and the SqCWD to evaluate a potential desalination plant in Santa Cruz. $SCWD^2$ is responsible for carrying out the desalination efforts planned by the City in its IWP and the SqCWD in its Integrated Resources Plan.

The desalination project concept evaluated in the IWP (that is being carried out by $SCWD^2$) involves constructing a seawater intake system using an existing, abandoned wastewater outfall, building a new desalination plant with an initial capacity of 2.5 mgd, and installing pipelines and pumping stations to deliver treated water to the Bay Street Reservoir and to convey seawater concentrate to the City's wastewater facilities, where it would be blended with municipal wastewater flows and disposed via a deep ocean outfall (Santa Cruz, 2006).

The purpose of the initial increment of 2.5 mgd of desalination capacity identified in the IWP is for drought protection, and the plant would only be used by the City intermittently during dry years when existing water supplies fall short (Santa Cruz, 2006). Use of the desalination plant for SqCWD would be both during normal and dry years.

9.3.3 Progress Made by $SCWD^2$

Several studies are currently underway or planned that will provide design data and recommendations for a full-scale desalination plant. These studies include:

- Pilot Plant Program
- Entrainment Study
- Off-shore Geological Survey
- Energy Minimization and Greenhouse Gas Reduction Study

The Program EIR for the regional desalination plant was approved by the City Council in 2005, and a pilot program was implemented using funds provided by the City, SqCWD, and DWR Proposition 50 grant money (Santa Cruz, 2009c). Grant funding received for the pilot plant totaled over $2.5 million, with $2 million awarded by DWR and $611,000 awarded by the SWRCB.

The pilot program facilities consisted of a 2,400 sq ft temporary building, custom fabricated pilot-scale treatment units treating up to 50 gpm, and source seawater from the existing UCSC Long Marine Laboratory seawater intake.

The pilot program tested various desalination pre-treatment and treatment processes over a one year period and. Processes evaluated as part of the pilot program included several combinations of reverse osmosis ("RO") membranes, including both seawater and low-pressure RO membranes, for the removal of salts. Pre-treatment processes that were tested during the pilot program included conventional pretreatment (flocculation/sedimentation and media filtration), slow sand filtration, and membrane ultra filtration.

Testing for the pilot program was completed in April 2009 and the results are currently being evaluated. Completion of the pilot program evaluation is expected by November 2009.

9.3.4 Anticipated Permits Required for a Full-Scale Desalination Plant

The full-scale desalination plant will be required to obtain permits from various federal, state, and local agencies, and a comprehensive CEQA environmental review will be completed prior to approval of construction of a full-scale desalination plant. As part of the requirements of CEQA, the City has initiated preparation of an EIR to identify potential effects that the proposed desalination plant is likely to have on the environment. The EIR will also propose ways in which these environmental effects might be minimized or mitigated, and what potential alternatives to the plant may be considered (Santa Cruz, 2009c). A complete list of the anticipated permits required for the desalination plant is provided in Appendix F.

9.3.5 Anticipated Schedule

The City anticipates that the program to design and build a full-scale desalination plant EIR will be launched in Fall 2009, and a scoping session will be held to discuss environmental issues related to the project and the scope/content of the Draft EIR analyses. Environmental review for the full-scale plant is expected to extend through the year 2012. Additional work to be performed for the plant would also include the

following actions, as listed below, with the anticipated preparation dates shown in parentheses (Santa Cruz, 2009c):

- Intake Design (2009-2011),
- Intake Construction (2013-2014),
- Full Scale Plant Design (2009-2012),
- Full Scale Plant Construction (2012-2015),
- Infrastructure Design (2010-2011), and
- Infrastructure Construction (2013-2014).

9.3.6 Estimated Cost and Funding for a Full-Scale Desalination Plant

The current estimated cost for design, permitting and other related pre-construction expenses between 2009 and 2012 is approximately $6.4 million in 2009-2010, $2.2 million in 2010-2011, and $6.9 million in 2011-2012. Construction and operation costs beyond 2012 have not yet been estimated (Santa Cruz, 2009c).

It is currently planned that the cost of the desalination plant will be shared between the City and SqCWD. City funds are expected to come from the sale of bonds anticipated by the City's current water rates. The City will also evaluate the potential for future grants from the state for part of the construction of the facility; however, at present, no grant funding has been obtained for the full-scale plant (Santa Cruz, 2009c).

9.4. ADDITIONAL POTENTIAL FUTURE WATER SUPPLY SOURCES

As discussed in the introduction to Section 9, the City's current strategies for water conservation, curtailment, and desalination outlined in the IWP are designed to meet the City's existing dry year water supply deficits, but also provide future decision-makers an option to augment supply to meet long-term needs (i.e., associated with new customers). For example, although the City's proposed desalination plant is currently planned to provide 2.5 mgd of dry year supply for existing customers, it could conceivably be expanded in the future if additional supplies are needed in the future.

As discussed in Section 8, since the Project will result in a new demand of 100 mgy on the City's water system, the City will need to develop new dry year water supplies or accept nominal additional dry year supply cutbacks. Depending on the growth rate of other developments within the City's service area (i.e., 0.8% or 0.4% per year), the City will face additional increased dry year supply shortfalls in proportion to the amount of growth. If future growth occurs as is projected by *Updated UWMP Scenario 1*, the City may also face normal year supply shortfalls at some point between 2025 and 2030.

Potential supply alternatives that could be evaluated to limit future curtailment at a maximum level as demand grows in the future could include:

- Expanded desalination capacity in 1 mgd increments,
- Water recycling,
- Groundwater recharge,

- Reservoir expansion,
- Aquifer storage and recovery, and
- Off-stream storage.

The City has evaluated over 30 different supplemental water supply options in the past, including many of those listed above, and has previously determined them to be inadequate, infeasible, or too costly. However, these and other supply alternatives may need to be re-evaluated in the future to avoid increased dry year cutbacks due to new development (including the Project), and potentially to augment the City's normal year water supplies if future development is approved at a rate greater than can be accommodated by the City's existing normal year water supply.

10. CONCLUSIONS

In the City's most recent UWMP, prepared in 2005, the estimated total demand on the City's water system (including the then-current projected demand of the Project) was projected to exceed the total available normal year water supply at some point between 2015 and 2020 (e.g., demand in 2020 was projected to exceed supply by 31 mgy; Santa Cruz, 2006).

Based on the updated water demand projections presented herein, this WSA concludes that in a normal year the City's supplies are sufficient to meet the demands of the Project and the City's existing and planned future uses through at least the year 2025. However, depending upon the rate of water demand growth, the City's water supplies may, during a normal year, be insufficient to fully support the demands of the Project and the City's other existing and planned future uses after 2025. The evaluations presented herein indicate that if water demand increases as is projected in *Updated UWMP Scenario 1*, which anticipates a 0.8% annual increase in the City's three largest customer classes and is consistent with general plans for the City's service area, the City will not be able to meet the demand of the Project and the City's existing and planned future uses beyond 2025 in a normal year. However, even under this high-end water demand growth rate, the magnitude of projected shortfall represent less than 1% of the City's total projected demand in 2030, or 42 mgy during a normal year.

If water demand increases as is projected in *Updated UWMP Scenario 2,* which anticipates a 0.4% annual increase in customer classes, and is consistent with historical trends in growth, the City will be able to meet the demands of the Project and other existing and planned future uses through the year 2030 (i.e., the 20 year evaluation horizon for this WSA).

In contrast to this potential future normal year supply shortfall, the City is already facing supply shortfalls during dry years, even without the additional demands from the Project and/or other future development. Given this existing shortfall, the City does ***not*** have sufficient water to meet the demands of the Project, in addition to other existing and planned future uses. Comparison of the City's future supply and demand indicates, however, that implementation of the Project would only increase dry year supply shortfalls by up to 2% (or 100 mgy) in a single or multiple dry year. Even in the "worst-case" growth scenario evaluated by the City's Water Department (i.e., 0.8% annual growth), existing users account for 72% of the projected supply shortfall in 2030 (1,200 mgy out of a total shortfall of 1,656 mgy).

While these supply and demand comparisons are useful for evaluating annual water supply shortfalls, they do not reflect ***peak season*** cutbacks, which are likely to be significantly greater than the annual supply deficits presented above. Furthermore, to the extent that the City's surface water or groundwater supplies are reduced or impaired due to SWRCB filings or saltwater intrusion, respectively, both the annual supply deficits and peak season cutbacks could be increased.

In response to the City's *existing* dry year supply shortfalls, the City has been implementing water conservation programs identified as part of the IWP and has initiated studies for the development of desalinated water. As of the 2005 UWMP, the City had achieved 153 mgy of conservation toward its goal of 282 mgy in 2010. The City has also recently completed testing of a one-year pilot desalination project (in April 2009) and initiated environmental review of the full-scale desalination plant in Fall 2009. Through the completion of these conservation programs and the 2.5 mgd desalination plant (if approved by the appropriate regulatory agencies), the City will be able to reduce the water supply deficit in a worst-case drought, like the 1976-1977 event, from over 50% at peak times to a maximum of 15%. Plans for achieving this 15% curtailment are outlined in the City's updated *Water Shortage Contingency Plan* (Santa Cruz, 2009b).

These strategies address the dry year supply shortfall associated with *current* demands, but also to provide future decision-makers an option to augment supply to meet long-term needs (i.e., associated with new customers). If the Project and/or other new development results in increased demand on the City's water system, the City will need to develop new dry year water supplies or accept increased cutbacks during dry years. Depending on actual future development within the City's service area (i.e., more similar to the 0.8% annual average growth rate projected in *Updated UWMP Scenario 1* or 0.4% annual average growth rate projected in *Updated UWMP Scenario 2*), the City may also face supply deficits during normal years at some point between 2025 and 2030.

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SqCWD and CWD, 2007. Soquel-Aptos Area Groundwater Management Plan; prepared by the Soquel Creek Water District and the Central Water District, dated February 2007.

Settlement Agreement, 2008. Santa Cruz County Superior Court in *City of Santa Cruz et al. v. Regents of the University of California et al.* (CV 155571, consolidated with Case No. CV155583). *Comprehensive Settlement Agreement* dated 15 August 2008.

UCSC, 2005a. UC Santa Cruz Long-Range Development Plan 2005-2020 Draft, dated January 2005.

UCSC, 2005b. UC Santa Cruz Long-Range Development Plan 2005-2020 Draft Environmental Impact Report, dated October 2005.

UCSC, 2006a. UC Santa Cruz Long-Range Development Plan 2005-2020, Final Draft dated September 2006.

UCSC, 2006b. UC Santa Cruz Long-Range Development Plan 2005-2020 Final Environmental Impact Report, dated September 2006.

Tables

Table 1
Projected Incremental Increase in Future Water Demand Associated with the Project and Other UCSC Facilities (a)

City of Santa Cruz, California

Water Demand Category (b)	Increased Water Use (mgy) (c)
2005 LRDP - Main Campus (d)	122
2005 LRDP - Main Campus (outside of SOI amendment area) (e)	-16
2005 LRDP - Summer Session (f)	10
935 new beds per Settlement Agreement (f)	14
Conservation per Settlement Agreement (f)	-30
Subtotal Project Demand (g)	*100*
2005 LRDP - Main Campus (outside of SOI amendment area) (e)	16
UCSC LRDP - 2300 Delaware (2007-2020)	1
UCSC Marine Science Campus (2007-2020)	9
Subtotal Additional UCSC Demand (h)	*26*
Total Projected Increase in UCSC Water Use by 2020 (i)	**126**

Abbreviations:
LRDP - Long Range Development Plan
mgy - million gallons per year
SOI - Sphere of influence
UCSC - University of California at Santa Cruz

Notes:
(a) The "incremental increase" in future water demand listed above is in addition to existing water uses at UCSC-owned facilities. Historical demand from UCSC has ranged from approximately 200 mgy to 206 mgy in recent years.
(b) Water demand categories are listed above for various components of UCSC, provided by City staff.
(c) The increased water use shown above represents the projected incremental increase in water use at each of the UCSC facilities. Details regarding the projected increase for each particular water demand category is included in subsequent notes.
(d) Additional development associated with the 2005 LRDP was estimated by ARUP (2006) as part of the 2005 LRDP environmental review. These projections were estimated by ARUP based on the area of previously approved (but not constructed) land uses and proposed new land uses from 2005 LRDP, multiplied by water use factors derived from historical water use at UCSC. New developments in water efficiency were incorporated ARUP's demand projections through assumptions regarding the achievable water savings from the use of efficient fixtures. The projected area of land uses, water demand factors, and estimated conservation savings is provided in Table B-1 of Appendix B, along with the memorandum prepared by ARUP for UCSC in 2006.
(e) Water demand associated with projects that are outside of the SOI amendment area (estimated by UCSC, 2009) are not considered part of the Project and therefore subtracted from the "Project" total and added back into the "Additional UCSC" total.
(f) Water demands associated with summer session students, additional beds required by the Settlement Agreement, and conservation savings required by the Settlement Agreement were provided by City staff. Conservation savings are expected to be achieved through implementation of 19 high-priority measures identified by MWM (2007). Although these savings will be achieved within existing facilities at the UCSC main campus (i.e., not within the SOI amendment area), because the conservation savings was a requirement of the Settlement Agreement it has been included as part of the Project above.
(g) Represents the total Project water demand.

Table 1
Projected Incremental Increase in Future Water Demand Associated with the Project and Other UCSC Facilities (a)
City of Santa Cruz, California

Notes (continued):

(h) "Additional UCSC Demand" includes increased water demands from 2,300 Delaware Street and the UCSC Marine Science Campus and from projects on the UCSC main campus that are located outside of the SOI amendment area (e.g., within the existing SOI). Demands from 2,300 Delaware Street and the Marine Science Campus have been updated above from the 2005 LRDP Environmental Impact Report based on actual water use data in 2007.

(i) The total projected increase in water use by UCSC reflects the incremental increase in demand estimated for all of the UCSC facilities listed above. This demands is used in Table 2 to update the City's projected future water use for its entire water service area, which previously included an additional 200 mgy of water for UCSC in 2020.

References:

1 Personal communication with the Water Department and Planning Department Staff, 13 July 2009.
2 MWM, 2007. UC Santa Cruz Water Efficiency Survey; prepared by Maddaus Water Management and UC Santa Cruz; dated December 2007.
3 UCSC, 2009. East Campus Infill Project Final Environmental Impact Report, dated 2009, available online at: http://ppc.ucsc.edu/cp/planning/6801EIRTOC.

Table 2
Projected Future Water Demand for the City of Santa Cruz Water Service Area
City of Santa Cruz, California

Projection	Water Demand (mgy) (a)					
	2005	2010	2015	2020	2025	2030
Population Forecast						
AMBAG (2009) (b)	93,160	96,399	100,670	103,275	104,539	106,454
Water Demand Forecasts						
MWM 1998 Forecast (c)	4,867	5,029	5,094	5,157	5,240	5,323
UWMP Scenario 1 (0.8% Growth) (d)	3,900	3,962	4,154	4,345	--	--
UWMP Scenario 2 (0.4% Growth) (e)	3,900	3,866	3,963	4,058	--	--
UWMP Scenario 1 Adjustments (f)						
Extension from 2020 to 2030 (g)	--	--	--	--	*4,350*	*4,430*
UCSC adjustments (h)	--	*-25*	*-50*	*-74*	*-74*	*-74*
Updated UWMP Scenario 1 (i)	**3,900**	**3,937**	**4,104**	**4,271**	**4,276**	**4,356**
UWMP Scenario 2 Adjustments (f)						
Extension from 2020 to 2030 (g)	--	--	--	--	*4,121*	*4,196*
UCSC adjustments (h)	--	*9*	*17*	*26*	*26*	*26*
Updated UWMP Scenario 2 (i)	**3,900**	**3,875**	**3,980**	**4,084**	**4,147**	**4,222**

Abbreviations:
AMBAG - Association of Monterey Bay Area Governments
mgy - million gallons per year
UCSC - University of California at Santa Cruz
UWMP - Urban Water Management Plan

Notes:
(a) Water demand forecasts are based on discussions with staff from the City's water and planning departments and the City's Environmental Impact Report consultant.
(b) Population projections from AMBAG (2009) include UCSC.
(c) Projections from the City's Water Demand Investigation were completed based on then-current information on local population and employment trends published by the Association of Monterey Bay Area Governments (“AMBAG”), and demographic data and land use information from the existing general plans (from the City of Santa Cruz, Santa Cruz County, and the City of Capitola).

Table 2
Projected Future Water Demand for the City of Santa Cruz Water Service Area
City of Santa Cruz, California

Notes (continued):

(d) The 2005 UWMP's "Scenario 1" demand projections were based on the assumption that the City's three largest customer classes (single-family residential, multi-residential and business, and irrigation) would grow at an annual rate of 0.8% (in proportion to the amount of growth envisioned in existing housing elements from general plans for the City and County of Santa Cruz and the City of Capitola), and that water use at the University would increase as predicted in the 2005 LRDP Draft EIR.

(e) The 2005 UWMP's "Scenario 2" assumed that residential and business water use would increase at an annual rate of 0.4% (based on actual residential growth rates experienced since 1997), and that water use at the University would increase at half of what was predicted in the 2005 Long Range Development Plan ("LRDP") Draft Environmental Impact Report ("EIR").

(f) Adjustments were made to the UWMP Scenarios 1 & 2 for two reasons (1) in order to extend the projections through the year 2030, as is required for a Water Supply Assessment ("WSA") pursuant to Water Code Section 10910, and (2) to account for reductions in the projected water demand for UCSC associated with the 2005 LRDP Final Environmental Impact Report and the Settlement Agreement. Both Updated UWMP Scenarios include the full volume of projected 2020 demand for UCSC. Therefore, Scenario 1 has been adjusted downward while Scenario 2 has been adjusted upward, to account for the full volume of updated UCSC demand.

(g) Demands were extended from 2020 to 2030 by the City for the purpose of this report, assuming a gross per capita water use of 114 gallons per day per person ("gpd/person") for UWMP Scenario 1 and 108 gpd/person for UWMP Scenario 2.

(h) Adjustments to the UCSC water demand projections (which include the demand for the Project) are equal to the difference between the prior projected UCSC demand growth by 2020 included in the UWMP scenarios (200 mgy for Scenario 1 and 100 mgy for Scenario 2), and the updated projected UCSC demand growth by 2020 presented in Table 1 (126 mgy for both scenarios). After 2020, demand growth by UCSC is assumed to be included in the per capita-based demand growth (Reference 1).

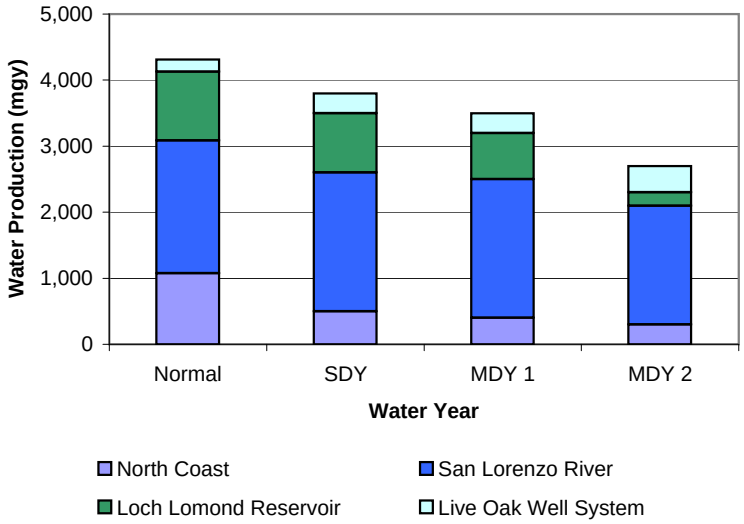
(i) The Updated UWMP Scenarios 1 & 2 are used for the purpose of evaluating the sufficiency of the City's water supplies to meet the projected future demands (including the demands of the Project), as is required in a WSA. The City has chosen to include these two potential future demand scenarios as the higher and lower ranges of the City's estimated future demand. Actual future development will be planned by the appropriate land use planning agencies for the City and County of Santa Cruz and the City of Capitola.

References:

1 Personal communication with the Water Department and Planning Department Staff, 13 July 2009.
2 MWM, 1998. *Water Demand Investigation* ; prepared by Maddaus Water Management.
3 AMBAG, 2009. Monterey Bay Area 2008 Regional Forecast. Population, Housing Unit and Employment Projections for Monterey, San Benito and Santa Cruz Counties to the Year 2035.

Table 3
City of Santa Cruz Projected Future Water Supply Availability (a)
City of Santa Cruz, California

Water Supply Source (b)	Water Supply by Water Year Type (mgy) (c)			
	Normal Year	Single Dry Year	Multiple Dry Year	
			Year 1	Year 2
North Coast	1,077	500	400	300
San Lorenzo River	2,008	2,100	2,100	1,800
Loch Lomond Reservoir	1,042	900	700	200
Live Oak Well System	187	300	300	400
Total Water Supply	**4,314**	**3,800**	**3,500**	**2,700**



Abbreviations:
SDY - single dry year
MDY - multiple dry year
mgy - million gallons per year

Notes:
(a) Supply availability is from Table 5-2 of the 2005 Urban Water Management Plan (Santa Cruz, 2006).
(b) See Sections 6 and 7 of the text for a complete description of the City's water supply sources.
(c) "Water Year Type" refers to normal, single dry, and multiple dry years as defined in the 2005 Urban Water Management Plan ("UWMP") based on the hydrologic record. The UWMP calculates "normal year" supply based on the period between 1999 and 2003, "single dry year" supply based on the year 1994 (the most recent single dry year on record), and "multiple dry year" supply based on the two-year drought sequence from 1976 to 1977 (the most critical drought on record).

References:
1 Santa Cruz, 2006. 2005 Urban Water Management Plan, dated February 2006.

Table 4
City of Santa Cruz Historical Water Supply Production (a)
City of Santa Cruz, California

Year	Water Supply Production (mgy)					
	North Coast Streams	San Lorenzo River	Tait Wells (b)	Loch Lomond Reservoir	Live Oak Wells	TOTAL
1985	1,004.4	1,926.7	331.5	793.9	174.7	4,231
1986	1,123.3	1,867.5	27.6	1,192.7	33.6	4,245
1987	592.5	2,246.5	172.5	971.8	389.6	4,373
1988	692.1	2,066.5	294.1	650.4	429.8	4,133
1989	872.3	2,187.2	232.3	455.0	298.6	4,045
1990	820.6	2,001.2	152.8	187.0	227.4	3,389
1991	661.9	1,921.0	251.1	510.1	178.7	3,523
1992	633.7	1,807.6	223.1	625.2	264.4	3,554
1993	826.1	1,667.2	102.3	1,035.7	135.5	3,767
1994	665.6	1,861.0	235.5	931.8	169.1	3,863
1995	1,207.7	1,317.2	256.8	857.2	90.0	3,729
1996	1,312.5	1,267.3	9.9	1,389.8	54.7	4,034
1997	1,291.6	1,719.6	5.3	1,304.5	79.9	4,401
1998	1,484.8	1,527.7	4.8	996.8	99.6	4,114
1999	1,580.0	1,966.0	106.1	583.7	92.4	4,328
2000	1,417.3	2,073.2	--	797.0	187.0	4,475
2001	1,326.5	2,003.0	--	842.4	171.4	4,343
2002	1,386.2	1,976.2	--	538.0	143.8	4,044
2003	1,297.0	1,917.9	--	748.5	129.7	4,093
2004	1,315.4	1,984.5	--	652.6	123.6	4,076
Average from 2000 to 2004	**1,348.5**	**1,991.0**		**715.7**	**151.1**	**4,206**

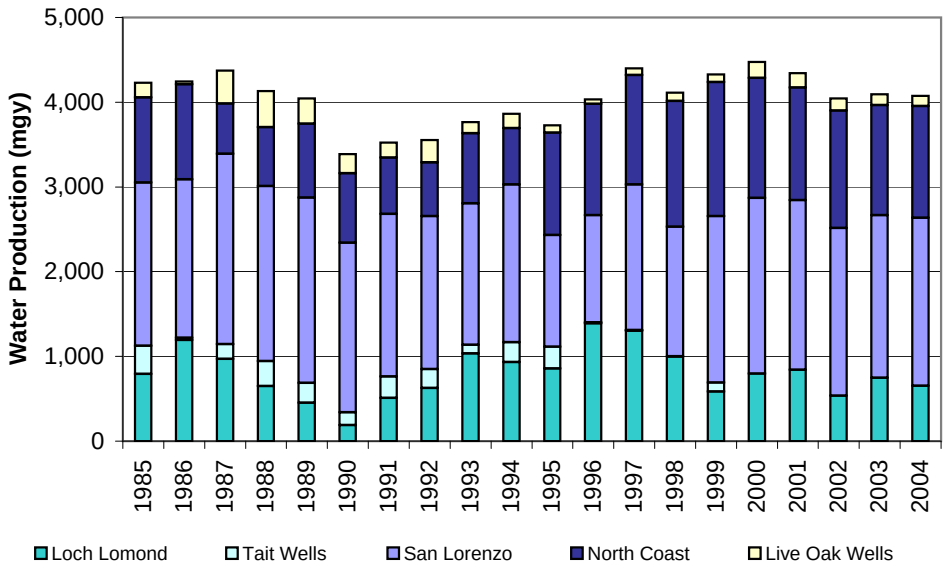


Table 4
City of Santa Cruz Historical Water Supply Production (a)
City of Santa Cruz, California

Abbreviations:
mgy - million gallons per year

Notes:
(a) Historical water production for the City of Santa Cruz is from Table 3.2 of the 2005 Urban Water Management Plan (Santa Cruz, 2006).
(b) Production from the Tait Wells is pursuant to the City's water rights permit for the Tait Street Diversion on the San Lorenzo River.

References:
1 Santa Cruz, 2006. 2005 Urban Water Management Plan, dated February 2006.

Table 5
City of Santa Cruz Surface Water Rights and Entitlements (a)
City of Santa Cruz, California

Water Supply Source (b)	SWRCB Permit / License (c)	Permit / License Face Value (mgy)	Seasonal Availability	Maximum Diversion (cfs)	Instream Flow Requirements (cfs) (d)	Annual Diversion Limit (mgy)
North Coast Diversions	Pre-1914	None	Year-round	No limit	None	None
San Lorenzo River						
- Tait Street Diversion / Wells	2372 / 1553 2738 / 7200	1,463 1,416	Year-round	12.2	None	None
- Felton Diversion (for storage in Loch Lomond)	16601 / -- 16123 / --	977	September October November-May June-August	7.8 20 20 0	10 25 20 NA	
Loch Lomond Reservoir						
- Collection from Newell Creek (for storage in Loch Lomond)	11618 / 9847	1,825	Sept-June	No limit	NA	1,825
- Withdrawal from Loch Lomond	11618 / 9847	1,042	Year-round	NA	1	1,042

Abbreviations:
cfs - cubic feet per second
mgy - million gallons per year
NA = not applicable
SWRCB - State Water Resources Control Board

Table 5
City of Santa Cruz Surface Water Rights and Entitlements (a)
City of Santa Cruz, California

Notes:

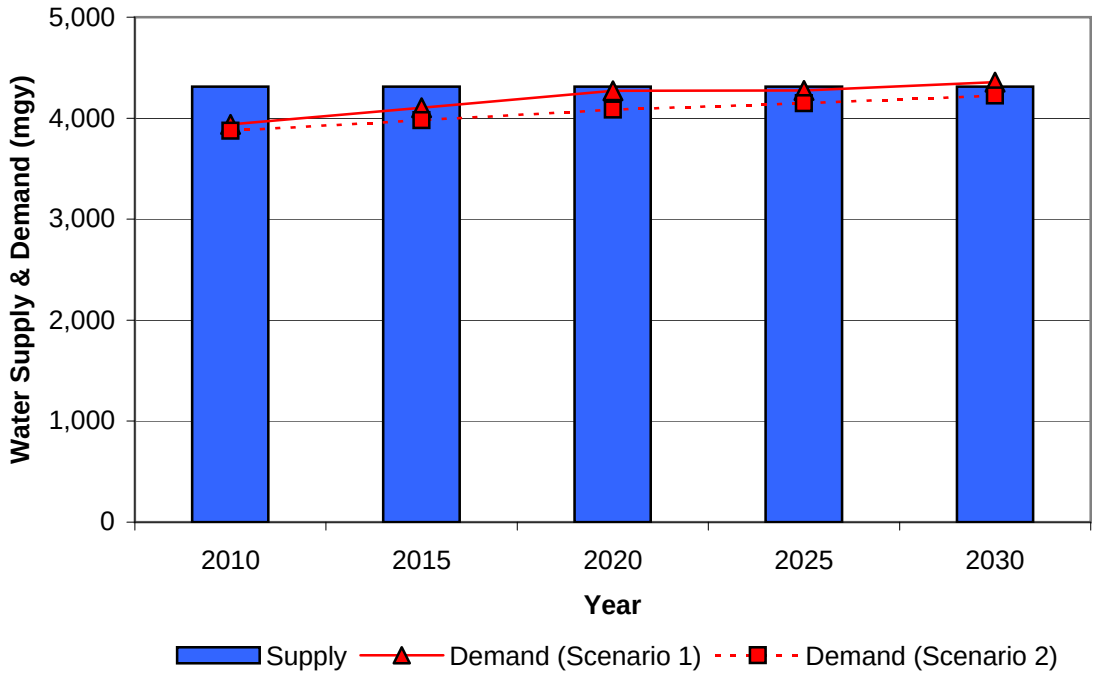
(a) Surface water rights and entitlements for the City of Santa Cruz are from Table 3-1 of the 2005 Urban Water Management Plan (Santa Cruz, 2006).
(b) See Sections 6 and 7 of the text for a complete description of the City's water supply sources.
(c) Copies of the City's permits and licenses for the Felton Diversion and the Tait Street Diversion are included in Appendix D.
(d) Instream requirements are the minimum flow that must be met before water can be diverted by the City. Instream flows are for fish and other instream environmental uses.

References:

1 Santa Cruz, 2006. 2005 Urban Water Management Plan, dated February 2006.

Table 6
Projected Normal Year Supply Versus Demand
City of Santa Cruz, California

Water Supply Source	Water Supply and Demand (mgy)				
	2010	2015	2020	2025	2030
Projected Supply (a)	4,314	4,314	4,314	4,314	4,314
Projected Demand (b)					
Updated UWMP Scenario 1 (c)	3,937	4,104	4,271	4,276	4,356
Updated UWMP Scenario 2 (d)	3,875	3,980	4,084	4,147	4,222
Difference (e)					
Updated UWMP Scenario 1	377	210	43	38	-42
Updated UWMP Scenario 2	439	334	230	167	92
Average Annual Deficit (f)					
Updated UWMP Scenario 1	--	--	--	--	-1%
Updated UWMP Scenario 2	--	--	--	--	--



Abbreviations:
UWMP - Urban Water Management Plan
mgy - million gallons per year

Table 6
Projected Normal Year Supply Versus Demand
City of Santa Cruz, California

Notes:

(a) Projected normal year water supply is from Table 5-3 of the 2005 UWMP (Santa Cruz, 2006).

(b) Projected demand for the City's water service area is from Table 2. The two scenarios shown above have been updated from the 2005 UWMP to extend to the year 2030, and to account for updates to the University of California, Santa Cruz, 2005 Long Range Development Plan that occurred as a result of environmental review and the subsequent litigation. These updated scenarios include 126 mgy of water demand for the Project (see Table 1).

(c) Updated UWMP Scenario 1 reflects a growth rate of 0.8% out to 2020, consistent with the applicable general plans, and that the University's water use will increase by 126 mgy by 2020 (see Table 2). Demand between 2020 and 2030 was projected using the average projected per capita water use (2010 through 2020) applied to the increase in population projected by the Association of Monterey Bay Area Governments (2009).

(d) Updated UWMP Scenario 2 reflects a growth rate of 0.4% out to 2020, consistent with the historical growth since 1997, and that the University's water use will increase by 126 mgy by 2020 (see Table 2). Demand between 2020 and 2030 was projected using the average projected per capita water use (2010 through 2020) applied to the increase in population projected by the Association of Monterey Bay Area Governements (2009).

(e) The difference between supply and demand is the supply less demand. Negative values indicate that demand exceeds supply.

(f) Annual average deficit is shown as a percent of demand. The annual average does not account for peak season deficits, which may be significantly greater.

References:

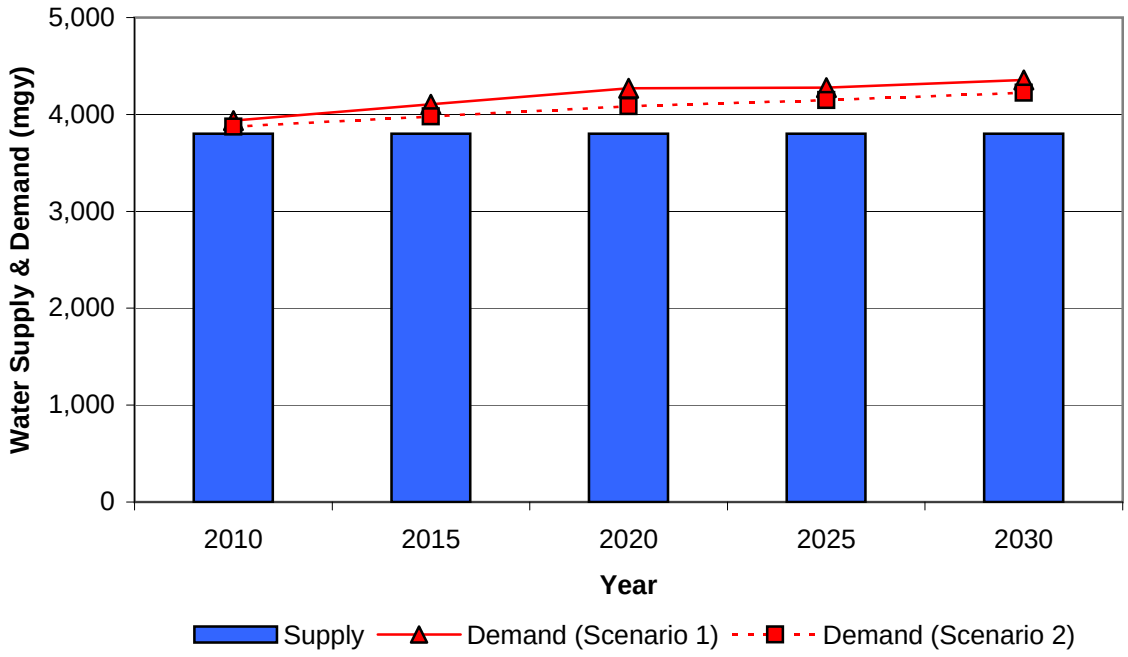
1 Santa Cruz, 2006. 2005 Urban Water Management Plan, dated February 2006.

2 Santa Cruz, 2009. Personal communication with staff from the City's water and planning departments and the City's Environmental Impact Report consultant.

3 AMBAG, 2009. Monterey Bay Area 2008 Regional Forecast. Population, Housing Unit and Employment Projections for Monterey, San Benito and Santa Cruz Counties to the Year 2035.

Table 7
Projected Single Dry Year Supply Versus Demand
City of Santa Cruz, California

Water Supply Source	Water Supply and Demand (mgy)				
	2010	2015	2020	2025	2030
Projected Supply (a)	3,800	3,800	3,800	3,800	3,800
Projected Demand (b)					
Updated UWMP Scenario 1 (c)	3,937	4,104	4,271	4,276	4,356
Updated UWMP Scenario 2 (d)	3,875	3,980	4,084	4,147	4,222
Difference (e)					
Updated UWMP Scenario 1	-137	-304	-471	-476	-556
Updated UWMP Scenario 2	-75	-180	-284	-347	-422
Average Annual Deficit (f)					
Updated UWMP Scenario 1	-3%	-7%	-11%	-11%	-13%
Updated UWMP Scenario 2	-2%	-5%	-7%	-8%	-10%



Abbreviations:
UWMP - Urban Water Management Plan
mgy - million gallons per year

Table 7
Projected Single Dry Year Supply Versus Demand
City of Santa Cruz, California

Notes:

(a) Projected single dry year water supply is from Table 5-4 of the 2005 UWMP (Santa Cruz, 2006).

(b) Projected demand for the City's water service area is from Table 2. The two scenarios shown above have been updated from the 2005 UWMP to extend to the year 2030, and to account for updates to the University of California, Santa Cruz, 2005 Long Range Development Plan that occurred as a result of environmental review and the subsequent litigation. These updated scenarios include 126 mgy of water demand for the Project (see Table 1).

(c) Updated UWMP Scenario 1 reflects a growth rate of 0.8% out to 2020, consistent with the applicable general plans, and that the University's water use will increase by 126 mgy by 2020 (see Table 2). Demand between 2020 and 2030 was projected using the average projected per capita water use (2010 through 2020) applied to the increase in population projected by the Association of Monterey Bay Area Governments (2009).

(d) Updated UWMP Scenario 2 reflects a growth rate of 0.4% out to 2020, consistent with the historical growth since 1997, and that the University's water use will increase by 126 mgy by 2020 (see Table 2). Demand between 2020 and 2030 was projected using the average projected per capita water use (2010 through 2020) applied to the increase in population projected by the Association of Monterey Bay Area Governements (2009).

(e) The difference between supply and demand is the supply less demand. Negative values indicate that demand exceeds supply.

(f) Annual average deficit is shown as a percent of demand. The annual average does not account for peak season deficits, which may be significantly greater.

References:

1 Santa Cruz, 2006. 2005 Urban Water Management Plan, dated February 2006.

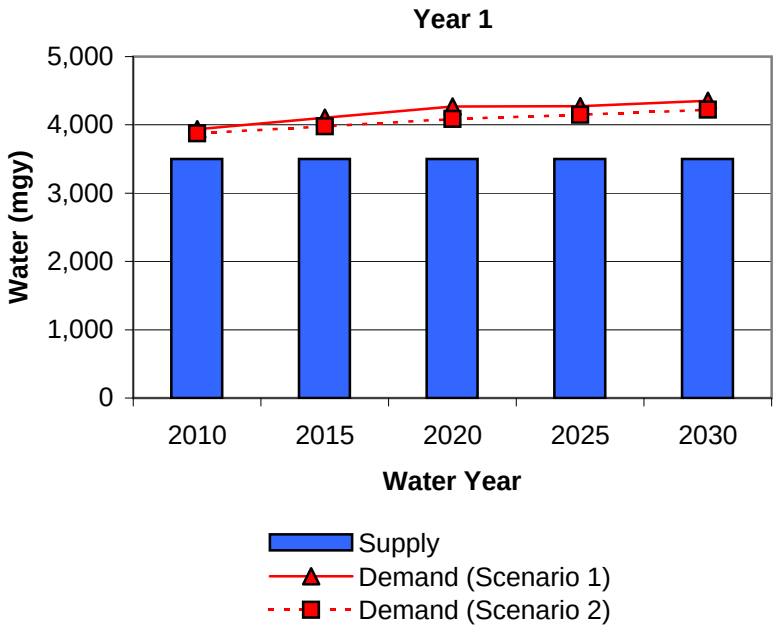
2 Santa Cruz, 2009. Personal communication with staff from the City's water and planning departments and the City's Environmental Impact Report consultant.

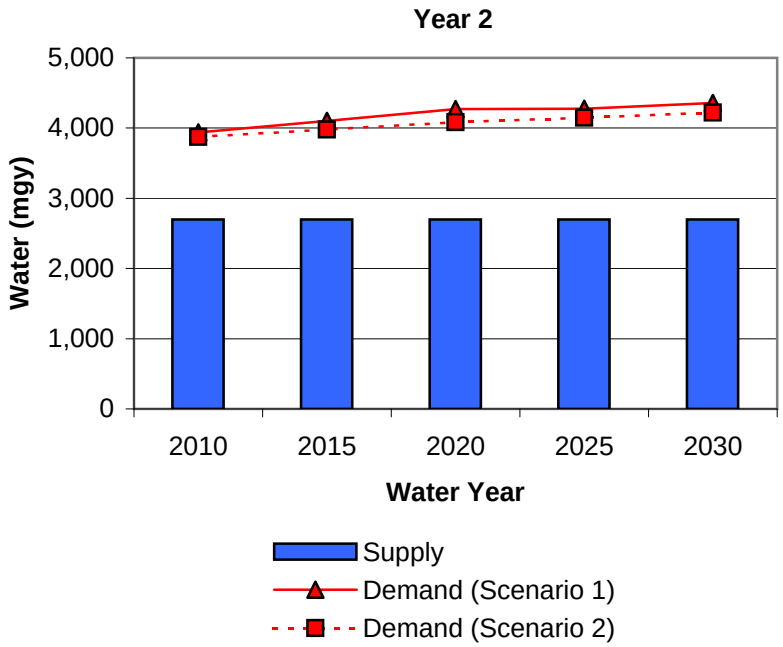
3 AMBAG, 2009. Monterey Bay Area 2008 Regional Forecast. Population, Housing Unit and Employment Projections for Monterey, San Benito and Santa Cruz Counties to the Year 2035.

Table 8
Projected Multiple Dry Year Supply Versus Demand
City of Santa Cruz, California

Water Supply and Demand	Water Supply and Demand (mgy)									
	Multiple Dry Year: Year 1					Multiple Dry Year: Year 2				
	2010	2015	2020	2025	2030	2010	2015	2020	2025	2030
Projected Supply (a)	3,500	3,500	3,500	3,500	3,500	2,700	2,700	2,700	2,700	2,700
Projected Demand (b)										
Updated UWMP Scenario 1 (c)	3,937	4,104	4,271	4,276	4,356	3,937	4,104	4,271	4,276	4,356
Updated UWMP Scenario 2 (d)	3,875	3,980	4,084	4,147	4,222	3,875	3,980	4,084	4,147	4,222
Difference (e)										
Updated UWMP Scenario 1	-437	-604	-771	-776	-856	-1,237	-1,404	-1,571	-1,576	-1,656
Updated UWMP Scenario 2	-375	-480	-584	-647	-722	-1,175	-1,280	-1,384	-1,447	-1,522
Average Annual Deficit (f)										
Updated UWMP Scenario 1	-11%	-15%	-18%	-18%	-20%	-31%	-34%	-37%	-37%	-38%
Updated UWMP Scenario 2	-10%	-12%	-14%	-16%	-17%	-30%	-32%	-34%	-35%	-36%

Table 8
Projected Multiple Dry Year Supply Versus Demand
City of Santa Cruz, California





Abbreviations:
UWMP - Urban Water Management Plan
mgy - million gallons per year

Notes:
(a) Projected multiple dry year water supply is from Table 5-3 of the 2005 UWMP (Santa Cruz, 2006).
(b) Projected demand for the City's water service area is from Table 2. The two scenarios shown above have been updated from the 2005 UWMP to extend to the year 2030, and to account for updates to the University of California, Santa Cruz, 2005 Long Range Development Plan occurred as a result of environmental review and the subsequent litigation. These updated scenarios include 126 mgy of water demand for the Project (see Table 1).

Table 8
Projected Multiple Dry Year Supply Versus Demand
City of Santa Cruz, California

Notes (continued):

(c) Updated UWMP Scenario 1 reflects a growth rate of 0.8% out to 2020, consistent with the applicable general plans, and that the University's water use will increase by 126 mgy by 2020 (see Table 2). Demand between 2020 and 2030 was projected using the average projected per capita water use (2010 through 2020) applied to the increase in population projected by the Association of Monterey Bay Area Governements (2009).

(d) Updated UWMP Scenario 2 reflects a growth rate of 0.4% out to 2020, consistent with the historical growth since 1997, and that the University's water use will increase by 126 mgy by 2020 (see Table 2). Demand between 2020 and 2030 was projected using the average projected per capita water use (2010 through 2020) applied to the increase in population projected by the Association of Monterey Bay Area Governments (2009).

(e) The difference between supply and demand is the supply less demand. Negative values indicate that demand exceeds supply.

(f) Annual average deficit is shown as a percent of demand. The annual average does not account for peak season deficits, which may be significantly greater.

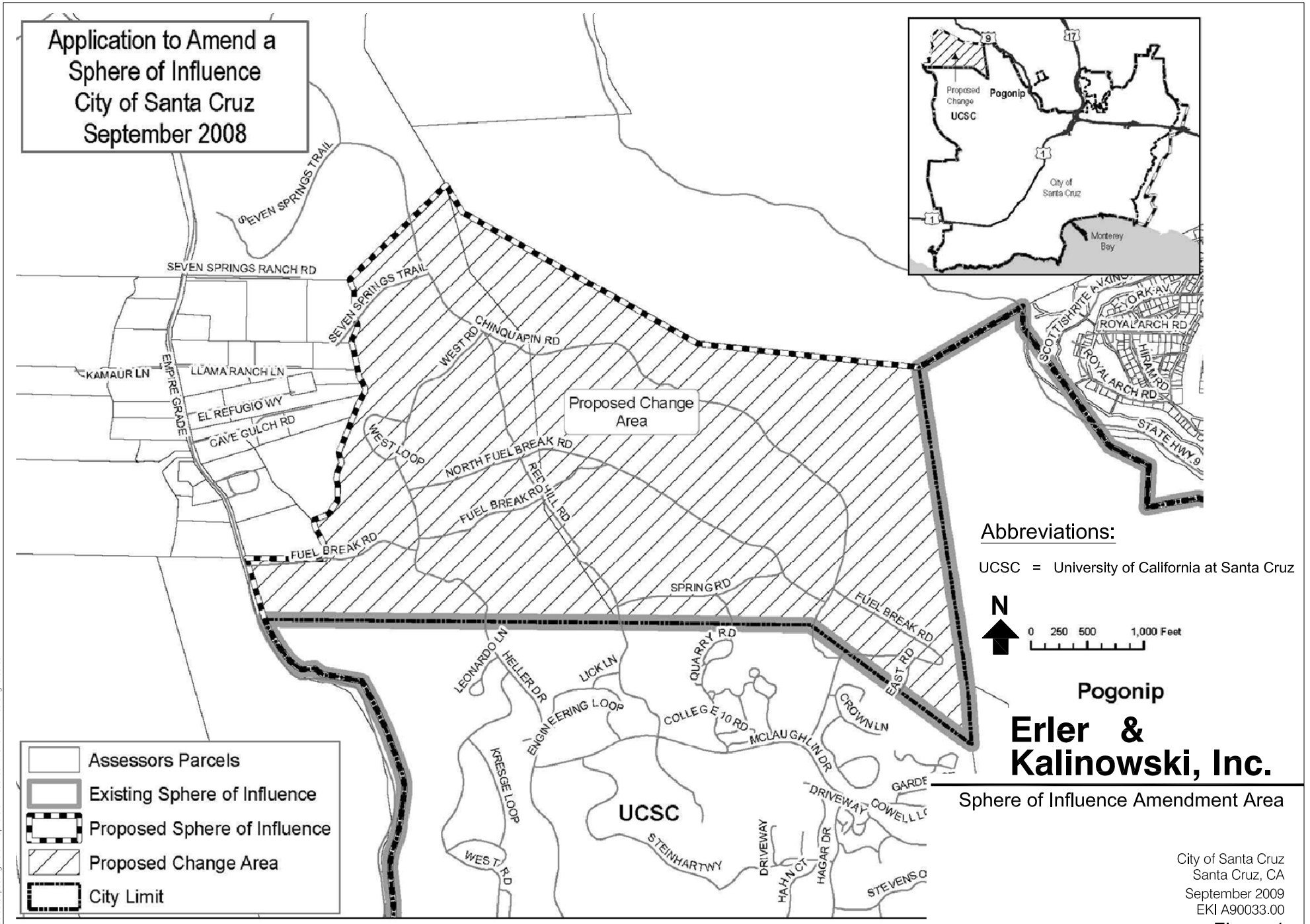
References:

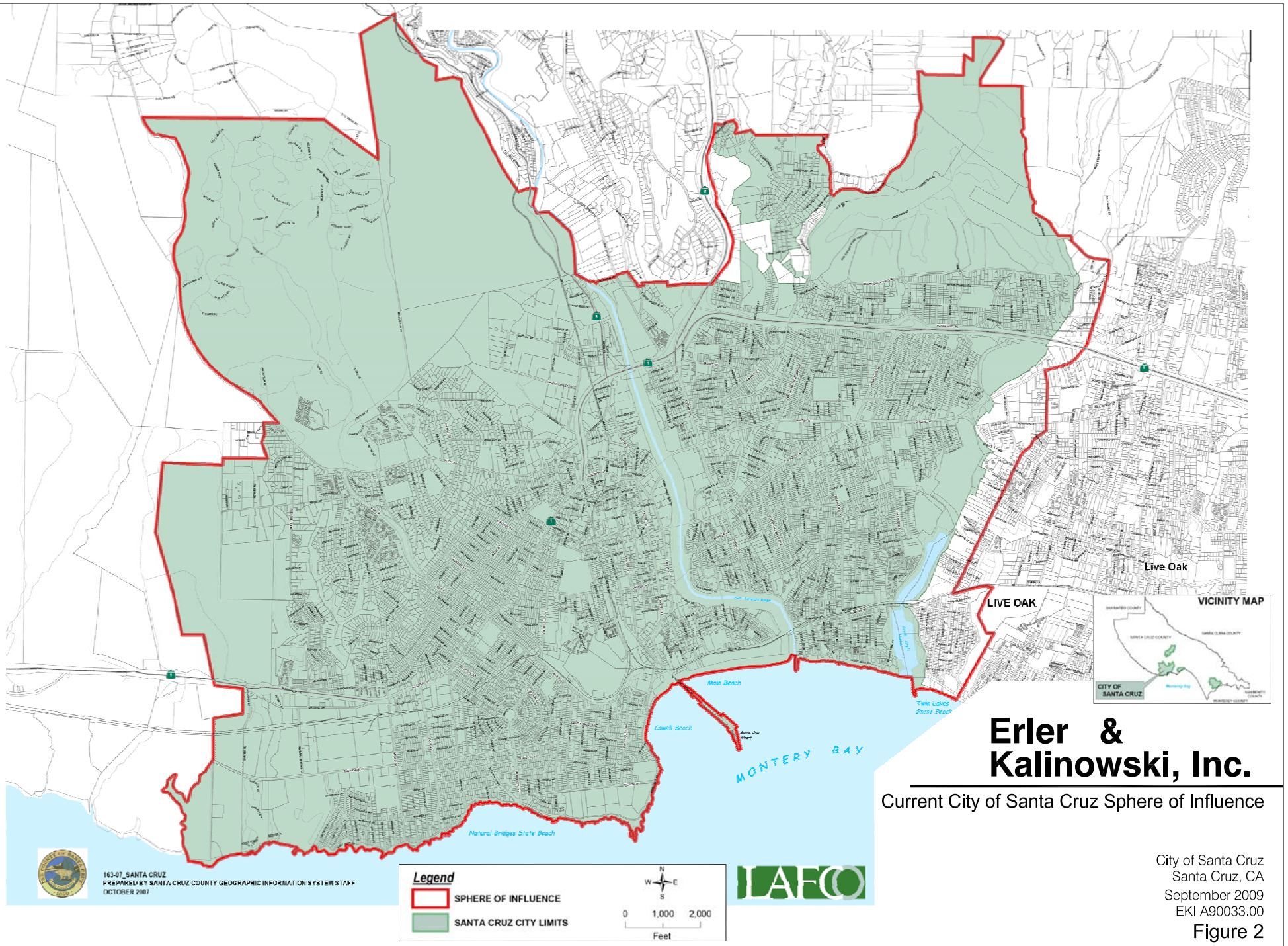
1 Santa Cruz, 2006. 2005 Urban Water Management Plan, dated February 2006.

2 Santa Cruz, 2009. Personal communication with staff from the City's water and planning departments and the City's Environmental Impact Report consultant.

3 AMBAG, 2009. Monterey Bay Area 2008 Regional Forecast. Population, Housing Unit and Employment Projections for Monterey, San Benito and Santa Cruz Counties to the Year 2035.

Figures


Application to Amend a Sphere of Influence City of Santa Cruz September 2008
Proposed Change Area
Proposed Change
Pogonip
UCSC
City of Santa Cruz
Monterey Bay
SEVEN SPRINGS TRAIL
SEVEN SPRINGS RANCH RD
KAMAUR LN
LLAMA RANCH LN
EMPIRE GRADE
EL REFUGIO WY
CAVE GULCH RD
WEST RD
CHINQUAPIN RD
WEST LOOP
NORTH FUEL BREAK RD
RED HILL RD
FUEL BREAK RD
SPRING RD
YORK AV
ROYAL ARCH RD
HIRAM RD
STATE HWY 9
LEONARDO LN
HELLER DR
LICK LN
QUARRY RD
EAST RD
ENGINEERING LOOP
COLLEGE 10 RD
MCLAUGHLIN DR
CROWN LN
KRESGE LOOP
UCSC
STEINHART WY
DRIVEWAY
HAHN CT
HAGAR DR
WEST RD
Assessors Parcels
Existing Sphere of Influence
Proposed Sphere of Influence
Proposed Change Area
City Limit
Abbreviations:
UCSC = University of California at Santa Cruz
N
0 250 500 1,000 Feet
Pogonip
Erler & Kalinowski, Inc.
Sphere of Influence Amendment Area
City of Santa Cruz
Santa Cruz, CA
September 2009
EKI A90033.00
Figure 1
Source: City of Santa Cruz
G:\A90033.00\Sep09\Figure 01 - Sphere of Influence Amendment Area.dwg 9-08-09

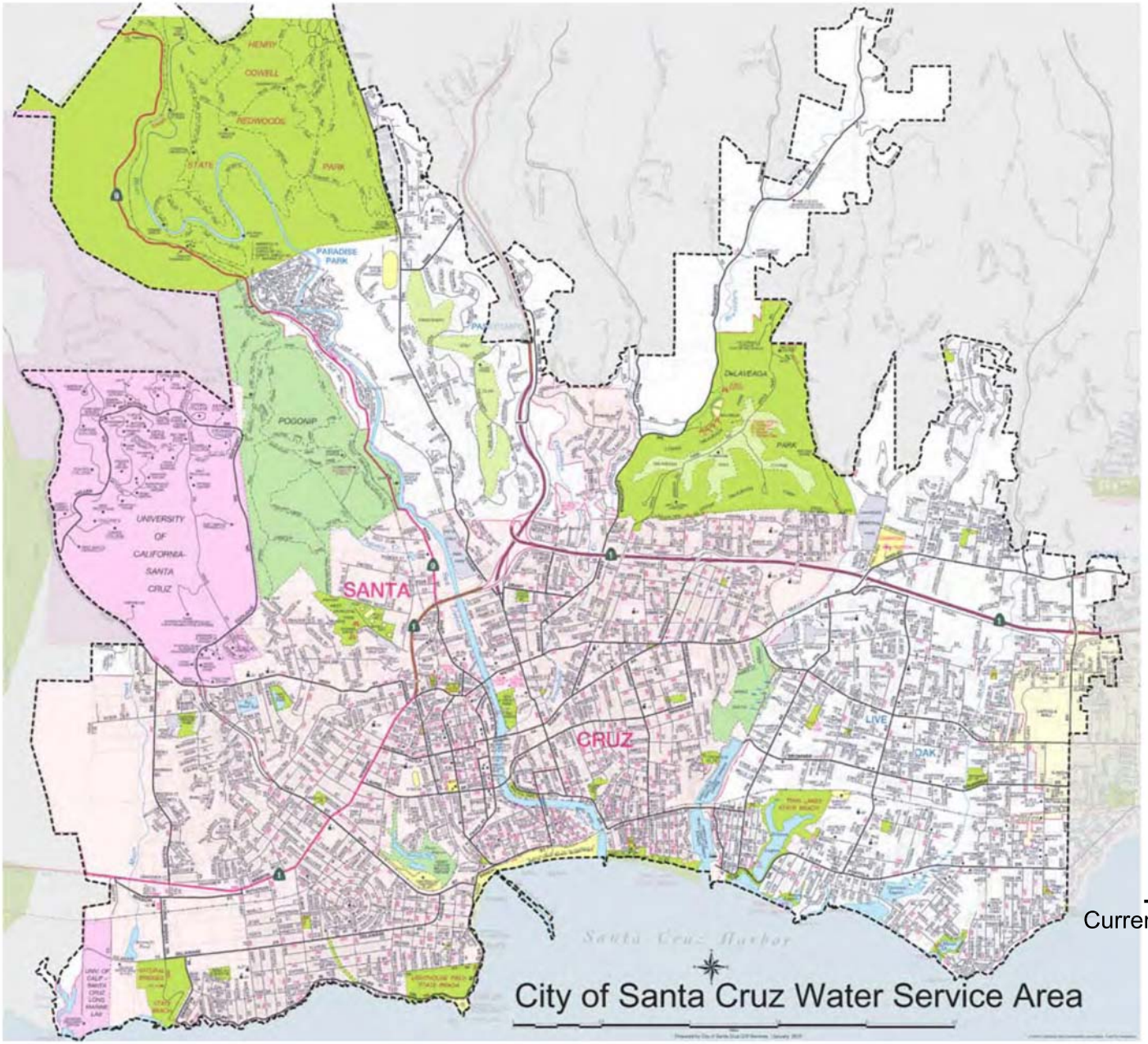


Erler & Kalinowski, Inc.

Current City of Santa Cruz Sphere of Influence

City of Santa Cruz
Santa Cruz, CA
September 2009
EKI A90033.00
Figure 2

G:\A90033.00\Sep09\Figure 02 - LAFCO.dwg 9-08-09



Legend:

Water Service Area

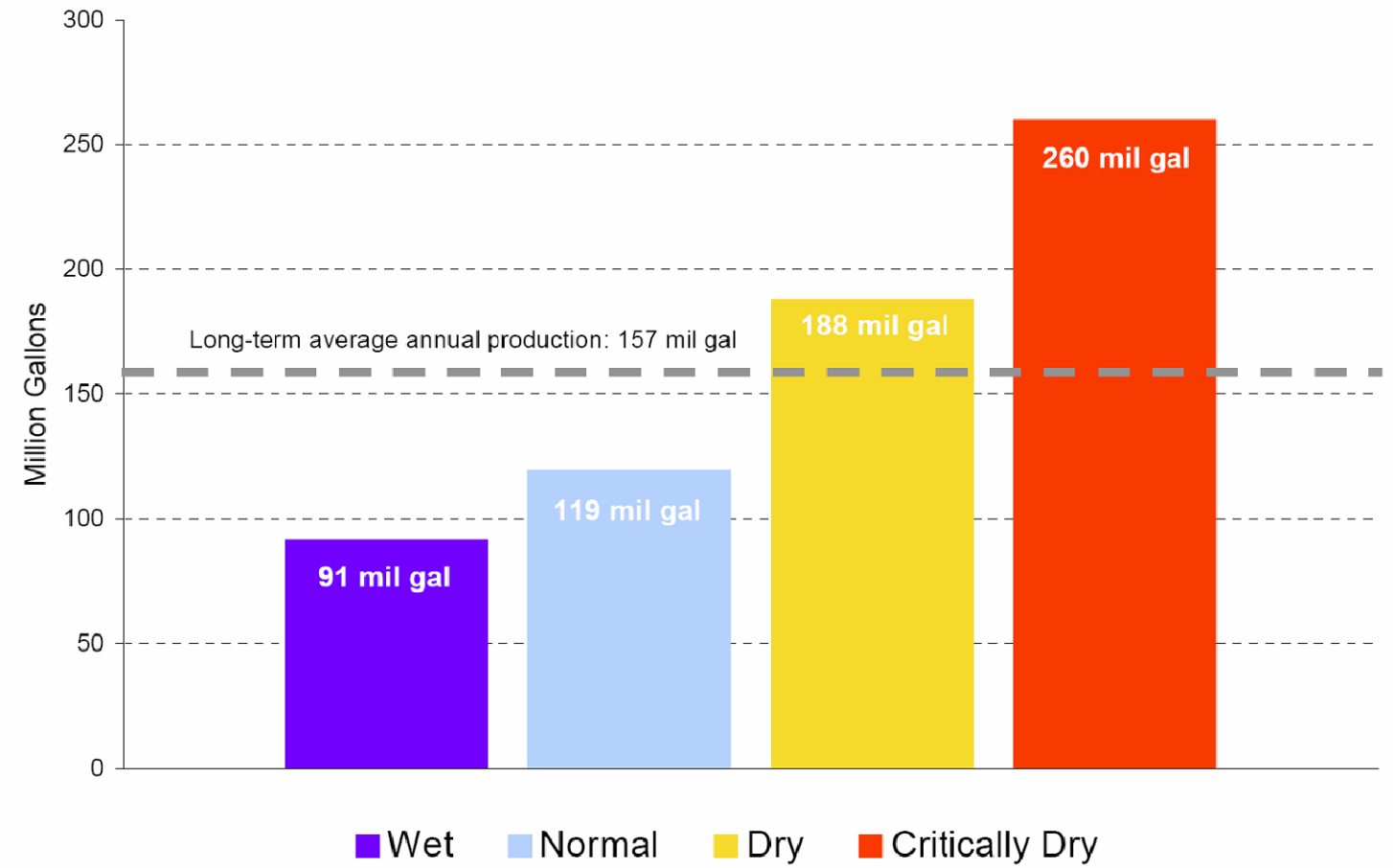
Source: 2005 Urban Water Management Plan; prepared by the City of Santa Cruz, dated February 2006.

Erler & Kalinowski, Inc.

Current City of Santa Cruz Water Service Area

City of Santa Cruz
Santa Cruz, CA
September 2009
EKI A90033.00
Figure 3

G:\A90033.00\Sep09\Figure 03 - Current City of Santa Cruz Water Service Area.dwg 9-08-09



Source: 2005 Urban Water Management Plan; prepared by the City of Santa Cruz, dated February 2006.

Note:

Long-term annual average production is a 32-year average from 1972 to 2003.

Erler & Kalinowski, Inc.

Historical Groundwater Production
by Water Year Type

City of Santa Cruz
Santa Cruz, CA
September 2009
EKI A90033.00
Figure 4

G:\A90033.00\Sep09\Figure 04 - Historical Groundwater Production.dwg 9-08-09

Appendices

Appendix A

Comprehensive Settlement Agreement

COMPREHENSIVE SETTLEMENT AGREEMENT

This Settlement Agreement ("Agreement") is entered into this 15th day of August 2008, by and between the City of Santa Cruz ("City"), the County of Santa Cruz ("County"), The Regents of the University of California ("Regents") and the University of California, Santa Cruz Campus (the "Campus") (collectively, the "University"), Coalition for Limiting University Expansion ("CLUE"); Don Stevens, Peter L. Scott, Hal Levin, Jeffrey M. Arnett, Harry D. Huskey, Kaye Beth, Eric M. Grodberg, Sigrid McLaughlin, John C. Aird, Russell B. Weisz, Helen B. Dowling, and Rural Bonny Doon Association.

RECITALS

WHEREAS, the City, County and University are governmental agencies that have distinct jurisdictions with overlapping property boundaries in Santa Cruz County, California; and

WHEREAS, CLUE is a non-profit organization of City and County residents interested in and concerned with University growth plans; and

WHEREAS, on September 21, 2006, The Regents approved the 2005 Long Range Development Plan ("LRDP") for the Santa Cruz Campus (the "2005 LRDP") and in conjunction therewith, also certified a Final Environmental Impact Report (the "2005 LRDP EIR"), thereby superseding and replacing the Campus' LRDP approved by The Regents in 1988; and

WHEREAS, on October 23, 2006, petitions for writ of mandate challenging the 2005 LRDP and 2005 LRDP EIR were filed in Santa Cruz Superior Court by the City and County (Case No. CV155571), and Don Stevens, Peter L. Scott, Hal Levin, Jeffrey M. Arnett, Harry D. Husky, Kaye Beth, Eric M. Grodberg, Sigrid McLaughlin and John Aird (Case No. CV155583) (collectively, "Stevens, et al.")(collectively Case No. CV155571 and Case No. CV155583 are referred to herein as the "LRDP Actions"); and

WHEREAS, on January 16, 2007, The Regents approved the Biomedical Sciences Facility Project (the "Biomed Project"), and in conjunction therewith, adopted a Mitigated Negative Declaration tiered from the 2005 LRDP EIR (the "MND"); and

WHEREAS, on February 20, 2007, petitions for writ of mandate challenging the Biomed Project and MND were filed in Santa Cruz Superior Court by the City and County (Case No. CV156366, and Coalition to Limit University Expansion, Don P. Stevens, Peter L. Scott, Hal Levin, Jeffrey M. Arnett, Harry D. Huskey, Kaye Beth, Eric M. Grodberg, Sigrid McLaughlin,

John C. Aird, Russell B. Weisz, Helen B. Dowling, and Rural Bonny Doon Association (Case No. CV156371) (collectively, "CLUE, et al.") (collectively Case No. CV156366 and Case No. 156371 are referred to herein as the "Biomed Actions");

WHEREAS, the Santa Cruz Superior Court granted in part and denied in part the petitions in the LRDP Actions and the Biomed Actions; and

WHEREAS, the City, County, University, CLUE, et al., and Stevens, et al. desire to settle all disputes between them with respect to the LRDP Actions and the Biomed Actions on the terms set forth herein.

NOW, THEREFORE, in consideration of the mutual covenants, agreements, representations, and warranties contained in this Agreement, and other good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the City, County, University, CLUE, et al., and Stevens, et al. agree as follows:

AGREEMENT

For as long as the 2005 LRDP is in effect:

1.0 ENROLLMENT

1.1 Full-time equivalent (FTE)[1] on-campus 3-qtr average (fall-winter-spring) enrollment (hereinafter referred to as "enrollment") for undergraduates will not exceed 17,500. In addition, for purposes of planning implementation of infrastructure development to accommodate enrollment growth, UCSC projects the following on-campus combined graduate and undergraduate enrollment levels:

a. 16,360 in academic year 2011-2012;

b. 17,615 in academic year 2015-2016; and

c. 19,480 in academic year 2020-2021.

[1] An FTE student is defined as (1) an undergraduate student who enrolls for 45 credit hours per academic year; or (2) a graduate student (master's level or doctoral student not yet advanced to candidacy) enrolled in 36 hours per year; or (3) a graduate doctoral student who has been advanced to candidacy. This does not include students at locations other than the City and County of Santa Cruz, including, but not limited to, UCSC's MBEST, Silicon Valley Campuses, UC programs in DC or Sacramento, or Education Abroad Programs.

1.2 In recognition that campus population growth may outpace implementation of infrastructure improvements contemplated under this Agreement and that UCSC's ability to meet its housing commitment is dependent on enrollment growth, the parties agree that upon execution of this Agreement:

a. UCSC will immediately initiate planning for on-campus housing on the west Campus;

b. The City and UCSC will immediately comply with the traffic commitments in Section 4.13 of this Agreement; and

c. UCSC has targeted new freshman enrollment growth until at least the commencement of the Fall 2009 Quarter to not exceed the Fall 2007 entering freshman class (3,730) (exclusive of transfer students).

1.3 As a means of enforcing UCSC's housing and water commitments herein, UCSC will adjust enrollment in the next Fall admissions cycle so as not to exceed, within a margin of error defined in Section 1.5 of this Agreement, the enrollment levels of the previous Fall admissions cycle, in the event of one or more of the following:

a. UCSC's housing commitment, described in Section 2.1 of this Agreement, is not met;

b. UCSC increases its water demands on the City water system during a City service area-wide moratorium on new connections because of a water supply emergency declared consistent with State Water law, as described in Section 3.2(a) of this Agreement.

1.4 If the traffic commitment in Section 4.1 is exceeded, the commitment will be enforced by requiring UCSC to reduce ADT by one or more of the following measures: adjusting enrollment, adjusting on-campus workforce, or through implementation of ADT reducing measure(s). The choice will be determined from this list by The Regents or its delegate. When UCSC main campus trips are within 1,500 of the applicable traffic commitment in Section 4.1, UCSC will hold a meeting to solicit public input regarding the choices listed above for the reduction of ADT. Within 90 days of the meeting, UCSC will initiate the process necessary to gain approval from The Regents or its delegate of its selected choice(s) for reduction of ADT. In addition, to further effectuate compliance and enforce the traffic commitment in Section 4.1,

UCSC agrees to a penalty payment in an amount equal to three times the City's citywide Traffic Impact Fee (TIF) then in effect for every average daily trip (ADT) in excess of the commitment (i.e., if the City's current citywide TIF were applied the penalty amount would be $1,098 per trip (3x $366)). Penalty payments will be made annually until such time as the ADT is equal to or below the traffic commitment in this Agreement. For purposes of calculating the penalty, ADT will be measured per 4.1 below. Penalty funds will be deposited into a dedicated account for use by the City and UCSC to reduce ADT to UCSC. UCSC and the City will work cooperatively to identify appropriate and effective trip reduction programs, including, but not limited to, increased SCMTD transit service to the UCSC campus, with the expenditure of funds being subject to approval by the City.

1.5 For purposes of 1.2(c) and 1.3, enrollment will be calculated within a 2% margin of error averaged prospectively over three years to account for the fact that the University admits students approximately six months prior to the start of the new fall term based on a projected "take rate" (i.e., the percentage of students that accept an offer of admission). In addition, retention/graduation rates fluctuate. Accordingly, enrollment may fall slightly above or below UCSC's projections within a 2% margin of error. Enrollment levels will be calculated based on the Fall third-week census. UCSC's commitment in 1.3 will take effect the next Fall admissions cycle and all subsequent Fall admissions cycles until the applicable commitment is met.

2.0 HOUSING

2.1 UCSC will provide housing capacity as follows:

a. For enrollment up to 15,000, UCSC will provide 7,125 beds.

b. Additional beds will be available to accommodate 67% of enrollment above 15,000, which equates to 3,000 new beds above the 7,125 beds if enrollment reaches 19,500. New beds will be provided by on-campus new construction, by remodeling or re-assignment resulting in a net increase in new on-campus beds, or through off-campus purchase or lease. An existing room designed as a double will not be converted to an unfilled triple room for the sole purpose of meeting the housing commitment under this Agreement. Except as provided in Section 2.1(d), beds will be available within four years of enrollment in excess of 15,000 until 2018 (i.e., housing in fall 2012 will be available for

67% of 2007-08 enrollment above 15,000). After 2018 and for as long as the 2005 LRDP is in effect, new beds will be available within 2 years of new enrollment growth.

c. UCSC's housing capacity commitment in Section 2.1(b) will be suspended (and its housing capacity commitment as reflected in the 2005 LRDP will be reinstated) for future projects (i.e., approved projects will be completed) in the event of one or more of the following:

i. UCSC's annual room and board rate is the highest and exceeds by 10% all other UC campuses as determined by the "UC On Campus Housing Rate Comparison", published annually by UC's Office of the President which presents a standardized systemwide comparable analysis sheet that presently reflects the cost at each campus for a residence hall room, double occupancy, 19 meals per week board plan, or equivalent;

ii. A legal action, or inaction by an agency, delays a proposal by UCSC for housing development in the North Campus, including, but not limited to, an action challenging a final decision by any agency with approval or permit authority necessary to construct the housing. UCSC commits to make reasonable efforts to expeditiously resolve the litigation.

d. The parties agree that UCSC will not be in violation of Section 2.1(b) or subject to the penalty in Section 1.3 in the event of, and for the time period of, any legal action, or inaction by an agency, including, but not limited to, an action challenging a final decision by any agency with approval or permit authority necessary to construct the housing, that delays a proposal by UCSC to timely fulfill its housing commitment. UCSC commits to make reasonable efforts to expeditiously resolve the litigation.

e. In the event UCSC's housing capacity commitment is suspended as provided for in Section 2.1(c), UCSC will provide written notification within 30 days to the City and County that (1) identifies the date on which the suspension commenced, and (2) the reason(s) for the suspension. On an annual basis following the initial notice of suspension and for as long as the suspension is in effect, UCSC will provide a report identifying the status of the suspension and any efforts by UCSC to end the suspension.

Further, UCSC will provide notification within 30 days of termination of the suspension period.

2.2. UCSC will annually provide, through public posting, its 5 year capital plan and a report on the status of construction and occupancy rates of student housing.

2.3. There will be an annual meeting to review UCSC, County, and City housing plans and capacity for the community workforce and campus affiliates.

2.4. UCSC housing may be accommodated on or off campus (in UC leased or owned property) provided that:

a. For purposes of satisfying the housing commitment in Section 2.1(b) UCSC will limit the number of new off-campus beds created in the City of Santa Cruz after the effective date of this Agreement to no more than 225 beds, which are in addition to the existing off-campus leased beds at UCSC Inn and University Town Center. The number of beds at UCSC Inn and University Town Center may be replaced by UCSC in the City of Santa Cruz without counting against the 225 if, upon expiration of the current lease period, UCSC does not renew the leases. Nothing in this subsection shall be construed to limit the University's ability to build more than 225 off-campus beds in the City of Santa Cruz provided that (i) the additional beds shall not be used to off-set UCSC's housing commitment in Section 2.1(b); (ii) the project is consistent with City zoning; (iii) UCSC first obtains the concurrence of the City; and (iv) UCSC arranges for alternative transportation modes from the project to the campus, if necessary. In the event the project is already readily served by public or other UCSC arranged transportation, no further transportation arrangements as provided for in (iv) shall be required; otherwise such alternative transportation shall be provided.

b. For each UCSC-owned or leased, off-campus student bed that results in a tax revenue loss to the City, the University will contribute funds/per bed to a Housing Impact Fund (HIF) (for July 2008 - June 2009 the HIF will be $199/bed, and in each subsequent University fiscal year will increase by 2%). Funds deposited into the HIF will be used by the City to directly support services serving UCSC's off-campus population, including, but not limited to, public safety, parks and recreation. Payments under this

Section will be made on or before October 1 of the first fiscal year in which UCSC adds new off-campus beds. UCSC will provide the City with an annual accounting of new off-campus beds for purposes of calculating the HIF.

2.5 UCSC will consult with the City, and after consultation, will provide the City with written notification of any intent to purchase property in the City.

2.6 UCSC agrees not to construct high-density off-campus housing in the City of Santa Cruz unless consistent with the City's zoning.

2.7 To assist UCSC in achieving its on-campus housing capacity commitment, the parties agree to the following:

a. The City currently provides water service to UCSC through five (5) connections, the most northern of which is north of the City's limits and was installed by the City in 1973. The City will continue to provide water service to the Campus through the five existing connections, and UCSC may use the water to support development implementing the 2005 LRDP, including the development of housing in the North Campus, consistent with the other provisions of this Agreement.

b. The parties will not oppose housing development west of Porter College as analyzed in the Draft 2005 LRDP EIR (necessary to timely achieve new housing commitment). Housing development in the area west of Porter College shall be initiated before development of new bed spaces in the North Campus Area.

c. The City agrees to propose and enforce City-wide ordinance(s) or municipal code(s) to regulate residential rental properties including, but not limited to, boarding, lodging, or rooming houses. In the event the City does not enact such legislation within two years of the approval of this agreement, UCSC's housing capacity commitment set forth in Section 2.1b above shall be reduced by 450 beds. The City, in consultation with UCSC, further agrees to review within three years of the effective date of this Agreement any such City-wide ordinance(s) or municipal code(s) for effectiveness in regulating residential rental properties and, if necessary, to consider revisions.

2.8 UCSC will apply to LAFCO for extraterritorial water and sewer services (for the development of 3,175,000 gross square feet of additional building space under the 2005 LRDP for

the service area below the line identified on the map attached hereto as Exhibit A) from the City of Santa Cruz on the following conditions:

a. The City, County, CLUE, et al. and Stevens, et al., do not object to UCSC's reliance on the 2005 LRDP EIR except as provided in subsection 2.8(b), 2.8(d), 2.8(e), and 2.8(f), below, and/or the City's Integrated Water Plan EIR, or on any applicable CEQA exemption, in support of its LAFCO application, if necessary; and

b. Pursuant to the requirements of Government Code Section 56425, et seq., the City's Sphere of Influence is amended to include the areas designated in the 2005 LRDP presently exclusively within the County limits (as identified in the map attached hereto as Exhibit A), concurrently with the University's application to LAFCO. Pursuant to Government Code Section 56425, et seq., the City and County will negotiate an agreement for the Sphere of Influence amendment to include the area below the line identified on the Exhibit A map. This agreement shall be submitted as part of the City's proposed Sphere of Influence amendment concurrent with UCSC's LAFCO application. UCSC shall initiate its LAFCO application concurrently with the City's proposed Sphere of Influence amendment on or before October 28, 2008, unless an extension of the application date is mutually agreed to by the City and UCSC. In the event the City's Sphere of Influence is not amended or a legal action challenging the amendment is filed, UCSC retains the ability to assert any and all rights or legal positions regarding its ability to develop the North Campus including, but not limited to, the applicability of an exemption or immunity from LAFCO's jurisdiction. Notwithstanding the foregoing, all parties retain the right to assert any and all legal claims or positions regarding any LAFCO decision or UCSC's ability to develop the North Campus; and

c. The City and County provide UCSC with all documentation identified or required by LAFCO as necessary to complete UCSC's application, including, but not limited to, a will serve letter, and will communicate to LAFCO that they do not oppose UCSC's application; and

d. CLUE, et al. and Stevens, et al. reserve the right to participate in the LAFCO proceedings (including raising all issues they feel appropriate), and to file a legal

action challenging any final LAFCO decision. The parties agree and acknowledge that UCSC's application to LAFCO shall not be construed as an admission, presumption or inference of admission, or concession by UCSC that it is subject to LAFCO's jurisdiction and that UCSC retains the right to assert any and all legal claims or positions regarding the applicability of an exemption or immunity from LAFCO's jurisdiction over UCSC, or to assert any other defenses, in the event LAFCO denies UCSC's application, conditionally approves the application on terms that are unacceptable to UCSC, or a legal action against LAFCO approval of the application is filed. Likewise, the City, the County, CLUE, et al. and Stevens, et al. retain their rights to assert that the University is subject to LAFCO's jurisdiction for any development outside the City's boundaries irrespective of the outcome of the University's application to LAFCO; and

e. In the event a legal action challenging LAFCO's decision is filed, UCSC's housing commitments shall be suspended during the time it takes for the legal action to be resolved and UCSC may assert its rights to develop the area north of the main campus and outside the City's jurisdictional limits (North Campus). Notwithstanding the foregoing, all parties retain the right to assert any and all legal claims or positions regarding UCSC's ability to develop the North Campus including, but not limited to, LAFCO's decision. If a final judicial determination upholds a LAFCO approval or reverses a LAFCO denial of the application, the housing commitment, if suspended, will be reinstated, and the provisions of Section 2.1(d) shall apply. If a final judicial determination upholds a LAFCO denial or reverses a LAFCO approval of the application so that the University is unable to develop in the North Campus area identified in the attached map, UCSC is excused from the housing commitment in this Agreement and its housing capacity commitment in the 2005 LRDP will be reinstated. The housing commitment will be reinstated if the University is able to obtain legislative or any other legal authority to develop in the North Campus area, irrespective of the LAFCO approval process, and the provisions of Section 2.1(d) shall apply.

f. In the event LAFCO denies UCSC's application, conditionally approves the application on terms that UCSC determines in good faith are unacceptable, delays more than 18 months from the date UCSC makes its initial application in making a decision, the

City fails to amend its Sphere of Influence, or LAFCO otherwise terminates UCSC's application, the City, County, CLUE, et al. and Stevens, et al. agree that UCSC may assert its rights to develop in the North Campus. Notwithstanding the foregoing, all parties retain the right to assert any and all legal claims or positions regarding UCSC's ability to develop the North Campus including, but not limited to, LAFCO's decision.

g. The parties further agree that Section 2.8 of this Agreement does not change, alter, amend, or otherwise supersede the 1962 and 1965 contracts for water and sewer service between the City and County and The Regents.

2.9 In recognition of City-wide zoning, building and municipal code violations in the City's residential neighborhoods attributable to deficient landlord oversight of rental housing (UC and non-UC affiliated), the City and UCSC agree to jointly and equally fund through 2013 a pilot program for two City Code enforcement positions as a means of improving rental property safety and standards. The pilot program will be reviewed after the first 3 years. After review and mutual agreement, the program may be modified. UCSC's commitment to fund its 50% share of the program will not accrue until the City enacts and enforces City-wide ordinance(s) or municipal code(s) consistent with Section 2.7(c), above.

2. 10 The City agrees to incorporate the housing elements of this agreement in its 2008-2009 Housing Element update and the City's update to the General Plan.

3.0 WATER

3.1 For every increment of 85,000/gallons of water used over 206 MGY (2005 LRDP baseline year for the UCSC main campus, each incremental payment resets the baseline), UCSC will contribute funds to the City as follows:

a. The University will pay a fee equivalent to the City's System Development Charges ("SDC's") for Equivalent Residential Units ("ERU") in its service area at the rate in effect on the date of payment (currently $6,530 per ERU (85,000 gallon increment)). The parties acknowledge that the SDC rate is adjusted by the City from time to time in accordance with the procedural and substantive requirements of the Mitigation Fee Act, California Government Code Sections 66000 et seq. It is the intention of the parties that the amount of UCSC's SDC equivalent payments will be proportionate to UCSC's share of

use of City developed new water source capacity. The parties acknowledge that this SDC payment term was negotiated and agreed to pursuant to Government Code Section 54999.3(b) and was based on the factors identified in the document entitled "Water Assumptions", attached hereto as Exhibit B and incorporated by reference into this Agreement.

b. The parties agree that UCSC's payment of the fee does not change, modify, or alter the 1962 and 1965 Contracts. UCSC's payment commitment under Section 3.1(a) will remain in effect until such time as a new LRDP is approved for UCSC.

c. The parties agree that payment constitutes UCSC's contribution to finance construction of public facilities needed to serve UCSC's water demands in non-drought years on the main campus (Marine Science Campus payments are governed by the Water System Connections/Construction Agreement, dated May 1997). UCSC pays existing water rates which include development of water supply for drought conditions.

d. The parties acknowledge the City's intention to implement its Integrated Water Plan, including additional water conservation, use curtailment in droughts, and construction of a desalination plant.

3.2 City agrees to treat UCSC as it would any other developer with regard to the remaining excess water supply capacity (300 MGY as estimated by City in 2007) as follows:

a. Except with regard to any UCSC housing projects under development, if the City establishes a service area-wide moratorium on new connections because of a water shortage emergency condition under State Water law, UCSC will not increase its water demands on the City water system from any University-owned properties, including the main campus, 2300 Delaware, and the Marine Sciences Campus, while the moratorium remains in effect. Leased properties will abide by regulations that affect property owners.

b. UCSC will comply with any service area-wide water restrictions or mandatory use curtailment imposed by the City in response to a declaration of water shortage emergency condition under State Water law on the following terms:

i. The City agrees that its Water Conservation staff will meet with University staff to discuss the University's water allocations prior to the effective

date of any use curtailment set in accordance with an approved final City Use Curtailment Plan and will accurately correlate the campus uses as much as possible (e.g., campus use allocations for student, faculty and staff housing will reflect the same use curtailment set by the City for its multi-family residential water customers, etc.)

ii. The parties recognize that UCSC's existing and future water demand is for (a) domestic and sanitation uses related to on-campus student and faculty/staff residences, classrooms, and business and support buildings; (b) research facilities; (c) fire protection; and (d) irrigation, and acknowledge that UCSC's unaccounted for water use (e.g., from submeter error, unmetered use, etc.) was less than 7.5% in 2006.

3.3 UCSC agrees that within 5 years of execution of this Agreement it will have implemented all high priority conservation measures recommended by the 2007 engineering audit of campus water use. UCSC's high priority conservation measures are identified in Table 19 of UC Santa Cruz's Water Efficiency Survey (12/2007), attached hereto as Exhibit C.

3.4. For infrastructure improvements required to serve the campus and not included in the City's SDC program, UCSC will contribute its proportionate share of the non-rate funded costs for those improvements according to the previously negotiated 1998 cost-sharing agreement.

3.5 There will be an annual meeting to review the City's plans for implementing additional water supply projects.

3.6 The City will review with UCSC the basis for its sewer service charge.

4.0 TRAFFIC

4.1 UCSC agrees to not exceed 28,700 ADT to the main campus (24,800 ADT 2005 LRDP baseline + 3,900 new ADT) for as long as the 2005 LRDP is in effect. Compliance will be monitored by arriving at an ADT through weekday (Monday – Friday) traffic volume counts at the two campus entrances for at least two weeks beginning on the fourth week of Fall and Spring quarter (when school is in session for the entire week) of each corresponding calendar year.

a. The parties agree that the traffic commitment in Section 4.1 will be increased by 1,300 ADT to a total of 30,000 ADT and that the penalty provisions of Section 1.4 will not apply in the event UCSC is prohibited from developing the North Campus area as identified in the attached map (e.g., a final judicial determination prohibits North Campus development) or the City fails to amend its Sphere of Influence. UCSC agrees to make additional ADT payments associated with an ADT increase of 1,300 under this section based on the citywide TIF fee schedule then in effect (currently $377/trip).The parties acknowledge and agree that 30,000 main campus ADT is 100 ADT lower than estimated by the City for UCSC in its current TIF program.

b. The parties further agree that UCSC will not be in violation of the applicable traffic commitment or subject to the penalty provisions in Section 1.4 in the event of, and for the time period of, one of more of the following:

i. a legal action, or inaction by an agency with approval or permit authority necessary to construct the housing project delays a proposal by UCSC to timely fulfill its housing commitment pursuant to Section 2.1. UCSC commits to make reasonable efforts to expeditiously resolve the litigation;

ii. implementation of an ADT-reducing project not identified in this Agreement is delayed as a result of a legal action or inaction by an agency with approval or permit authority necessary to construct the ADT-reducing project, upon the concurrence of the City.

c. The parties agree that UCSC's ability to meet the applicable traffic commitment in this Section 4.1 requires the City, County and SCMTD to continue existing services and provide transportation enhancements.

d. Should temporary conditions arise that result in anomalous or erroneous weekday ADT measurements (i.e, bus strike, hose counter failure, etc.), as described in Section 4.1, then efforts will be made to re-collect reliable and appropriate data within one month of the initial traffic counts.

e. Should SCMTD transit service to the main campus (excluding Supplemental

services provided under the "guaranteed cost" clause of the UCSC/SCMTD contract) be reduced from 2007-08 service hours or capacity, then the commitment in Section 4.1 will be suspended until regular transit service levels to the main campus are restored.

f. In the event UCSC's traffic commitment is suspended as provided for in Sections 4.1(b) and 4.1(e), UCSC will provide written notification within 30 days to the City and County that (1) identifies the date on which the suspension commenced, and (2) the reason(s) for the suspension. On an annual basis following the initial notice of suspension and for as long as the suspension is in effect, UCSC will provide a report identifying the status of the suspension and any efforts by UCSC to end the suspension. Further, UCSC will provide notification within 30 days of termination of the suspension period.

g. Should SCMTD transit service to the main campus (excluding Supplemental services provided under the "guaranteed cost" clause of the UCSC/SCMTD contract) not increase in proportion to campus population growth such that it accommodates at least 25% of all trips to and from UCSC (reflective of 2007-2008 conditions) and UCSC continues to pay the cost of its SCMTD ridership, the applicable ADT commitment will be increased by applying an ADT credit. The ADT credit will be equivalent to 50% of the difference between a calculated 25% UCSC SCMTD mode split (measured in person trips) and the actual UCSC SCMTD mode split (measured in person trips).

h. The parties acknowledge and agree that alternative transportation modes and/or transit services may change over time as a result of technological, financial or other conditions, and to the extent such changes result in a significant shift in current modes, and as such the parties agree that elements of this proposal, by written notice by any party to this agreement, will be revisited and revised, as necessary, and subject to the mutual agreement of the City and UCSC. The parties will attempt to resolve disputes arising pursuant to this section by mediation.

i. The parties agree that the commitments in Section 4.1 are made for the sole and exclusive purpose of settlement and in recognition of access constraints unique

to the UCSC main campus. These constraints include: campus access dependence upon two arterial roadways (Bay Street and Empire Grade) and two collector roads (High Street and Western Drive) traversing residential neighborhoods; an incomplete roadway network as envisioned in the original campus planning; the absence of any direct campus access route from State Route 9 or Highway 1; reliance on only two entrance gates to the main campus; State and City parklands and open space adjacency that surrounds the main campus on three sides; and the geographic and topographic distance of the main campus from commercial service areas within the City.

4.2 Within three months from the approval of this Agreement, UCSC agrees to contribute funds in an amount equal to the City's TIF in three consecutive annual payments for off-site traffic improvements for the 3,900 new ADT in Section 4.1, above. UCSC acknowledges that the TIF is revised annually on July 1, based on the Engineering News Record Cost of Construction index, and that as a result, each annual payment will be calculated by the current TIF rate at the time of payment. At its discretion, UCSC may make a one-time payment of $1,427,400 within 15 days of entry of the Agreement as a final judgment, as provided for in Section 7.1. Funds contributed to the City under this section will constitute UCSC's share of the cost of improvements to the Bay Corridor between Mission and High, including improvements to the Bay/Mission and Bay/Escalona intersections and any other intersections identified in the City's TIF program to which UCSC contributes traffic. UCSC's payment is based on the City's 2007-2008 TIF and traffic model.

3,900 ADT x $366/trip = $1,427,400

Within three months of executing this Agreement, the City and UCSC will meet to identify TIF projects for immediate implementation. Identified and agreed upon improvements will be initiated by the City within one year.

4.3 The parties agree that UCSC's payment as set forth in Section 4.2 fulfills UCSC's "fair share" commitment in 2005 LRDP mitigation measure TRA-2A and the portion of TRA-5A that relies on TRA-2A for off-campus traffic impacts associated with campus ADT of 28,700.

4.4 UCSC agrees to make additional ADT payments associated with UCSC's 2300 Delaware property based on the City's methodology (20 trips per 1000 building gross square feet

based on office use) and citywide TIF fee schedule (currently $366 per trip). UCSC's payment for existing occupied gross square footage (gsf) at 2300 Delaware (Buildings A and B) is based on the City's 2007-2008 TIF and traffic model as represented by the following calculation:

57,223 gsf @ 20 ADT/1,000 sf = 1,144.45 ADT x $366/ADT = $418,868.70

If UCSC converts Buildings A and B to non-office use resulting in a higher trips per square foot rate, a further ADT payment will be made by UCSC provided that UCSC receives a credit for the above-payment towards any additional calculated TIF associated with the change in use. Payment for buildings A & B will be in addition to, and paid at the same time as, the amount to be paid in Section 4.2, above. Payment for ADT associated with building C or any other development on the 2300 Delaware site will be paid based on the City's methodology and citywide TIF fee schedule in effect at the time of occupancy. The City's TIF accounts for 2,068 total ADT from 2300 Delaware and UCSC's CEQA documentation for the project projected 1,780 total ADT at full build-out and occupancy of buildings A, B, and C.

4.5 UCSC agrees to make additional ADT payments associated with UCSC development at the Marine Science Campus, based on the City's methodology and citywide TIF fee schedule in effect at the time new development receives all required approvals. The City's TIF accounts for 3,120 total ADT from the Marine Science Campus and the University's CEQA documentation projected 2,600 total ADT at full implementation of the CLRDP. UCSC does not anticipate the first major trip generating project to be occupied until 2012.

4.6 The parties agree to the following to reduce peak hour traffic impacts and to reduce overall traffic volumes:

a. The City and UCSC will continue to work cooperatively with other Bus Rapid Transit Task Force members to develop BRT improvements and other alternative transit systems that have the greatest feasibility of reducing peak hour impacts and greatest potential to be funded and implemented. UCSC further agrees to:

i. Continue to fund the current study of BRT opportunities between the campus and downtown Pacific Station; this existing study to be completed in Fall 2008. This study will provide the information to prepare the operational analysis portion of an FTA application by SCMTD for "Very Small Starts"

funding corridor improvements.

ii. Commit to include its share of development and construction costs of an on-campus transit hub and related on-campus BRT improvements when calculating the total share/match for the FTA "Very Small Starts" application.

b. UCSC and the City will begin work immediately to mitigate existing and future peak hour traffic demand from UCSC facilities including signal synchronization studies and implementation, to be funded pursuant to Section 4.14, below.

c. UCSC will continue to work with the City and SCMTD to expand and enhance existing public transit service to UCSC facilities in advance of the BRT process (described in (a), above). Enhancements may include pilot projects, evaluated regularly for their effectiveness, such as:

i. "Limited Express" SCMTD service to the campus from downtown and outlying areas of Santa Cruz County funded under UCSC's "guaranteed cost" agreement with SCMTD;

ii. Implementation of electronic boarding passes for UCSC affiliates using SCMTD transit;

iii. On-going GIS analysis of UCSC residential patterns to identify opportunities for new or expanded SCMTD transit routes to and from the campus;

iv. Working with Caltrans to coordinate signal synchronization improvements to the Bay and Mission corridors.

d. UCSC will continue to implement and expand its existing Transportation Demand Management programs with the objective of increasing sustainable transportation modes (use of modes other than single-occupant vehicles) above 55% and to reduce peak hour traffic volumes and address increases in traffic overall.

4.7 UCSC will work cooperatively with the City to review, revise and maintain the City's traffic model following completion of the City's General Plan update. Based on the traffic model adopted as part of the City's General Plan update, UCSC's trip generation rates and distribution will be updated every three years. UCSC agrees to, at intervals of no more than

three years or increments of no more than 1,000 students in enrollment growth (whichever occurs first), conduct traffic counts at a mutually agreed number of intersections for the purpose of updating the City's traffic model and Traffic Impact Fee, because the model and additional TIF specified projects are required to accommodate the projected traffic demand.

4.8 UCSC agrees to contribute to the cost of implementing an Off-Campus Parking Permit Program (Upper Westside or potential programs on the lower Westside) in an amount up to $50,000 per year for a pilot period of three years, to be continued, revised, or reallocated by mutual consent.

4.9 UCSC has contributed $216,500 to the Mission Street widening project and agrees to contribute an additional $107,500 to the City, which has been in dispute. Payment will be made within 90 days of execution of this Agreement and the parties agree that the University's obligation under University Assistance Measure 7 is satisfied with this payment.

4.10 UCSC will pay 100% of the cost of Heller/Empire Grade Intersection Improvements at the UCSC west entrance. If UCSC develops an additional entrance/exit to/from the campus along Empire Grade, related intersection improvements will be funded 100% by UCSC. The scope of those improvements will be informed by the project and a CEQA analysis of the associated traffic impacts.

4.11 UCSC will pay 40% of the bid costs of Bay Street Repair project. If, during the term of the 2005 LRDP, Bay Street requires re-surfacing (asphalt over-lay) in addition to the repair described above according to industry standards, UCSC agrees to pay 40% of the re-surfacing costs only. Either party may initiate a study and propose an alternate percentage.

4.12 UCSC will pay 100% of the cost of improvements to the Marine Science Campus entrance at the intersection of Shaffer Road and Delaware Avenue, as well as improvements to Shaffer Road on UCSC property up to the new driveway to Upper Terrace development zone when development occurs in that zone. As identified in implementation measure 5.1.7 of the Marine Science Campus Coastal Long Range Development Plan, UCSC "will collaborate with the City of Santa Cruz on the construction of an emergency grade crossing" over the tracks.

4.13 Within ninety days of execution of this Agreement, the City and UCSC will meet to identify for immediate implementation transportation improvements that are not included in

the City's current TIF program or an integrated sequence of transportation studies to explore alternative transportation solutions. Identified and agreed upon improvements will be initiated, and studies will be commissioned, by the City within one year. For purposes of this Section, UCSC and the City each commit up to $500,000 (over a 3 year period) for a total of $1,000,000. Specific milestones and deliverables with which the phasing of funding will be tied will be agreed to by the City and UCSC. Study funds are to be used for appropriate consultant(s) to assist in defining realistic transportation solutions and trip reduction improvements. The City and UCSC have identified the following projects for implementation/study as a starting point for discussion:

a. A signal timing analysis and plan for Bay/Mission corridors;

b. Integration of signal pre-emption for SCMTD to allow SCMTD buses to move more quickly through intersections;

c. Expand SCMTD service to the campus including Express Bus service;

d. On-going GIS analysis of UCSC residential patterns to identify opportunities for new or expanded SCMTD transit routes to and from the campus;

e. Locate "Park and Ride" opportunities around/within City of Santa Cruz for UCSC Commuters;

f. Locate long-term "storage" parking areas for UCSC students; and

g. Expand existing ZipCar carshare programs.

4.14 UCSC and the City and CLUE shall make their best effort to jointly plan and implement a public transportation system capable of reducing the use of City streets and traffic congestion on City streets. Specific tasks of this planning effort (as far as financially feasible with available funds under this Section) will include, but not be limited to, identification of preferred technologies, routes and rights of way, and identification of probable ridership and financing. UCSC and the City will each commit $50,000 towards this effort.

5.0 FUTURE LRDP PROPOSALS

5.1 In recognition of the purpose and intent of Measures I and J, as adopted in November 2006, UCSC agrees that the next major amendment to the 2005 LRDP will include a

comprehensive analysis of potentially feasible alternative locations to accommodate proposed UCSC enrollment growth beyond that analyzed in the 2005 LRDP EIR (i.e., satellite campuses, remote-classrooms, etc.) as a means of assessing UCSC's ability to meet the State Mandate for Higher Education while taking into consideration City of Santa Cruz infrastructure including, but not limited to, transportation, water and housing.

6.0 IMPLEMENTATION OF THE 2005 LRDP

6.1 UCSC will continue to fund all warranted University Assistance Measures ("UAMs") from the 1988 LRDP. The 1988 LRDP EIR and subsequent CEQA documents based on the 1988 LRDP adopted 12 traffic-related UAMs – 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, and 19, six utility-related UAMs – 1, 2, 3, 4, 5, and 6, and one UAM related to baseline analysis – UAM 15. With regard to UAM implementation, all parties acknowledge and agree that:

a. UCSC has fulfilled its commitment to implement UAMs 2, 3, 4, 8, 11, 12, 13, 15, 17, and 18;

b. UAM 7 (Mission Street widening), UAM 12 (Heller/Empire signal) and UAM 14 (Bay Street resurfacing) are warranted and will be satisfied by Sections 4.9 through 4.11 of this Agreement, respectively;

c. UAMs 9 and 10 commit UCSC to contribute funds towards the development of an Eastern Access road and are not warranted;

d. UAM 1 (water system improvements) will be satisfied pursuant to Section 3.1 of this Agreement; UAM 16 and UAM 19 (fair share towards signalization of Storey/King and Bay/Escalona, respectively) are warranted, included in the City's TIF program, and will be satisfied upon UCSC's payment in Section 4.2 of this Agreement;

e. UAM 5 (sewer line upgrade) and UAM 6 (waste water plant upgrade) will be satisfied upon payment by UCSC of its proportional share of the cost of the upgrades necessary to serve the main campus, to be negotiated once final cost estimates are completed.

6.2 Except as provided for in this Agreement, for future projects under the 2005 LRDP, UCSC will not "tier" from or otherwise rely on the water or housing analysis in the

LRDP EIR invalidated by the Santa Cruz Superior Court to obtain CEQA compliance. All parties acknowledge that the Santa Cruz Superior Court did not invalidate the LRDP EIR's traffic analysis and that the Superior Court's decision regarding the adequacy of the LRDP EIR's traffic mitigation is resolved by this Agreement. Notwithstanding, UCSC agrees to perform additional traffic analysis, as set forth in Section 4.7.

6.3 UCSC agrees not to locate a Corporation Yard in the "Campus Support" designated area along Empire Grade north of the West Entrance (see Map from 2005 LRDP, attached as Exhibit A). If and when there is a proposal by UCSC for a bridge over Cave Gulch, UCSC commits to perform additional CEQA review and consider limiting the access to egress and emergency access only.

7.0 ENFORCEBILITY/EFFECT OF SETTLEMENT

7.1 The University, City, County, CLUE, et al., and Stevens, et al. agree to take all necessary actions to ensure that the Agreement will be made fully enforceable through its entry as a final judgment.

7.2 The University, City, County and CLUE, et al., agree that all legal challenges to the validity of the Biomed project and associated Mitigated Negative Declaration are fully and finally resolved to the satisfaction of the parties; that additional CEQA review is not required for the Biomed project approval; that the Biomed project approval is deemed final and effective; and that all legal challenges will be resolved and judgment entered consistent with Section 7.1.

7.3 The University, City, County, and Stevens, et al. agree that all legal challenges to the validity of the 2005 LRDP and associated LRDP EIR are fully and finally resolved to the satisfaction of all parties; that additional CEQA review is not required for the 2005 LRDP; that the 2005 LRDP approvals are deemed final and effective; and that all legal challenges will be resolved and judgment entered consistent with Section 7.1.

7.4 The parties agree that the purpose and intent of Measures I and J, as adopted by the City in November 2006, will be satisfied and fulfilled upon finalization of this fully executed settlement agreement for development consistent with the 2005 LRDP. The parties further agree that any additional action to effectuate the intent and purpose of Measures I and J is unnecessary provided that the parties fulfill their commitments under this Agreement.

7.5 The University agrees to dismiss, without prejudice, its legal challenge against the City and LAFCO regarding the 1962 and 1965 water contracts (Santa Cruz Superior Court Case No. CV155995). The University will also dismiss, with prejudice, its currently pending appeal on the issue of attorneys' fees in the Measures I and J litigation (Santa Cruz Superior Court Case No. 155136; Sixth District Court of Appeal Case No. H032405).

7.6 The County Board of Supervisors will rescind its resolution of June 26, 2007, authorizing staff to appeal UCSC THP/Conversion #1-07-062 SCR, and agrees not to appeal or file a legal action challenging any determination by the California Department of Forestry and Fire Protection regarding UCSC THP/Conversion #1-07-062 SCR. CLUE, et al. and Stevens, et al. agree not to file a legal action challenging any determination by the California Department of Forestry and Fire Protection regarding UCSC THP/Conversion #1-07-062 SCR.

7.7 Notwithstanding any determination of "prevailing party" or "successful party", UCSC has agreed to pay reasonable attorneys' fees and costs to the City in the amount of $350,000; to the County in the amount of $50,000; and to CLUE, et al. and Stevens, et al. in the amount of $375,000. The City further commits to pay CLUE, et al. and Stevens, et al. $15,889. Payment under this Section 7.7 will be made within 15 days of entry of the Agreement as a final judgment, as provided for in Section 7.1.

7.8 On or before November 1, 2008, the parties will agree to a format and mechanism for reporting compliance under this Agreement.

8.0 CITY/UCSC PARTNERSHIPS

8.1 UCSC obtained in 1964 a Use Tax Direct Payment Permit from the State of California [7/1/1964 SR ARE 26117705] and regularly prepares the required self-assessment report.

8.2 UCSC will, to the extent feasible and under applicable laws, request its construction contractors to allocate the local sales and use tax derived from construction contracts of $5 million or more to the local jurisdiction where the job site is located. Toward that end, the University will annually invite the City and its consultant(s) to provide materials for linking from a UCSC website as an informational resource for contractors engaged in projects at UCSC.

8.3 UCSC agrees not to renew its lease on the UCSC Inn when it expires in 2011.

UCSC does not intend to lease additional hotel bed space during the term of the 2005 LRDP. Should conditions change that intention, UCSC shall inform the City in writing and will obtain the City's consent prior to Master Leasing additional hotel bed space.

8.4 UCSC will discuss with the City the collection and payment by UCSC of Transient Occupancy Tax and an admissions tax on specified UCSC-sponsored events.

8.5 UCSC and the City will meet on a regular basis to explore opportunities for cooperation in the following areas: economic development, grants, public safety, parks and recreation, and neighborhood issues relating to UCSC.

9.0 GOOD-FAITH OBLIGATIONS

9.1 The City, County, University, CLUE, et al., and Stevens, et al. agree to cooperate fully, expeditiously, reasonably, and in good faith in the implementation of this Agreement; to execute any and all supplemental documents, and to take all additional lawful and reasonable actions, which may be necessary or appropriate to give full force and effect to the terms and to fully implement the goals and intent of this Agreement. The City, County, University, CLUE, et al., and Stevens, et al., also agree to exercise good faith, individually and through counsel, to work out any issues, misunderstandings, or disagreements that may arise with respect to the terms of this Agreement.

10.0 COMPREHENSION OF AGREEMENT

10.1 The City, County, University, CLUE, et al., and Stevens, et al. represent that in entering into this Agreement they have relied upon the legal advice of their attorneys, who are the attorneys of their own choice, and that the terms of the Agreement are fully understood and voluntarily accepted. This Agreement has been jointly drafted by the parties, and its provisions shall not be construed against either party on the basis of authorship.

11.0 GOVERNING LAW

11.1 This Agreement shall be construed and interpreted in accordance with the laws of the State of California.

12.0 NO ADMISSION OF LIABILITY

12.1 This Agreement is not an admission of liability by any party to this Agreement to the any other party or to any third party. It is the intent of the parties that this Agreement is a compromise of disputed claims.

13.0 AUTHORIZATION

13.1 The City, County, University, CLUE, et al., and Stevens, et al., hereby represent and warrant that the execution, delivery, and performance of this Agreement has been duly authorized by all necessary actions, and that the individuals who execute this Agreement on each party's behalf are duly authorized to do so.

14.0 ENTIRE AGREEMENT

14.1 This Agreement constitutes the entire understanding between the City, County, University, CLUE, et al., and Stevens, et al. Any other terms, promises, provisions, obligations or agreements by or between the parties shall be enforceable only as set forth in any other applicable written agreement. If any provision of this Agreement is held to be illegal, invalid or unenforceable, each party agrees that such remaining provisions shall be enforced to the maximum extent permissible so as to effect the intent of the parties, and the validity, legality and enforceability of the remaining provisions of this Agreement shall not in any way be affected or impaired thereby.

15.0 EFFECTIVENESS

15.1 This Agreement shall become effective upon full execution by the City, County, University, CLUE, et al., and Stevens, et al., which may occur in counterparts such that one or more signatures may appear on separate pages. The signatures of counsel may be provided through facsimile transmission.

COMPREHENSIVE SETTLEMENT AGREEMENT

IN WITNESS WHEREOF, the City, County, University, CLUE, et al., and Stevens, et al., have caused this Agreement to be executed as of the date last written below.

CITY OF SANTA CRUZ

By: _____

Date: 8.13.08

Approved as to form:

_____ 8-12-08

Counsel to the City of Santa Cruz

COUNTY OF SANTA CRUZ

By: _____

Date: _____

Approved as to form:

_____

Santa Cruz County Counsel

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

By: _____

By: _____

Date: _____

Approved as to form:

_____

Counsel to The Regents

COALITION FOR LIMITING UNIVERSITY EXPANSION

By: _____

By: _____

Date: _____

Approved as to form:

_____

Counsel to CLUE

RURAL BONNY DOON ASSOC.

By: _____

Date: _____

Approved as to form:

_____

Counsel to Rural Bonny Doon Assoc.

DON STEVENS

By: _____

Date: _____

Approved as to form:

_____

Counsel to Don Stevens

PETER L. SCOTT

By: _____

Date: _____

Approved as to form:

_____

HAL LEVIN

By: _____

Date: _____

Approved as to form:

_____

COMPREHENSIVE SETTLEMENT AGREEMENT

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By:_____

Date:_____

Approved as to form:

_____

Counsel to the City of Santa Cruz

COUNTY OF SANTA CRUZ

By:_____

Date: 8/12/08

Approved as to form:

_____

Santa Cruz County Counsel

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

By:_____

By:_____

Date:_____

Approved as to form:

_____

Counsel to The Regents

COALITION FOR LIMITING UNIVERSITY EXPANSION

By:_____

By:_____

Date:_____

Approved as to form:

_____

Counsel to CLUE

RURAL BONNY DOON ASSOC.

By:_____

Date:_____

Approved as to form:

_____

Counsel to Rural Bonny Doon Assoc.

DON STEVENS

By:_____

Date:_____

Approved as to form:

_____

Counsel to Don Stevens

PETER L. SCOTT

By:_____

Date:_____

Approved as to form:

_____

HAL LEVIN

By:_____

Date:_____

Approved as to form:

_____

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By: _____

Date: 8.13.08

Approved as to form:

8-12-08

Counsel to the City of Santa Cruz

COUNTY OF SANTA CRUZ

By: _____

Date: _____

Approved as to form:

_____

Santa Cruz County Counsel

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

By: _____

By: _____

Date: 8/15/08

Approved as to form:

Kelly L. Doro

Counsel to The Regents

COALITION FOR LIMITING UNIVERSITY EXPANSION

By: _____

By: _____

Date: _____

Approved as to form:

_____

Counsel to CLUE

RURAL BONNY DOON ASSOC.

By: _____

Date: _____

Approved as to form:

_____

Counsel to Rural Bonny Doon Assoc.

DON STEVENS

By: _____

Date: _____

Approved as to form:

_____

Counsel to Don Stevens

PETER L. SCOTT

By: _____

Date: _____

Approved as to form:

_____

HAL LEVIN

By: _____

Date: _____

Approved as to form:

_____

COMPREHENSIVE SETTLEMENT AGREEMENT

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CITY OF SANTA CRUZ

By: _____

Date: 8.13.08

Approved as to form:

_____ 8-12-08

Counsel to the City of Santa Cruz

COUNTY OF SANTA CRUZ

By: _____

Date: _____

Approved as to form:

_____

Santa Cruz County Counsel

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

By: _____

By: George R. Blumenthal

Date: 8/15/08

Approved as to form:

_____

Counsel to The Regents

COALITION FOR LIMITING UNIVERSITY EXPANSION

By: _____

By: _____

Date: _____

Approved as to form:

_____

Counsel to CLUE

RURAL BONNY DOON ASSOC.

By: _____

Date: _____

Approved as to form:

_____

Counsel to Rural Bonny Doon Assoc.

DON STEVENS

By: _____

Date: _____

Approved as to form:

_____

Counsel to Don Stevens

PETER L. SCOTT

By: _____

Date: _____

Approved as to form:

_____

HAL LEVIN

By: _____

Date: _____

Approved as to form:

_____

COMPREHENSIVE SETTLEMENT AGREEMENT

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CITY OF SANTA CRUZ

By:_____

Date:_____

Approved as to form:

_____

Counsel to the City of Santa Cruz

COUNTY OF SANTA CRUZ

By:_____

Date:_____

Approved as to form:

_____

Santa Cruz County Counsel

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

By:_____

By:_____

Date:_____

Approved as to form:

_____

Counsel to The Regents

COALITION FOR LIMITING UNIVERSITY EXPANSION

By: 8/6/08

By: Don Stevens 8-5-08

Date:_____

Approved as to form:

Counsel to CLUE

RURAL BONNY DOON ASSOC.

By:

Date: Aug. 5, 2008

Approved as to form:

Counsel to Rural Bonny Doon Assoc.

DON STEVENS

By: Don Stevens

Date: 8-5-08

Approved as to form:

Counsel to Don Stevens

PETER L. SCOTT

By:

Date: 8/5/08

Approved as to form:

HAL LEVIN

By:

Date: 5 August 2008

Approved as to form:

COMPREHENSIVE SETTLEMENT AGREEMENT

KAYE BETH

By: Kaye Beth

Date: August 11, 2008

Approved as to form:

Counsel to Kaye Beth

ERIC M. GRODBERG

By:_____

Date:_____

Approved as to form:

_____

Counsel to Eric M. Grodberg

SIGRID McLAUGHLIN

By:_____

Date:_____

Approved as to form:

_____

Counsel to Sigrid McLaughlin

JOHN C. AIRD

By:_____

Date:_____

Approved as to form:

_____

Counsel to John C. Aird

RUSSELL B. WEISZ

By:_____

Date:_____

Approved as to form:

_____

Counsel to Russell B. Weisz

HELEN B. DOWLING

By:_____

Date:_____

Approved as to form:

_____

Counsel to Helen B. Dowling

COMPREHENSIVE SETTLEMENT AGREEMENT

KAYE BETH

By:_____

Date:_____

Approved as to form:

_____

Counsel to Kaye Beth

ERIC M. GRODBERG

By:_____

Date:_____

Approved as to form:

_____

Counsel to Eric M. Grodberg

SIGRID McLAUGHLIN

By: Sigrid McLaughlin

Date: 8-10-08

Approved as to form:

Counsel to Sigrid McLaughlin

JOHN C. AIRD

By:_____

Date:_____

Approved as to form:

_____

Counsel to John C. Aird

RUSSELL B. WEISZ

By: Russell B. Weisz

Date: 8-11-08

Approved as to form:

Counsel to Russell B. Weisz

HELEN B. DOWLING

By: Helen B Dowling

Date: 8-11-08

Approved as to form:

Counsel to Helen B. Dowling

COMPREHENSIVE SETTLEMENT AGREEMENT

Counsel to Peter L. Scott

JEFFREY M. ARNETT

By:_____

Date: 8/05/2008

Approved as to form:

_____

Counsel to Jeffrey M. Arnett

Counsel to Hal Levin

HARRY D. HUSKEY

By:_____

Date: 8/5/08

Approved as to form:

_____

Counsel to Harry D. Huskey

KAYE BETH

By:_____

Date:_____

Approved as to form:

_____

Counsel to Kaye Beth

ERIC M. GRODBERG

By:_____

Date: 8/5/08

Approved as to form:

_____

Counsel to Eric M. Grodberg

SIGRID McLAUGHLIN

By:_____

Date:_____

Approved as to form:

_____

Counsel to Sigrid McLaughlin

JOHN C. AIRD

By:_____

Date: 8/5/08

Approved as to form:

_____

Counsel to John C. Aird

RUSSELL B. WEISZ

By:_____

Date:_____

Approved as to form:

_____

Counsel to Russell B. Weisz

HELEN B. DOWLING

By:_____

Date:_____

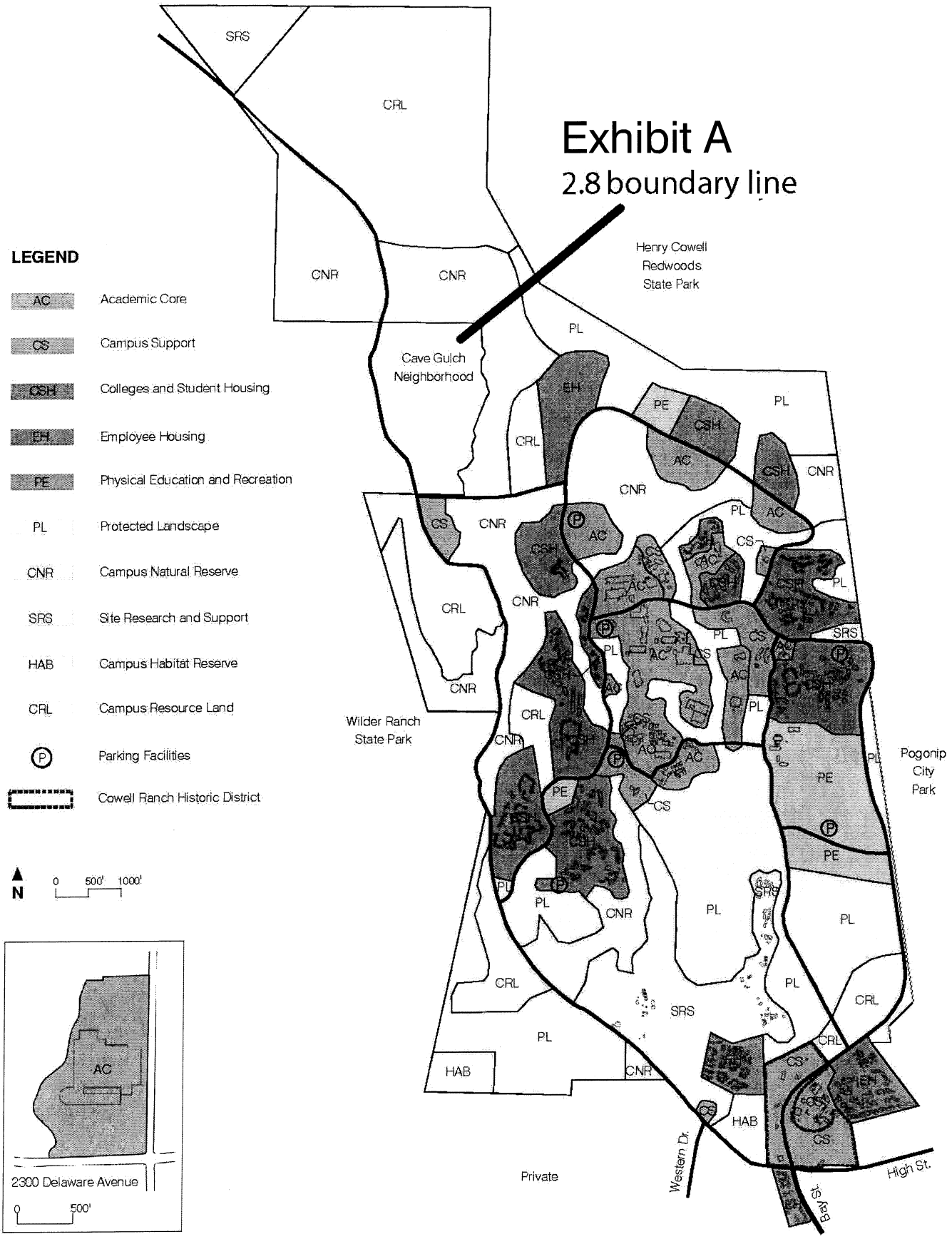
Approved as to form:

_____

Counsel to Helen B. Dowling

Exhibit A

2.8 boundary line



UNIVERSITY OF CALIFORNIA, SANTA CRUZ
LONG-RANGE DEVELOPMENT PLAN 2005-2020
SEPTEMBER 2006

LAND-USE MAP

EXHIBIT B

Water Assumptions

The parties agree that the provisions of section 3.1a are based on the understanding that at the conclusion of the pilot study phase of the desalination plant, the Santa Cruz City Water Department (SCCWD) intends to pursue the phased incremental implementation of a desalination plant on the Westside of Santa Cruz. The parties further agree that the assumptions related to the scope and nature of all phases of the desalination plant are as follows:

Phase One

1. The design of Phase One is presently contemplated to provide water during drought conditions as follows:
    a. roughly 90 % to accommodate existing demand (subsequent to imposed conservation restrictions);
    b. and roughly10 % to accommodate foreseeable growth between now and when the plant is complete.

2. Water rates from existing customers will fund roughly 90 % of system improvements, including Phase One, related to existing demand.

3. System Development Charges (SDC) from future developers and UCSC will fund roughly 10 % of the costs related to foreseeable growth.

4. Future SDCs may be increased to cover escalation in construction costs and other water system improvements necessary to accommodate growth in demand.

5. SCCWD's existing water rates and SDCs have been set on a suite of system improvements that includes, among other things, a desalination plant with a budget forecast of around $40 million for Phase One and project soft costs, including financing.

6. The water rates and SDCs may be adjusted upwards to reflect refinements to the scope and escalating cost of Phase One. It is unlikely that construction costs for Phase One would escalate more than double the current budget forecast.

7. SCCWD anticipates a cost sharing agreement with the Soquel Water District at about a 50% share of the cost of Phase One. In the event the Phase One budget is double the forecast this cost sharing agreement would help offset the increased cost and current rate and SDC charges could be maintained at roughly their current levels.

Phase Two (and subsequent phases)

1. Phase Two and subsequent phases would be implemented to accommodate future growth in system demand.

2. Phase Two expansion (and potential future phases) would be accommodated by adding pumps and modular filtration membranes to the then existing Phase One facility.

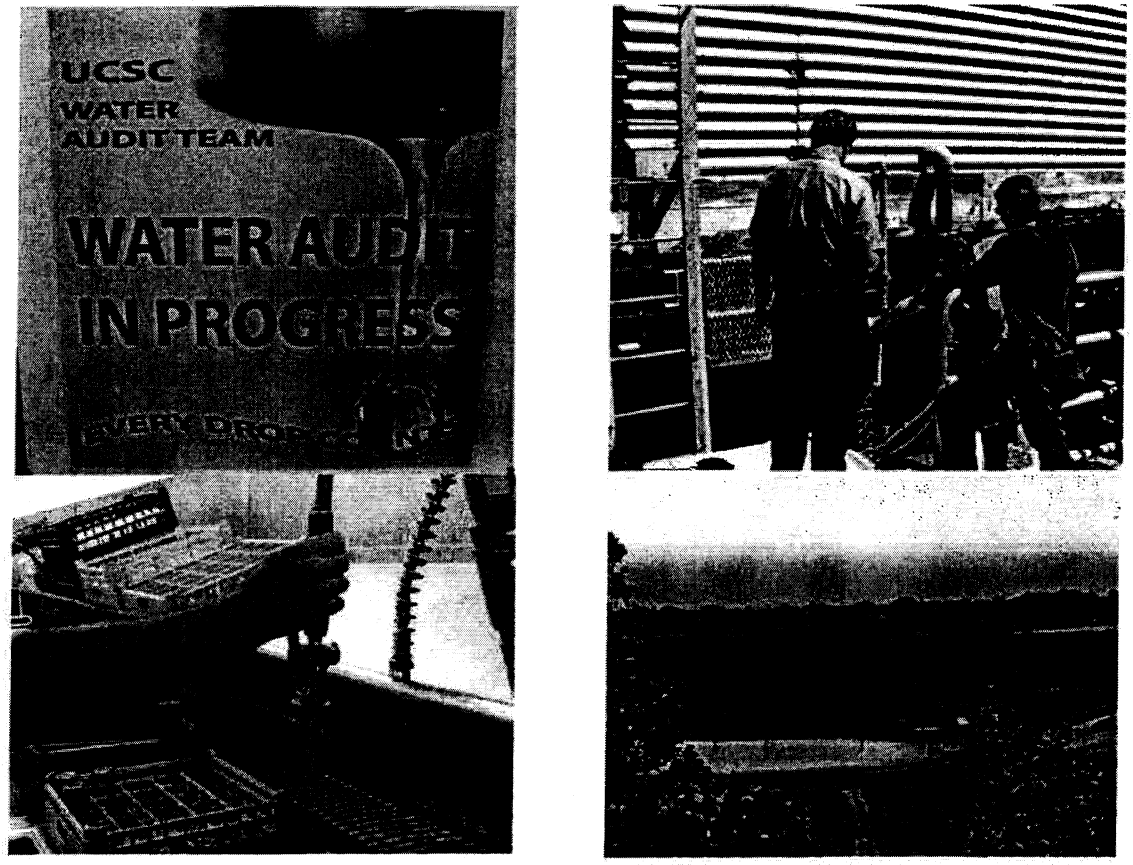
3. SDCs would likely be adjusted upward to reflect the cost of future phases and other system improvements.

4. If Phase Two were sized to produce 1 mg/day, the projected construction cost in today's dollars would likely be less than $4 million.

EXHIBIT C

UC SANTA CRUZ
WATER EFFICIENCY SURVEY

FINAL REPORT



December 2007

Prepared By

Maddaus Water Management

and

UC Santa Cruz

UC SANTA CRUZ

Pressure regulators – to help reduce high pressures on drip systems lower part of campus

5.3 Water Conservation Project Costs

A summary matrix of the high priority projects and rough estimates of costs, assuming contractor labor and retail prices, is shown in Table 19. The labor rate for all projects is $85 per hour as provided by Physical Plant staff. Because some of the projects have not been fully designed and detailed cost estimates have not been completed, initial project costing includes a 20% contingency for those projects identified that would require further cost analysis or project management. In addition to the 20% contingency, the $100,000 cost to perform this water efficiency study was spread among all the high priority projects.

Table 19 – High Priority Water Conservation Projects for UC Santa Cruz

Project Number	Potential Water Conservation Project	Number of units to be Replaced or Installed	Unit Cost	Unit Labor hours	Labor Cost	Total Project Cost
	IRRIGATION					
8	Install ET controllers for selected high-water-use areas.	9	$ 2,000	1.0	$ 765	$ 26,683
9	Implement water budgets for individual connection points that appear to be over watering that are not connected to the Central control system	12	$ 500	1.0	$ 1,020	$ 8,578
10	Add wireless rain sensors on existing controllers	70	$ 80	2.0	$ 11,900	$ 24,885
	FARM					
13	Add 10 new PRVs to Farm irrigation system.	10	$ 200			$ 2,444
	ARBORETUM					
14	Use battery-operated timers to shut water off on drip systems.	40	$ 80			$ 3,910
15	Install Arboretum PRVs to reduce water pressure to drip	100	$ 9			$ 1,100

Project Number	Potential Water Conservation Project	Number of units to be Replaced or Installed	Unit Cost	Unit Labor hours	Labor Cost	Total Project Cost
	lines.					
16	Add campus submeters for large un-metered irrigated areas use at Arboretum.	1	$ 3,900			$ 5,546
	FIXTURES					
17	Replace high flow toilets in "high-use" areas with 1.6 gpf or 1.28 gpf toilets.	204	$ 400	3.0	$ 52,020	$ 190,004
19	Replace Flapper Valves and Diaphragms on 1.6 gpf Toilets that tested with high flush volumes.	850	$ 10	0.5	$ 36,125	$ 63,455
20	Install waterless urinals in "high use" restrooms. [A]	65	$ 400	3.0	$ 16,575	$ 60,540
22	Conduct pilot test 1.0 gpm aerators on "high use" restroom faucets.	318	$ 5	0.5	$ 13,515	$ 18,458
23	Replace faucet aerators in non high use restrooms.	2,137	$ 5	0.5	$ 90,823	$ 124,039
24	Replace existing showerheads in "high use" housing and athletic facilities.	40	$ 55	1.0	$ 3,400	$ 6,843
25	Replace existing showerheads in "non high use" housing and athletic facilities.	310	$ 55	1.0	$ 26,350	$ 53,034
26	Replace 9 inefficient spray valves in kitchens, cafes, and restaurants.	9	$ 50	2.0	$ 1,530	$ 2,420
27	Replace hose in College 9/10 Dining Hall kitchen with low flow spray valve.	1	$ 450	8.0	$ 680	$ 1,381
	LABORATORIES					
30	Replace 2 spray valves in steam sterilizer room of Earth and Marine Sciences.	2	$ 50	2.0	$ 340	$ 538
31	Remove Steam Sterilizer from DI Water System in Marine Sciences Building.	1	$ 100	4.0	$ 340	$ 538

Project Number	Potential Water Conservation Project	Number of units to be Replaced or Installed	Unit Cost	Unit Labor hours	Labor Cost	Total Project Cost
	COOLING TOWERS					
48	Change operating procedure of CT-5 from conductivity set point of 1200 to 2000.	0	$ -	80.0	$ 6,800	$ 8,309

A = Does not include cost of replacement cartridges for waterless urinals

5.4 Estimated Water, Sewer, and Energy Savings and Paybacks

Table 20 shows the projected water savings and the associated paybacks for the high priority projects. Projects were identified to be high priority if they had a payback of less than 5 years. The payback is defined as the number of years for the UC Santa Cruz to recover its investment in a given water conservation project, based on the projected water and sewer bill savings associated with implementation of that project. In this case, nineteen water conservation projects identified for the UC Santa Cruz have paybacks which are equal to or less than five years and are recommended.

The value of the saved water for all recommended water conservation projects is an estimated reduction in water, sewer, and energy costs of $542,000 per year (2009 rates). Savings will increase when the UC Santa Cruz's water, sewer and energy rates increase in the future.

Table 20 shows the estimated annual savings achieved by the completion of the recommended water conservation projects. In terms of priorities, projects should be implemented in the order of increasing payback. The total cost to implement the nineteen recommended water conservation projects is estimated to be approximately $603,000. The overall payback for these projects is estimated to be 1.1 years. The cost estimates presented in this report are planning level costs, sufficiently accurate to identify projects with attractive paybacks. The exact costs to the UC Santa Cruz to implement these water conservation projects will depend on the specific number and type of fixtures. In addition, MWM recommends that the UC Santa Cruz adjust the estimates contained herein based on estimates provided by plumbing contractors and engineering staff.

Table 20 - Annual Water, Sewer, Irrigation And Energy Bill Savings for High Priority UC Santa Cruz Projects

Project Number	Project	Annual Water Savings (gpd)	Annual Water Bill Savings, ($/year)	Annual Sewer Bill Savings, ($/year)	Annual Irrigation Bill Savings, ($/year)	Annual Energy Savings ($/year)	Total Savings, ($/year)
	IRRIGATION						
8	Install ET controllers for selected high-water-use areas.	2,613	$ -	$ -	$ 5,355	$ -	$ 5,355

Appendix B

Demand calculations for the 2005 Long Range Development Plan (ARUP, 2006)

Table B-1
Summary of Incremental Water Demand Projections associated with the UCSC Long Range Development Plan (a)
City of Santa Cruz, California

Water Demand Category	[A] Additional Proposed Program (b)		[B] Average Water Use Factor (b) (gpd)	[C] Baseline Demands (gpd) Existing Demand (b)	[D] Program Demand D = A x B	[E] Total Future Demand (b) (d)	[F] Low Flow Water Use Factor (e) (gpd)	[G] Proposed Demand (gpd) Existing Demand (b)	[H] Program Demand H = A x F	[I] Total Future Demand (b) (d)
UCSC MAIN CAMPUS										
Irrigation	--	--	--	219,101	*41,147 (c)*	260,248	--	219,101	*39,090 (c)*	258,191
Office/Classroom	1,260,442	GSF	0.026	40,448	32,288	72,727	0.018	40,448	22,688	63,162
Science Labs	930,382	GSF	0.035	15,672	32,222	47,852	0.033	15,672	30,703	46,414
Library	193,600	GSF	0.085	14,509	16,465	30,976	0.060	14,509	11,616	26,097
Athletic	151,000	GSF	0.075	6,167	11,357	17,530	0.066	6,167	9,966	16,132
Housing / Apt	4,782	bed	38	237,535	183,573	421,111	35	237,535	166,103	403,627
Mechanical / Cooling	--	--	--	25,694	*52,759 (c)*	78,453	--	25,694	*52,759 (c)*	78,453
Other	0	GSF	0.60	6,475	0	6,475	--	6,475	0.00	6,475
UCSC Main Campus			**(gpd)**	**565,601**	**369,811**	**935,372**		**565,601**	**332,950**	**898,551**
			(mgy) (f)	**206.4**	**135.0**	**341.4**		**206.4**	**121.6**	**328.0**

Abbreviations:

gpd - gallons per day
GSF - gross square feet
LRDP - Long Range Development Plan
mgy - million gallons per year
UCSC - University of California at Santa Cruz

Notes:

(a) Water demand estimates shown above are from ARUP (2006), revised to show the incremental demand associated with the Program. These demands were estimated for the LRDP's Final Environmental Impact Report and do not include demands or conservation savings resulting from the Settlement Agreement.

(b) Values are given in ARUP (2006) Table 3A. Additional Program includes both approved development (referred to by ARUP as "Approved 2004-05") as well as new development as part of the 2005 LRDP (referred to by ARUP as "Additional Proposed 2020").

(c) Italicized values were not calculated using water use factors but instead using linear relationships as described in ARUP (2006). For the purpose of identifying the incremental Program demand, these values are estimated as the Total Future Demand less the Existing Demand.

(d) Total Future Demand is from ARUP (2006) and should be equal to the sum of Existing and Program demands (C + D) or (G + H). Small differences are likely the result of rounding of the Additional Program or the Water Use Factors.

(e) Low Flow Water Use Factors are from ARUP (2006) Table 4.

(f) UCSC Main Campus demands are converted from gpd to mgy by multiplying by 365 and dividing by 1E6. Program demands are rounded up so that the sum of Existing and Program demands equals the Total Future Demand shown above.

References:

1 ARUP, 2006. Memorandum entitled *UC Santa Cruz: LRDP EIR Water Demand Projections for 19,500 Enrollment Alternative - Calculation Summary,* prepared for Alisa Klaus, UCSC, dated 28 August 2006.

To	Alisa Klaus, UCSC	Reference number 130316/GM
cc	Steve Paul, UCSC Bruce Hoffman, UCSC Sally Morgan, UCSC	File reference 1-02
From	Grant McInnes x 594 (Arup SF)	Date August 28, 2006
Subject	UC Santa Cruz: LRDP EIR Water Demand Projections for 19,500 Enrollment Alternative - Calculation Summary	

The following water demand projections were developed using historic metered consumption data supplied by UC Santa Cruz and the City of Santa Cruz, and the program data contained in the Long Range Development Plan (LRDP) for the year 2020. Metered consumption data for the year 2003 was analyzed, and divided into programmatic Water Demand Categories depending on the land-use associated with the meter. The existing building square footage and housing units were allocated to similar categories so that the rate of water consumption could be calculated for each Water Demand Category. The future consumption projections were then extrapolated based on the increase in future program requirements.

The following paragraphs summarize the methodology used in the projection calculations, by providing a brief explanation regarding the purpose of each table.

Table 1A: provides a summary of the Existing and Approved (2004-5) campus program and the Proposed Program for 2020, on a square footage basis. The Existing and Approved (2004-5) data contains program for buildings not yet constructed during 2003 (the year from which the metering data is taken).

Table 1B: provides a summary of the campus housing program by the number of beds for the Existing (2003), Existing and Approved (2004-5) and the Proposed (2020) years.

Table 1C: consolidates the data from Table 1A into the Water Demand Categories to be used in the projection calculations.

Table 1D: summarizes the program data for buildings that are included in the Existing and Approved (2004-05) data, but were not constructed as of 2003.

Table 2: summarizes the metered water consumption for 2003 provided by UCSC. The campus' sub-metering system does not capture all of the water used on campus. Therefore, data from the City's metering system, which provides total campus water consumption, was used to derive the amount of "unmetered water" (i.e. water not captured by the campus' sub-metering system). The unmetered water was distributed to the various Water Demand Categories based on likely use. The assumptions that have been made regarding the likely use of this unmetered water are noted and calculated.

Table 3A: calculates the existing average Water Use Factor (average gpd per GSF or average gpd per bed) for the Existing (2003) program based on the metered water consumption for 2003. This factor is applied to the Proposed 2020 program to generate a proposed baseline demand for 2020, which assumes that future buildings are constructed with similar typical water demands as the existing buildings on campus.

The US Energy Policy Act of 1992 resulted in Californian Plumbing Codes requiring the use of flow low fixtures from 1992 onwards. For the purposes of this study, it is assumed that all buildings constructed during and since 1993 contain fixtures that meet these low flow requirements.

UC Santa Cruz has engaged in a retrofit program for some of these pre-1993 fixtures in recent years. However, fixtures in some of the buildings on the campus that were constructed prior to 1993 have not been retrofitted; these buildings have a water demand greater than those constructed to current code. The actual project demand for 2020 adjusts the baseline demand to account for the fact that new development will comply with current code requirements. Therefore, the Water Use Factors for future buildings will be less than for existing buildings, which have a mix of low-flow and pre-1993 fixtures.

Refer to Table 4 for these adjustment calculations that account for existing low flow fixtures (for the Office/Classroom, Science, Library, Athletic and Housing/Apts water demand categories).

The following demand savings for new development (with respect to buildings fitted with pre-1993 fixtures) that are achievable using low flow fixtures and improved efficiency irrigation systems, have been assumed for the following Water Demand Categories:

- Irrigation = 5%
- Office / Classroom = 50%
- Science Labs = 10%
- Library = 50%
- Athletic (Physical Ed) = 25%
- Housing / Apartments = 20%
- Mechanical / Cooling = 0%
- Other (theatre, retail, etc) = 10%

Table 3B: calculates the proposed baseline irrigation demand for 2020, assuming a linear extrapolation of demand based on the increase in area of general landscaping and athletic fields.

Table 4: calculates the percentage of Existing (2003) buildings that are fitted with code compliant low flow fixtures (completed since 1993, or retrofitted), and the associated program area. The assumed demand savings achievable using low flow fixtures are used to calculate existing Water Use Factors for both low flow fixture fitted and non-low flow fixture fitted Existing (2003) buildings. The existing Water Use Factor for low flow fixture fitted buildings is used to generate the proposed demand for the future buildings, which when added to the Existing (2003) metered demand results in the actual proposed demand for 2020.

UCSC - Program Assumptions for EIR LRDP (2020), 19,500FTE

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TABLE 1A
UCSC Long Range Development Plan (2005-2020) 19,500FTE
Projected Space for Enrollment Scenarios[1]

8/28/2006

Program Element	Code[2]	Existing and Approved (2004-05) ASF	Existing and Approved (2004-05) GSF	Additional Proposed (2020) ASF	Additional Proposed (2020) GSF	Total Proposed (2020) ASF	Total Proposed (2020) GSF
Instruction and Research (non-college)							
Arts	O/C	160,205	256,352	106,000	182,000	266,205	438,352
Humanities	O/C	34,004	55,289	49,000	81,000	83,004	136,289
Physical & Biological Sciences	Sci	311,430	529,303	218,000	390,000	529,430	919,303
Social Sciences	O/C	110,481	188,112	103,000	171,000	213,481	359,112
Engineering	Sci	123,710	208,947	146,000	247,000	269,710	455,947
Classrooms	O/C	53,166	88,666	18,000	31,000	71,166	119,666
Open Computer Labs	O/C	9,962	15,524	4,000	7,000	13,962	22,524
Subtotal: I&R		**802,958**	**1,342,193**	**644,000**	**1,109,000**	**1,446,958**	**2,451,193**
Organized Research Units, ORA's	O/C	86,706	136,542	131,000	225,000	217,706	361,542
Academic Support	O/C	58,589	80,104	34,000	57,000	92,589	137,104
Libraries	Lib	203,883	287,170	54,000	77,000	257,883	364,170
Student Services	O/C	87,767	131,735	90,000	132,000	177,767	263,735
Public Services	O/C	1,434	2,422	26,000	43,000	27,434	45,422
Physical Education and Recreation	PE	56,743	81,954	112,000	151,000	168,743	232,954
Institutional Support (General Services)	O/C	109,498	338,729	64,000	107,000	173,498	445,729
Institutional Support (Administration)	O/C	54,373	89,637	22,000	37,000	76,373	126,637
Other (non-institutional agency)	O/C	1,398	1,848	0	0	1,398	1,848
Total Non-College		**1,463,349**	**2,492,334**	**1,177,000**	**1,938,000**	**2,640,349**	**4,430,334**
Colleges							
(number)			(10)		(12)		
(beds)							
Instruction and Research							
Arts	O/C	12,786	20,073	0	0	12,786	20,073
Humanities	O/C	17,823	28,878	0	0	17,823	28,878
Phys & Bio Sci	Sci	5,329	8,228	0	0	5,329	8,228
Social Sciences	O/C	40,351	67,464	0	0	40,351	67,464
Engineering	Sci	0	0	0	0	0	0
Classrooms	O/C	27,813	45,522	0	0	27,813	45,522
Open computer labs	O/C	6,757	10,249	0	0	6,757	10,249
Subtotal: I&R		**110,859**	**180,414**	**0**	**0**	**110,859**	**180,414**
Academic support	O/C	59,563	91,765	13,000	22,000	72,563	113,765
Undergraduate College Housing	Apt	1,090,745	1,548,759	173,000	249,000	1,263,745	1,797,759
Graduate College Housing	Apt	0	0	125,000	159,000	125,000	159,000
Food Services	Apt	82,881	125,544	0	0	82,881	125,544
Faculty/Staff Housing	Apt	22,652	29,894	2,000	3,000	24,652	32,894
Other (U Ctr, CATS, Cam Fac)	Ot	7,456	10,783	0	0	7,456	10,783
Museum/Exhibit	O/C	5,070	8,117	0	0	5,070	8,117
Student Services	O/C	46,933	68,844	11,000	19,000	57,933	87,844
Total Colleges		**1,426,159**	**2,064,120**	**324,000**	**452,000**	**1,750,159**	**2,516,120**
Additional Undergraduate Apartments	Apt	30,878	41,893	308,100	390,000	338,978	431,893
Additional Graduate Apartments	Apt	23,480	27,269	0	0	23,480	27,269
Family Student Housing	Apt	163,794	192,428	185,600	234,937	349,394	427,365
Faculty/Staff Housing	Apt	303,200	357,325	125,000	158,228	428,200	515,553
Total		**3,410,860**	**5,175,369**	**2,119,700**	**3,173,165**	**5,530,560**	**8,348,534**

Notes:

1) Program data in Table 1 agreed with UCSC by email on 08/28/2006.

2) Code designations have been allocated to each Program Element, to facilitate compatibility with the existing metered data (see Table 2) for the purposes of the future demand projection. Program Elements with similar water demand characteristics have been combined to form the following water demand categories: Irr = Irrigation; OC = Office / Classroom; Sci = Science Labs; Lib = Library; PE = Athletic (Phys Ed); Apt = Housing / Apartments; Coo = Mechanical / Cooling; Ot = Other (theatre, retail, etc).

3) See Table 1C for corrected Existing Buildings (2003) ASF/GSF total program areas.

UCSC - Program Assumptions for EIR LRDP (2020), 19,500FTE

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TABLE 1B
Housing Program Summary

Existing On-Campus beds (2003)[1]	
Students	5,630 beds
Employee Housing	557 beds
Total	**6,187 beds**

Existing and Approved On-Campus beds (2004-05)[2]	
Undergraduate	6,140 beds
Graduate	182 beds
Family Student Housing (non-students)	315 beds
Staff	331 beds
Faculty	611 beds
Total	**7,579 beds**

2005 LRDP: Proposed Additional On-Campus beds (2020)[2]	
Undergraduate	2,148 beds
Graduate	549 beds
Family Student Housing Non-Students	320 beds
Staff/Faculty	373 beds
Total	**3,390 beds**

	Total Beds			
Scenario	**Existing (2003)**	**Existing and Approved (2004-05)**	**Additional Proposed (2020)**	**Total Proposed (2020)**
LRDP EIR: Scenario A	6,187	7,579	3,390	10,969

Notes:
1) Existing on-campus beds (2003) data agreed with UCSC by email on 03/11/2005, using the campus-wide vacancy rate data prepared by Geri Wolff (UCSC Colleges and University Housing), September 2004.
2) Program data agreed with UCSC by email on 06/29/2006. Laureate Court units not included as these are on a separate supply.

UCSC - Program Assumptions for EIR LRDP (2020), 19,500FTE

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TABLE 1C: Program Summary: Square Footage Area per Water Demand Category - Existing and Proposed

		2003 Buildings[1]		Existing and Approved (2004-05)		Additional Proposed (2020) from (2004-05)		Total Proposed (2020)	
Water Demand Category	Code	ASF	GSF	ASF	GSF	ASF	GSF	ASF	GSF
Irrigation[2]	Irr	na		na		na		na	
Office / Classroom	OC	896,726	1,579,430	984,679	1,725,872	671,000	1,114,000	1,655,679	2,839,872
Science Labs	Sci	269,746	453,096	440,469	746,478	364,000	637,000	804,469	1,383,478
Library	Lib	122,283	170,570	203,883	287,170	54,000	77,000	257,883	364,170
Athletic (Phys Ed)	PE	56,743	81,954	56,743	81,954	112,000	151,000	168,743	232,954
Housing / Apts	Apt	1,553,940	2,101,112	1,717,630	2,323,112	918,700	1,194,165	2,636,330	3,517,277
Cooling[3]	Coo	na		na		na		na	
Other	Ot	7,456	10,783	7,456	10,783	0	0	7,456	10,783
		2,906,894	**4,396,945**	**3,410,860**	**5,175,369**	**2,119,700**	**3,173,165**	**5,530,560**	**8,348,534**

Notes:

1) 2003 building areas are calculated using the Existing and Approved (2004-05) program areas, less the areas of the 2004 and 2005 buildings not yet constructed, as listed in Table 1D.
2) Refer to Table 3B for the irrigation demand program assumptions.
3) The Water Demand Category "Mechanical / Cooling" is not based on an assignable program area, therefore is not listed here. Refer to Table 3A for the water demand projection for this category.

TABLE 1D: Approved Buildings not yet constructed (2004 and 2005 buildings)

		Approved Not Yet Constructed (2004-05)	
Building	Code	ASF	GSF
Humanities	OC	51,140	85,000
McHenry Addition	Lib	81,600	116,600
Engineering Building	Sci	90,894	156,937
Physical Sciences	Sci	79,829	136,445
Emergency Response	OC	11,200	17,250
Digital Arts	OC	25,613	44,192
Infill Apartments	Apt	163,690	222,000
		503,966	**778,424**

Notes:

1) Existing and Approved Buildings not constructed data is taken from Appendix A of the Draft LRDP (January 2005).

UCSC - Water Demand Calculations for EIR LRDP (2020), 19,500FTE

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TABLE 2: UCSC Measured Water Consumption, Calendar Year 2003

			CONSUMPTION CORRECTED FOR UNMETERED WATER[2]			
	UCSC Land Use Designation[1]	Metered Data (avg gal/day)[1]	% Total measured	Unmetered water (avg gal/day)	Corrected Existing Demand (avg gal/day)[3]	Code[4]
IRRIGATION	LANDSCAPE	34,746	29.2%	29,333	64,080	Irr
	ATHLETIC FIELD	46,996	39.6%	39,675	86,672	Irr
	AGRICULTURE	37,062	31.2%	31,288	68,350	Irr
TOTAL IRRIGATION		118,804	100.0%	100,297	219,101	
INDOOR - OMP	TRAILERS	164	0.1%	23	187	Ot
	THEATRE	1,228	0.4%	174	1,402	Ot
	SCIENCE LABS	13,728	4.5%	1,944	15,672	Sci
	RETAIL	977	0.3%	138	1,115	Ot
	OFFICE/CLASSROOM	35,430	11.7%	5,018	40,448	OC
	LIBRARY	12,709	4.2%	1,800	14,509	Lib
	ATHLETIC BLDG	5,402	1.8%	765	6,167	PE
		69,638	22.9%	9,862	79,500	
INDOOR - OTHER	RETAIL FOOD	600	0.2%	85	685	Ot
	OTHER	2,002	0.7%	283	2,285	Ot
	COOLING TOWER	11,775	3.9%	1,668	13,443	Coo
	MECHANICAL	10,731	3.5%	1,520	12,251	Coo
	COMMONS	702	0.2%	99	801	Ot
		25,809	8.5%	3,655	29,465	
INDOOR - RESIDENTIAL	TRAILERS	2,138	0.7%	303	2,441	Apt
	TOWNHOMES	1,660	0.5%	235	1,895	Apt
	LAUNDRY ROOM	832	0.3%	118	950	Apt
	KITCHEN	25,590	8.4%	3,624	29,214	Apt
	HOUSES	17,552	5.8%	2,486	20,038	Apt
	DORMITORIES	91,289	30.1%	12,928	104,217	Apt
	COMMONS	1,412	0.5%	200	1,612	Apt
	APARTMENTS	67,595	22.3%	9,573	77,168	Apt
		208,068	68.6%	29,467	237,535	
TOTAL INDOOR		303,515	100.0%	42,984	346,500	
TOTAL		422,320		143,281	565,601	

TOTAL METERED WATER (UCSC sub-metering system)	**422,320**	**Avg Gal/Day**
METERED IRRIGATION WATER	118,804	Avg Gal/Day
METERED INDOOR WATER	303,515	Avg Gal/Day
TOTAL METERED WATER (from City of Santa Cruz)	**565,601**	**Avg Gal/Day**
UNMETERED WATER (Imported water usage from City of Santa Cruz)	**143,281**	**Avg Gal/Day**
Assume 70% unmetered water is used for unmetered irrigation.	100,297	Avg Gal/Day
Assume 20% unmetered water is due to water leaks from the campus and building piping systems.	28,656	Avg Gal/Day
Assume 10% unmetered water is water not measured due to meter turn-down capacity.	14,328	Avg Gal/Day

Notes:

1) UCSC metered water consumption data was obtained from Patrick Testoni of UCSC Physical Plant on April 16, 2004.

2) It is assumed that "unmetered water" can be attributed as follows: 70% = unmetered irrigation systems; 30% = leakage and metering inefficiencies in pipes and meters serving INDOOR uses (from UCSC email received July 26, 2005).

3) Corrected Existing Demand = Metered Data + Unmetered water

4) Code designations have been allocated to each existing Land Use Designation, to facilitate compatibility with the proposed Program Elements (see Table 1A) for the purposes of the future demand projection. Land Use Designations with similar water demand characteristics have been combined to form the following water demand categories: Irr = Irrigation; OC = Office / Classroom; Sci = Science Labs; Lib = Library; PE = Athletic (Phys Ed); Apt = Housing / Apartments; Coo = Mechanical / Cooling; Ot = Other (theatre, retail, etc).

UCSC - Water Demand Calculations for EIR LRDP (2020), 19,500FTE

DRAFT - For Discussion Only

ARUP

TABLE 3A: Proposed (2020) Water Demand Summary - Baseline, assuming Low Flow Fixtures for New Buildings

Water Demand Category	Code[1]	Existing (2003) Demand (avg gpd)[2]	Existing Program - 2003 (GSF/ No of Beds)[3]	Existing Average Water Use Factor (avg gpd)[4]	Existing Average Water Use Factor (cu.ft / year)[4]	Additional Proposed Program (2020) from 2003	Total Proposed Program - 2020[3]	Proposed Baseline Demand - 2020 (avg gpd)[5]	Assumed savings achievable using Low Flow fixtures[6]	Proposed Demand - 2020 (avg gpd)[7]
Irrigation[8]	Irr	219,101	See Table 3B	See Table 3B	See Table 3B	See Table 3B	See Table 3B	**260,248**	**5%**	**258,191**
Office / Classroom	OC	40,448	1,579,430 GSF	0.026 /GSF	1.25 /GSF	1,260,442 GSF	2,839,872 GSF	**72,727**	**50%**	**63,162**
Science Labs	Sci	15,672	453,096 GSF	0.035 /GSF	1.69 /GSF	930,382 GSF	1,383,478 GSF	**47,852**	**10%**	**46,414**
Library	Lib	14,509	170,570 GSF	0.085 /GSF	4.15 /GSF	193,600 GSF	364,170 GSF	**30,976**	**50%**	**26,097**
Athletic (Phys Ed)	PE	6,167	81,954 GSF	0.075 /GSF	3.67 /GSF	151,000 GSF	232,954 GSF	**17,530**	**25%**	**16,132**
Housing / Apts	Apt	237,535	6,187 Beds	38 /bed	1,873.23 /bed	4,782 Beds	10,969 Beds	**421,111**	**20%**	**403,627**
Mechanical / Cooling[9]	Coo	25,694	n/a	n/a	n/a	n/a	n/a	**78,453**	**0%**	**78,453**
Other (theatre, retail, etc)	Ot	6,475	10,783 GSF	0.600 /GSF	29.30 /GSF	0 GSF	10,783 GSF	**6,475**	**10%**	**6,475**
	Daily	**565,601**	**gpd total demand**					**935,373**		**898,550** **gpd total demand**
	Yearly Equivalent	206.4	million gallons / yr					341.4	million gallons / yr	328.0 million gallons / yr
		346,500	gpd - indoor demand only, i.e. discounting irrigation demand					675,125.1	gpd - indoor demand only	640,359.8 gpd - indoor demand only
		126.5	million gallons / yr					246.4	million gallons / yr	233.7 million gallons / yr
		240.62	gpm (average)					468.84	gpm (average)	444.69 gpm (average)

Notes:

1) Code designations have been allocated to each Program Element, to facilitate compatibility with the existing metered data (see Table 2) for the purposes of the future demand projection. Program Elements with similar water demand characteristics have been combined to form the following water demand categories: Irr = Irrigation; OC = Office / Classroom; Sci = Science Labs; Lib = Library; PE = Athletic (Phys Ed); Apt = Housing / Apartments; Coo = Mechanical / Cooling; Ot = Other (theatre, retail, etc).
2) Refer to Table 2 for corrected existing metered demand summary.
3) Refer to Table 1 for LRDP EIR Program data for existing (2003) and 19,500FTE. (2020) program data.
4) Existing Water Use Factor = Existing Demand / Existing Program (area / beds).
5) Baseline Consumption predictions are based on an assumed linear expansion from 15,000FTE to 19,500FTE. Proposed Baseline Consumption = Existing Water Use Factor * Proposed Program - 2020.
6) Assumed savings achievable using Low Flow Fixture technology compliant with existing codes, compared to demands from the existing campus buildings with pre-1993 fixtures.
7) For Irrigation, Proposed Demand-2020 = {[Proposed Baseline Demand (2020) - Existing Demand (2003)] * [1 - assumed savings achievable]} + Existing Demand (2003). Refer to Table 4 in "Factored Low Flow Fixtures" worksheet for the Consumption calculations for the OC, Sci, Lib, PE and Apt uses. This calculation assumes that all new buildings that are constructed under this LRDP EIR will be fitted with conventional fixtures per current minimum standards.
8) Refer to Table 3B for calculation of future irrigation demands.
9) Proposed Mechanical / Cooling water demand is assumed to have a linear relationship with the increase in square footage of the Science Lab buildings (from 453,096GSF to 1,383,478GSF).

UCSC - Water Demand Calculations for EIR LRDP (2020), 19,500FTE

DRAFT - For Discussion Only

ARUP

TABLE 3B: Irrigation - Proposed (2020) Water Demand Summary

IRRIGATION USE	Existing (2003) Demand (avg gpd)	Proposed Demand - 2020 (avg gpd)
LANDSCAPE [1]	64,080	83,304
ATHLETIC FIELD [2]	86,672	108,594
AGRICULTURE [3]	68,350	68,350
TOTAL IRRIGATION	**219,101**	**260,248**

Notes:

1) Proposed general landscaping irrigation demand is assumed to have a linear relationship with the increase in student population (from 15,000FTE to 19,500FTE).
2) Proposed Athletic Field irrigation demand is assumed to have a linear relationship with the increase in area of irrigated playing fields (from 17 acres to 21.3 acres).
3) Future AGRICULTURE demand is assumed to remain as existing.

UCSC - Water Demand Calculations for EIR LRDP (2020), 19,500FTE

ARUP

DRAFT - For Discussion Only

TABLE 4 - Water Demand Calculation allowing for existing savings being made due to Low Flow Fixtures
(allowing for retrofits previously performed and due to the implementation of US Energy Policy Act of 1992, for buildings constructed in California after 1993)

% of existing building area completed during and since 1993	33%	calculated from existing program data supplied by UCSC on 4/16/2004
% of existing buildings on-campus retrofitted with Low Flow Fixtures (constructed prior to 1993)	25%	A UCSC fixture audit of pre-1993 OMP buildings determined that 38% of these buildings have been retrofitted. Assume 38% of all pre-1993 buildings have been retrofitted, therefore the % of all existing buildings that have been retrofitted = 38% * (1-33%) = 25%
Total Building Area 2003 (GSF)	4,396,945	refer to Table 1C
Building Area constructed during and since 1993 (GSF)	1,446,252	(% of existing building area completed since 1993 * Total building area 2003)
Building Area constructed prior to 1993, retrofitted with Low Flow Fixtures (GSF)	1,099,236	(% of existing building area built prior to 1993 retrofitted with Low Flow Fixtures * Total building area 2003)
Total Building area with Low Flow Fixtures (GSF)	2,545,488	
% of existing buildings with Low Flow Fixtures	58%	

	Water Demand Category				
	Office / Classroom	Science	Library	Athletic (Phys Ed)	Housing / Apts[1]
Building program - 2020 (GSF; Beds for Housing / Apts)[1]	2,839,872	1,383,478	364,170	232,954	10,969
Existing Demand - 2003 (gpd)[2]	40,448	15,672	14,509	6,167	237,535
% of existing buildings retrofitted with Low Flow Fixtures	58%	58%	58%	58%	58%
Existing Building Program - 2003 (GSF; Beds for Housing / Apts)[1]	1,579,430	453,096	170,570	81,954	6,187
Existing Building Program - 2003, fitted with low flow fixtures (GSF; Beds for Housing / Apts)[3]	914,367	262,307	98,747	47,445	3,582
Existing Building Program - 2003, not fitted with low flow fixtures (GSF; Beds for Housing / Apts)[4]	665,063	190,789	71,823	34,509	2,605
Assumed X% savings achievable using low flow fixtures[5]	50%	10%	50%	25%	20%
Existing Water Use Factor for low flow fixture fitted buildings - 2003 (gal/GSF or gal/bed)[6]	0.018	0.033	0.060	0.066	34.735
Existing Water Use Factor for non-low flow fixture fitted buildings - 2003 (gal/GSF or gal/bed)[7]	0.036	0.037	0.120	0.088	43.418
Demand from existing low flow fixture fitted buildings - 2003 (gpd)[8]	16,478	8,667	5,911	3,131	124,417
Demand from existing non-low flow fixture fitted buildings - 2003 (gpd)[9]	23,970	7,005	8,598	3,036	113,118
Total Existing Demand - 2003 (gpd)	40,448	15,672	14,509	6,167	237,535
Total Campus Demand 2020 - New Buildings fitted with Low Flow Fixtures (gpd)[10]	**63,162**	**46,414**	**26,097**	**16,132**	**403,627**
Total Campus Demand - All Buildings Retrofitted (gpd)	**51,177**	**45,714**	**21,798**	**15,373**	**381,003**

Notes:

1) Refer to Tables 1B and 1C for Existing (2003) and Proposed (2020) program summaries of Water Demand Categories. The Water Demand Category "Housing / Apts" uses # of beds program information to project future demand.
2) Refer to Table 2 for summary of Existing Demand (2003)
3) 2003 Program fitted with low flow fixtures = Existing Building Program-2003 * % of existing buildings with low flow fixtures
4) 2003 Program not fitted with low flow fixtures = Existing Building Program-2003 * [1 - % of existing buildings with low flow fixtures].
5) This calculation assumes that the existing buildings fitted with low flow fixtures are achieving a water saving of X% for each Water Demand Category. The numbers presented herein have been checked and verified as suitable for use by UCSC.
6) Water Use Factor for low flow buildings-2003 = (7) * [1 - (5)]
7) Water Use Factor for non-low flow buildings-2003 = (2) / { [(3) * [1 - (5)] + (4)}
8) Demand from low flow fitted buildings-2003 = (3) * (6)
9) Demand from non-low flow fitted buildings-2003 = (4) * (7)
10) Total Campus Demand 2020 - New Buildings fitted with Low Flow Fixtures = {[Building Program 2020 - Building Program 2003] * (6)} + (2)

Appendix C

City of Santa Cruz Surface Water Licenses, Permit and Applications to the State Water Resources Control Board

P16123

STATE OF CALIFORNIA
THE RESOURCES AGENCY
STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

ORDER

APPLICATION 22318 PERMIT 16123 LICENSE

ORDER APPROVING A NEW DEVELOPMENT SCHEDULE AND AMENDING THE PERMIT

WHEREAS:

1. A PETITION FOR EXTENSION OF TIME WITHIN WHICH TO DEVELOP THE PROJECT AND APPLY THE WATER TO THE PROPOSED USE HAS BEEN FILED WITH THE STATE WATER RESOURCES CONTROL BOARD.

2. THE PERMITTEE HAS PROCEEDED WITH DILIGENCE AND GOOD CAUSE HAS BEEN SHOWN FOR EXTENSION OF TIME AND FOR THE SAID CHANGE.

NOW, THEREFORE, IT IS ORDERED THAT:

1. PARAGRAPH 9 OF THE PERMIT IS AMENDED TO READ AS FOLLOWS:

COMPLETE APPLICATION OF THE
WATER TO THE PROPOSED USE
SHALL BE MADE ON OR BEFORE DECEMBER 1, 1990

2. PARAGRAPH 16 IS ADDED AS FOLLOWS:

PURSUANT TO CALIFORNIA WATER CODE SECTIONS 100 AND 275, ALL RIGHTS AND PRIVILEGES UNDER THIS PERMIT AND UNDER ANY LICENSE ISSUED PURSUANT THERETO, INCLUDING METHOD OF DIVERSION, METHOD OF USE, AND QUANTITY OF WATER DIVERTED, ARE SUBJECT TO THE CONTINUING AUTHORITY OF THE STATE WATER RESOURCES CONTROL BOARD IN ACCORDANCE WITH LAW AND IN THE INTEREST OF THE PUBLIC WELFARE TO PREVENT WASTE, UNREASONABLE USE, UNREASONABLE METHOD OF USE, OR UNREASONABLE METHOD OF DIVERSION OF SAID WATER.

THE CONTINUING AUTHORITY OF THE BOARD MAY BE EXERCISED BY IMPOSING SPECIFIC REQUIREMENTS OVER AND ABOVE THOSE CONTAINED IN THIS PERMIT WITH A VIEW TO MINIMIZING WASTE OF WATER AND TO MEETING THE REASONABLE WATER REQUIREMENTS OF PERMITTEE WITHOUT UNREASONABLE DRAFT ON THE SOURCE. PERMITTEE MAY BE REQUIRED TO IMPLEMENT SUCH PROGRAMS AS (1) REUSING OR RECLAIMING THE WATER ALLOCATED; (2) USING WATER RECLAIMED BY ANOTHER ENTITY INSTEAD OF ALL OR PART OF THE WATER ALLOCATED; (3) RESTRICTING DIVERSIONS SO AS TO ELIMINATE AGRICULTURAL TAILWATER OR TO REDUCE RETURN FLOW; (4) SUPPRESSING EVAPORATION LOSSES FROM WATER SURFACES; (5) CONTROLLING PHREATOPHYTIC GROWTH; AND (6) INSTALLING, MAINTAINING, AND OPERATING EFFICIENT WATER MEASURING DEVICES TO ASSURE COMPLIANCE WITH THE QUANTITY LIMITATIONS OF THIS PERMIT AND TO DETERMINE ACCURATELY WATER USE AS AGAINST REASONABLE WATER REQUIREMENTS FOR THE AUTHORIZED PROJECT. NO ACTION WILL BE TAKEN PURSUANT TO THIS PARAGRAPH UNLESS THE BOARD DETERMINES, AFTER NOTICE TO AFFECTED PARTIES AND OPPORTUNITY FOR HEARING, THAT SUCH SPECIFIC REQUIREMENTS ARE PHYSICALLY AND FINANCIALLY FEASIBLE AND ARE APPROPRIATE TO THE PARTICULAR SITUATION.

(000012)

3. PARAGRAPH 17 IS ADDED TO THIS PERMIT AS FOLLOWS:

THE STATE WATER RESOURCES CONTROL BOARD, UNDER ITS AUTHORITY TO CONSERVE THE PUBLIC INTEREST, RETAINS CONTINUING AUTHORITY OVER THIS PERMIT TO REQUIRE PERMITTEE TO DEVELOP AND IMPLEMENT A WATER CONSERVATION PROGRAM, AFTER NOTICE AND OPPORTUNITY FOR HEARING. THE REQUIREMENTS OF THIS TERM MAY BE SATISFIED BY PERMITTEE'S COMPLIANCE WITH ANY COMPREHENSIVE WATER CONSERVATION PROGRAM, APPROVED BY THE STATE WATER RESOURCES CONTROL BOARD, WHICH MAY BE IMPOSED BY A PUBLIC AGENCY. (000029B)

DATE: MARCH 31 1981

Walter G. Pettit

WALTER G. PETTIT, CHIEF
DIVISION OF WATER RIGHTS

CONTACT REPORT

DIVISION OF WATER RIGHTS
STATE WATER RESOURCES CONTROL BOARD

Subject: Fish water release at Felton Diversion Dam
Permits 16123 & 16601 (applications 22318 & 23710)

Division Personnel: L. Spencer

Date: 1-3-79 Time: 16:45

Personal ☐ Where:

Telephone ☒ Number: 408-429-3670

Individual(s)/Agency Contacted: Morris Allen

Conversation Description: Paul Chappelle of DFG called Wall Pettit this afternoon about a fisheries problem in San Lorenzo River below Felton Diversion Dam. He reported that flow was below 20 cfs and the City was bypassing the entire flow. The inflatable dam was not inflated enough to cause the fish ladder to operate and salmon were spawning below the diversion dam. See Wall's note for further info. Walt asked me to call Morris Allen and check out the factual situation.

Morris stated that the flow in the San Lorenzo was 16 cfs, that the entire flow was being bypassed. The inflatable dam was up about 2 feet and the fish ladder non-operational. The flow being bypassed was to swift for the salmon to navigate. We discussed Chappelle's proposal, and Morris mentioned an alternative. He stated that the City was not willing to operate at variance from its permit without a directive from us. He stated that an order by the Board would not be necessary, a written directive would be sufficient.

I stated we would keep him advised of developments.

Decision(s):

Action Items:

SURNAME	Spencer	Pettit 1/5		

P16123.

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

ORDER

Application 22318 Permit 16123 License _____

ORDER APPROVING A NEW DEVELOPMENT SCHEDULE AND AMENDING THE PERMIT

WHEREAS:

1. Permit 16123 was issued to City of Santa Cruz on December 21, 1970 pursuant to Application 22318.

2. A petition for an extension of time within which to develop the project and apply the water to the proposed use has been filed with the State Water Resources Control Board (SWRCB).

3. The permittee has proceeded with diligence and good cause has been shown for said extension of time.

4. Permit Condition 11 pertaining to the continuing authority of the SWRCB should be updated to conform to Section 780(a), Title 23 of the California Code of Regulations.

NOW, THEREFORE, IT IS ORDERED THAT:

1. Condition 9 of the permit be amended to read:

   COMPLETE APPLICATION OF THE WATER TO THE PROPOSED USE SHALL BE MADE ON OR BEFORE December 31, 2006 (0000009)

2. Condition 11 of the permit be amended to read:

   Pursuant to California Water Code Sections 100 and 275, and the common law public trust doctrine, all rights and privileges under this permit and under any license issued pursuant thereto, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the SWRCB in accordance with law and in the interest of the public welfare to protect public trust uses and to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

   The continuing authority of the SWRCB may be exercised by imposing specific requirements over and above those contained in this permit with a view to eliminating waste of water and to meeting the reasonable water requirements of permittee without unreasonable draft on the source. Permittee may be required to implement a water conservation plan, features of which may include but not necessarily be limited to: (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water

surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this permit and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the SWRCB determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.

The continuing authority of the SWRCB also may be exercised by imposing further limitations on the diversion and use of water by the permittee in order to protect public trust uses. No action will be taken pursuant to this paragraph unless the SWRCB determines, after notice to affected parties and opportunity for hearing, that such action is consistent with California Constitution Article X, Section 2; is consistent with the public interest and is necessary to preserve or restore the uses protected by the public trust. (0000012)

Dated: SEPTEMBER 9 1996

for Edward C. Anton, Chief
Division of Water Rights

STATE OF CALIFORNIA
THE RESOURCES AGENCY
STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

ORDER

APPLICATION 22318 PERMIT 16123 LICENSE

ORDER CORRECTING DESCRIPTION OF
POINT OF DIVERSION

WHEREAS:

1. The permittee's Felton Diversion Plant was constructed within NE¼ of SW¼ of Section 22 instead at the permitted point of diversion being within SE¼ of NW¼ of said Section 22.

2. The State Water Resources Control Board has determined that no legal user of water will be injured by correcting the description of point of diversion.

NOW, THEREFORE, IT IS ORDERED THAT:

1. The description of the point of diversion under permit 16601 be corrected to read as follows:

   SOUTH 30° EAST 3,200 FEET FROM THE NW CORNER OF SECTION 22 BEING WITHIN THE NE¼ OF SW¼ OF PROJECTED SECTION 22, T10S, R2W, MDB&M.

Dated: DECEMBER 8 1978

for Walter G. Pettit
Michael A. Campos, Chief
Division of Water Rights

Permit 16123

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

In the Matter of Request for Modification of Terms of Permits 16123 and 16601 by CITY OF SANTA CRUZ	)	Decision 1464

DECISION TEMPORARILY MODIFYING PERMIT TERMS

BY BOARD MEMBER ADAMS:

On March 8, 1977, the State Water Resources Control Board held a public hearing in the above-entitled matter pursuant to Section 736.1 of Title 23, California Administrative Code. This hearing was held to determine whether the Board should exercise its continuing authority under Term 11 of Permits 16123 and 16601 to modify permit conditions regarding bypasses for preservation of fish and wildlife. The City of Santa Cruz, Department of Fish and Game and other interested parties having appeared and presented evidence; the evidence received at the hearing having been duly considered, the Board finds as follows:

Permittee's Water Supply System

1. Permittee's water system provides service to about 58,000 customers within and without the city limits. Permittee's major sources of water are the San Lorenzo River, coastal streams and wells.

2. Permittee holds Permits 16123 and 16601 which authorize diversion from San Lorenzo River at Felton diversion offstream storage in Loch Lomond Reservoir. These permits together limit the total quantity diverted at the Felton diversion to 3,000 acre-feet per annum (afa). The annual safe yield estimate for the remaining components of permittee's water supply is as follows: Newell Creek, 2,300 afa; San Lorenzo River at Crossing Street, 6,190 afa; wells, 450 afa; and coastal streams, 1,360 afa. The total annual safe yield estimate for the City's system, including the Felton diversion, is 13,300 afa.

3. Evidence established the existence of a bonafide drought and that because of the existing drought conditions the City would have a deficiency of 2,832 acre-feet (af) in estimated total annual safe yield at the end of this year, assuming normal usage.

Water Conservation Measures

4. On March 1, 1977, the City of Santa Cruz adopted a water conservation ordinance (Ordinance No. 77-6) which declares the presence of a drought emergency, reduces water use, and prescribes penalties for violations. The water usage provisions are substantially as follows:

Residential usage:

Persons per house	Bimonthly Amount	Equivalent Gallons per day	Equivalent Gallons per day per person
1	900 cf	112	112
2	1500 cf	187	94
3	2000 cf	250	83
4	2400 cf	300	75
Each additional person	400 cf	50	

All other uses, including commercial, industrial, and irrigation, are limited to 70 percent of use in 1975.

5. A priority system for water use based upon need was not established by the ordinance, and the ordinance is specifically found to be deficient in this respect. Moreover, testimony was presented, including that of a witness representing the County of Santa Cruz, generally critical of the daily per capita domestic water consumption allowed by the ordinance. One witness characterized the measure as a "water wasting" ordinance. Nevertheless, it is found that the measure does require a substantial reduction in "normal" water usage in the permittee's service area. The Board is reluctant to review the judgment of permittee's City Council, at this time, with respect to the specifics of its water conservation measures.

6. The water conservation measures noted above would, by permittee's estimate, reduce water consumption by 3,500 af by the end of this year. This saving in consumption, less the

deficit identified in paragraph 3 would result in a net savings of 700 af to permittee's system for use after 1977.

Availability of Alternative Supplies

7. Evidence established that the most likely source of an alternative water supply is increased use of groundwater. However, neither this source nor increased diversion from the San Lorenzo River at Crossing Street is available at this time. It is further found that permittee in the past has not diligently pursued development of alternative supplies.

Permittee's Request

8. By letter of February 9, 1977, permittee requested a temporary modification of Term 16 of Permit 16601. (Since the same restriction is imposed by Term 14 of Permit 16123, modification of that term was also considered at the hearing.) The effect of these terms relevant to this proceeding is to require bypass of 20 cubic-feet per second (cfs) or the natural flow, whichever is the less, until May 31, the end of the diversion season, for preservation of fish and wildlife. Permittee requested that this bypass requirement be reduced to 10 cfs.

9. Since the effect of the water conservation measures taken by permittee will be to achieve a net saving of 700 af this year for use next year, it is found that permittee's supply will not be exhausted this year. Therefore, the reason for the request to modify the bypass requirement is to further increase availability of water to the system should the

drought continue into 1978. The City estimates it can increase storage in Loch Lomond by 750-900 af by May 31, 1977, if its request to reduce the bypass flow is granted.

Impact on the Fishery

10. Evidence presented by the Department of Fish and Game established that the existing bypass requirement of 20 cfs is a minimum flow needed to provide transportation for migrating salmon and steelhead.

11. Department of Fish and Game evidence further established that a flow of 14.1 cfs existed on March 1 and flows immediately prior to the date of hearing were about 10.4 cfs, all of which flows, pursuant to the relevant permit terms, were being bypassed. As a result of these low flows, the San Lorenzo River fishery has been and will continue to be damaged. Such flows do not allow migration, but will only serve to keep a small population of fish alive in pools in which they are stranded.

12. Department of Fish and Game evidence further established that modification of the relevant terms to require bypass of 10 cfs for the remainder of the diversion season will not have a significant additional adverse impact on the already damaged fishery, but that any significant storm flows occurring between now and the end of the diversion season at the Felton diversion should be bypassed through the diversion to allow temporary fish movement to mitigate the drought's adverse impact upon the fishery.

13. The Board should, upon any request of Permittee for modification of bypass terms to be effective when the diversion season resumes next fall, hold further hearing to consider the suitability of permittee's water conservation measures and pursuit of alternate supplies.

14. The Department of Fish and Game also recommended that the fishery be given a "credit" in the form of a right to release from storage in a normal water year within five years, at a rate specified by the Department, the amount of water diverted to storage as the result of any modification. The record in this matter discloses considerable concern over the adequacy, in normal years, of the existing fish and wildlife preservation conditions of the permits governing the Felton diversion. Moreover, the record also discloses the existence of an on-going joint local-state program to develop a Waterway Management Plan for the San Lorenzo River. Accordingly, rather than acting upon the Department's recommendation to establish a "credit" for the diversions allowed by the modification, the Board announces its intention to review the adequacy of these existing permit terms in the light of the completed Waterway Management Plan and with the aid of further input by the Department of Fish and Game, permittee, and other interested parties. The Board may, on its own motion or upon request of any interested party, hold a hearing at the appropriate time to conduct such review.

DETERMINATION OF ISSUE

Cause exists for modification of the relevant permit terms regarding minimum bypass flows, upon suitable conditions, in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion of water.

ORDER

1. Condition 14 of Permit 16123 is temporarily modified to read:

"14. Permittee shall bypass 10 cubic feet per second or the natural flow, whichever is less, from September 1 through May 31 for the preservation of fish and wildlife; provided, that diversion shall be made only during such times as flow at the diversion exceeds 12.5 cubic feet per second."

2. Condition 16 of Permit 16601 is temporarily modified to read:

"16. For the protection of fish, no diversion shall be made during the month of October which depletes the flow of the stream to less than 25 cubic feet per second nor to less than 10 cubic feet per second during the period November 1 to the succeeding May 31. No water shall be diverted until permittee has installed in the stream immediately below its point of diversion a staff gage, or other device satisfactory to the State Water Resources Control Board, showing the water levels which correspond

to the above-mentioned flows in cubic feet per second. As a condition of continuing diversion, said measuring device shall be properly maintained. Diversion shall be made only during such times as flow at the diversion exceeds 12.5 cubic feet per second."

3. The following additional condition, appropriately numbered, is added to Permits 16123 and 16601:

"The duration of the modification of Condition (14/16) authorized by State Water Resources Control Board Decision 1464, and of this condition shall be from March 17, 1977, through May 31, 1977, and shall thereafter be of no force or effect. From and after June 1, 1977, said condition (14/16) shall be as it existed immediately prior to the effective date of such modification. In addition, the following conditions shall be observed during the effective period of the modification of condition (14/16): (0000300)

a. During any period when flow at the diversion exceeds 20 cfs, permittee shall bypass 20 cfs for the preservation of fish and wildlife. When, following any such period, such flow recedes to 20 cfs or less but is greater than 18 cfs, permittee shall make no diversion until such flow recedes to 18 cfs or less, whereupon permittee may divert in accordance with modified condition (14/16).

b. Approval of permittee's gage system and rating table was required by State Water Resources Control Board Decision 1459. Interim approval thereof until March 31, 1977, as granted by letter from the Chief, Division of Water Rights, dated November 18, 1976, (333:MLS:22318), is hereby extended through May 31, 1977."

Dated: MAR 17 1977

WE CONCUR:

/s/ W. W. Adams
W. W. Adams, Member

/s/ John E. Bryson
John E. Bryson, Chairman

/s/ W. Don Maughan
W. Don Maughan, Vice Chairman

/s/ Roy E. Dodson
Roy E. Dodson, Member

/s/ Jean Auer
Jean Auer, Member

STATE OF CALIFORNIA
THE RESOURCES AGENCY
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS

PERMIT FOR DIVERSION AND USE OF WATER

PERMIT No. 16123

Application 22318 of City of Santa Cruz

City Hall, Santa Cruz, California 95061

filed on October 20, 1965, has been approved by the State Water Resources Control Board SUBJECT TO VESTED RIGHTS and to the limitations and conditions of this Permit.

Permittee is hereby authorized to divert and use water as follows:

1. Source:	Tributary to:
San Lorenzo River	Monterey Bay

2. Location of point of diversion:	40-acre subdivision of public land survey or projection thereof	Section	Township	Range	Base and Meridian
S 48° E 2,904' From NW Corner of	SE ¼ of NW ¼	22	10S	2W	MD
Section 22, T10S, R2W, MDB&M	¼ of ¼				
(Felton Diversion Station)	¼ of ¼				
	¼ of ¼				
	¼ of ¼				
	¼ of ¼				

County of Santa Cruz

3. Purpose of use:	4. Place of use:	Section	Township	Range	Base and Meridian	Acres
Municipal	City of Santa Cruz					
	Water Service Area,					
	within T10-11S,					
	R1-3W, MDB&M					

The place of use is shown on map filed with the State Water Resources Control Board.

27276-983 11-68 9M ② OSP

5. The water appropriated shall be limited to the quantity which can be beneficially used, and shall not exceed 3,000 acre-feet per annum by storage to be collected in Loch Lomond Reservoir from about September 1 of each year to about June 1 of the succeeding year.

The maximum rate of diversion to offstream storage shall not exceed 3,500 gallons per minute.

This permit does not authorize collection of water to storage outside of the specified season to offset evaporation and seepage losses or for any other purpose. (000 0005)

6. The maximum quantity herein stated may be reduced in the license if investigation warrants. (000 0006)

7. Actual construction work shall begin on or before December 1, 1971 and shall thereafter be prosecuted with reasonable diligence, and if not so commenced and prosecuted this permit may be revoked. (000 0007)

8. Said construction work shall be completed on or before December 1, 1975. (000 0008)

9. Complete application of the water to the proposed use shall be made on or before December 1, 1980. (000 0009)

10. Progress reports shall be filed promptly by permittee on forms which will be provided annually by the State Water Resources Control Board until license is issued. (000 0010)

11. All rights and privileges under this permit including method of diversion, method of use and quantity of water diverted are subject to the continuing authority of the State Water Resources Control Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion of said water~~, and to carry out legally established water quality objectives~~. (000 0012)

12. Permittee shall allow representatives of the State Water Resources Control Board and other parties, as may be authorized from time to time by said Board, reasonable access to project works to determine compliance with the terms of this permit. (000 0011)

13. The quantity of water diverted under this permit and under any license issued pursuant thereto is subject to modification by the State Water Resources Control Board if, after notice to the permittee and an opportunity for hearing, the Board finds that such modification is necessary to meet water quality objectives in water quality control plans which have been or hereafter may be established or modified pursuant to Division 7 of the Water Code. No action will be taken pursuant to this paragraph unless the Board finds that (1) adequate waste discharge requirements have been prescribed and are in effect with respect to all waste discharges which have any substantial effect upon water quality in the area involved, and (2) the water quality objectives cannot be achieved solely through the control of waste discharges. (000 0013)

14. Permittee shall bypass 10 cubic feet per second or the natural flow, whichever is less from September 1 through September 30; and 20 cubic feet per second or the natural flow, whichever is less from October 1 through May 31 for the preservation of fish and wildlife. (014 0060)

15. The provisions of the preceeding paragraph are based on a bilateral agreement between permittee and the Department of Fish and Game, and shall not be construed as a finding by the State Water Resources Control Board that the amount of water named herein is either adequate or required for the maintenance of fish life. (000 0300)

This permit is issued and permittee takes it subject to the following provisions of the Water Code:

Section 1390. A permit shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code), but no longer.

Section 1391. Every permit shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a permit is issued takes it subject to the conditions therein expressed.

Section 1392. Every permittee, if he accepts a permit, does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any permit granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any permittee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any permittee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Dated: DEC 21 1970

STATE WATER RESOURCES CONTROL BOARD

K. L. Woodward

Chief, Division of Water Rights

27276-C-983 11-68 7500 OSP

P16601

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

ORDER

Application 23710 Permit 16601 License _____

ORDER APPROVING A NEW DEVELOPMENT SCHEDULE AND AMENDING THE PERMIT

WHEREAS:

1. Permit 16601 was issued to City of Santa Cruz on July 23, 1973 pursuant to Application 23710.

2. A petition for an extension of time within which to develop the project and apply the water to the proposed use has been filed with the State Water Resources Control Board (SWRCB).

3. The permittee has proceeded with diligence and good cause has been shown for said extension of time.

4. Permit Condition 11 pertaining to the continuing authority of the SWRCB should be updated to conform to Section 780(a), Title 23 of the California Code of Regulations.

NOW, THEREFORE, IT IS ORDERED THAT:

1. Condition 9 of the permit be amended to read:

   COMPLETE APPLICATION OF THE WATER TO THE PROPOSED USE SHALL BE MADE ON OR BEFORE December 31, 2006 (0000009)

2. Condition 11 of the permit be amended to read:

   Pursuant to California Water Code Sections 100 and 275, and the common law public trust doctrine, all rights and privileges under this permit and under any license issued pursuant thereto, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the SWRCB in accordance with law and in the interest of the public welfare to protect public trust uses and to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

   The continuing authority of the SWRCB may be exercised by imposing specific requirements over and above those contained in this permit with a view to eliminating waste of water and to meeting the reasonable water requirements of permittee without unreasonable draft on the source. Permittee may be required to implement a water conservation plan, features of which may include but not necessarily be limited to: (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water

surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this permit and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the SWRCB determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.

The continuing authority of the SWRCB also may be exercised by imposing further limitations on the diversion and use of water by the permittee in order to protect public trust uses. No action will be taken pursuant to this paragraph unless the SWRCB determines, after notice to affected parties and opportunity for hearing, that such action is consistent with California Constitution Article X, Section 2; is consistent with the public interest and is necessary to preserve or restore the uses protected by the public trust. (0000012)

Dated: SEPTEMBER 9 1996

for Edward C. Anton, Chief
Division of Water Rights

P1662

STATE OF CALIFORNIA
THE RESOURCES AGENCY
STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

ORDER

APPLICATION 23710 PERMIT 16601 LICENSE

ORDER APPROVING A NEW DEVELOPMENT SCHEDULE AND AMENDING THE PERMIT

WHEREAS:

1. A PETITION FOR EXTENSION OF TIME WITHIN WHICH TO DEVELOP THE PROJECT AND APPLY THE WATER TO THE PROPOSED USE HAS BEEN FILED WITH THE STATE WATER RESOURCES CONTROL BOARD.

2. THE PERMITTEE HAS PROCEEDED WITH DILIGENCE AND GOOD CAUSE HAS BEEN SHOWN FOR EXTENSION OF TIME AND FOR THE SAID CHANGE.

NOW, THEREFORE, IT IS ORDERED THAT:

1. PARAGRAPH 9 OF THE PERMIT IS AMENDED TO READ AS FOLLOWS:

COMPLETE APPLICATION OF THE WATER TO THE PROPOSED USE SHALL BE MADE ON OR BEFORE DECEMBER 1, 1990 (0000009)

2. PARAGRAPH 11 IS AMENDED AS FOLLOWS:

PURSUANT TO CALIFORNIA WATER CODE SECTIONS 100 AND 275, ALL RIGHTS AND PRIVILEGES UNDER THIS PERMIT AND UNDER ANY LICENSE ISSUED PURSUANT THERETO, INCLUDING METHOD OF DIVERSION, METHOD OF USE, AND QUANTITY OF WATER DIVERTED, ARE SUBJECT TO THE CONTINUING AUTHORITY OF THE STATE WATER RESOURCES CONTROL BOARD IN ACCORDANCE WITH LAW AND IN THE INTEREST OF THE PUBLIC WELFARE TO PREVENT WASTE, UNREASONABLE USE, UNREASONABLE METHOD OF USE, OR UNREASONABLE METHOD OF DIVERSION OF SAID WATER.

THE CONTINUING AUTHORITY OF THE BOARD MAY BE EXERCISED BY IMPOSING SPECIFIC REQUIREMENTS OVER AND ABOVE THOSE CONTAINED IN THIS PERMIT WITH A VIEW TO MINIMIZING WASTE OF WATER AND TO MEETING THE REASONABLE WATER REQUIREMENTS OF PERMITTEE WITHOUT UNREASONABLE DRAFT ON THE SOURCE. PERMITTEE MAY BE REQUIRED TO IMPLEMENT SUCH PROGRAMS AS (1) REUSING OR RECLAIMING THE WATER ALLOCATED; (2) USING WATER RECLAIMED BY ANOTHER ENTITY INSTEAD OF ALL OR PART OF THE WATER ALLOCATED; (3) RESTRICTING DIVERSIONS SO AS TO ELIMINATE AGRICULTURAL TAILWATER OR TO REDUCE RETURN FLOW; (4) SUPPRESSING EVAPORATION LOSSES FROM WATER SURFACES; (5) CONTROLLING PHREATOPHYTIC GROWTH; AND (6) INSTALLING, MAINTAINING, AND OPERATING EFFICIENT WATER MEASURING DEVICES TO ASSURE COMPLIANCE WITH THE QUANTITY LIMITATIONS OF THIS PERMIT AND TO DETERMINE ACCURATELY WATER USE AS AGAINST REASONABLE WATER REQUIREMENTS FOR THE AUTHORIZED PROJECT. NO ACTION WILL BE TAKEN PURSUANT TO THIS PARAGRAPH UNLESS THE BOARD DETERMINES, AFTER NOTICE TO AFFECTED PARTIES AND OPPORTUNITY FOR HEARING, THAT SUCH SPECIFIC REQUIREMENTS ARE PHYSICALLY AND FINANCIALLY FEASIBLE AND ARE APPROPRIATE TO THE PARTICULAR SITUATION.

3. PARAGRAPH 17 IS ADDED TO THIS PERMIT AS FOLLOWS:

THE STATE WATER RESOURCES CONTROL BOARD, UNDER ITS AUTHORITY TO CONSERVE THE PUBLIC INTEREST, RETAINS CONTINUING AUTHORITY OVER THIS PERMIT TO REQUIRE PERMITTEE TO DEVELOP AND IMPLEMENT A WATER CONSERVATION PROGRAM, AFTER NOTICE AND OPPORTUNITY FOR HEARING. THE REQUIREMENTS OF THIS TERM MAY BE SATISFIED BY PERMITTEE'S COMPLIANCE WITH ANY COMPREHENSIVE WATER CONSERVATION PROGRAM, APPROVED BY THE STATE WATER RESOURCES CONTROL BOARD, WHICH MAY BE IMPOSED BY A PUBLIC AGENCY. (0000029)

DATED: MARCH 31 1981

Walter G. Pettit

WALTER G. PETTIT, CHIEF
DIVISION OF WATER RIGHTS

CONTACT REPORT

DIVISION OF WATER RIGHTS

STATE WATER RESOURCES CONTROL BOARD

Subject [illegible] water release [illegible] Felton Diversion Dam Permits [illegible] & [illegible] (Applications 22318 & 23710)

Division Personnel L. Spencer

Date 1- -79 **Time** 16:45

Personal ☐ **Where**

Telephone ☒ **Number** 408-429-3670

Individual(s)/Agency Contacted Morris Allen

Conversation Description Paul Chappelle / DFG called Walt Pettit this afternoon about a fisheries problem in San Lorenzo River below Felton Diversion Dam. He reported that flow was below 20 cfs and the City was bypassing the entire flow. The inflatable dam was not inflated enough to cause the fish ladder to operate and salmon were spawning below the diversion dam. See Walt's note for further info. Walt asked me to call Morris Allen and check out the factual situation.

Morris stated that the flow in the San Lorenzo was 16 cfs that the entire flow was being bypassed. The inflatable dam was up about a foot and the fish ladder non-operational. The flow being bypassed was to small for the salmon to navigate. We discussed Chappelle's proposal and Morris mentioned an alternative. He stated that the City was not willing to operate at variance from its permit without a directive from us. I stated that an order by the Board would not be necessary, a written directive would be sufficient.

I stated we would keep him advised of developments.

Decision(s)

Action Items

SURNAME	Spencer	[illegible]		

STATE OF CALIFORNIA
THE RESOURCES AGENCY
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS

ORDER

APPLICATION 23710 PERMIT 16601 LICENSE

ORDER CORRECTING DESCRIPTION OF
POINT OF DIVERSION

WHEREAS:

1. The permittee's Felton Diversion Plant was constructed within NE¼ of SW¼ of Section 22 instead at the permitted point of diversion being within SE¼ of NW¼ of said Section 22.

2. The State Water Resources Control Board has determined that no legal user of water will be injured by correcting the description of point of diversion.

NOW, THEREFORE, IT IS ORDERED THAT:

1. The description of point of diversion under permit 16601 be corrected to read as follows:

   SOUTH 30° EAST 3,200 FEET FROM THE NW CORNER OF SECTION 22 BEING WITHIN THE NE¼ OF SW¼ OF PROJECTED SECTION 22, T10S, R2W, MDB&M.

Dated: DECEMBER 8 1978

for Michael A. Campos, Chief
Division of Water Rights

16283-987 11-67 2M OSP

STATE OF CALIFORNIA
THE RESOURCES AGENCY
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS

PERMIT FOR DIVERSION AND USE OF WATER

PERMIT 16601

Application 23710 of CITY OF SANTA CRUZ

CITY HALL, SANTA CRUZ, CALIFORNIA 95060

filed on MARCH 1, 1971, has been approved by the State Water Resources Control Board SUBJECT TO VESTED RIGHTS and to the limitations and conditions of this Permit.

Permittee is hereby authorized to divert and use water as follows:

1. Source: SAN LORENZO RIVER — Tributary to: PACIFIC OCEAN

2. Location of point of diversion:	40-acre subdivision of public land survey or projection thereof	Section	Township	Range	Base and Meridan
SOUTH 48° EAST, 2,904 FEET FROM NW CORNER OF SECTION 22	SE1/4 OF NW1/4	22	10S	2W	MD

County of SANTA CRUZ

3. Purpose of use:	4. Place of use:	Section	Township	Range	Base and Meridan	Acres
MUNICIPAL	CITY OF SANTA CRUZ					
	WATER SERVICE AREA					
	WITHIN T10-11S, R1-3W, MDB&M					

The place of use is shown on map filed with the State Water Resources Control Board.

5. THE WATER APPROPRIATED SHALL BE LIMITED TO THE QUANTITY WHICH CAN BE BENEFICIALLY USED AND SHALL NOT EXCEED 3,000 ACRE-FEET PER ANNUM BY STORAGE TO BE COLLECTED FROM OCTOBER 1 OF EACH YEAR TO JUNE 1 OF THE SUCCEEDING YEAR.

THE TOTAL QUANTITY OF WATER DIVERTED UNDER THIS PERMIT TOGETHER WITH THAT DIVERTED UNDER PERMIT 16123 (APPLICATION 22318) SHALL NOT EXCEED 3,000 ACRE-FEET PER ANNUM.

THE COMBINED MAXIMUM RATE OF DIVERSION TO OFFSTREAM STORAGE UNDER THIS PERMIT AND PERMIT 16123 (APPLICATION 22318) SHALL NOT EXCEED 20 CUBIC FEET PER SECOND.

THIS PERMIT DOES NOT AUTHORIZE COLLECTION OF WATER TO STORAGE OUTSIDE THE SPECIFIED SEASON TO OFFSET EVAPORATION AND SEEPAGE LOSSES OR FOR ANY OTHER PURPOSE. (0000005)

6. THE AMOUNT AUTHORIZED FOR APPROPRIATION MAY BE REDUCED IN THE LICENSE IF INVESTIGATION WARRANTS. (0000006)

7. ACTUAL CONSTRUCTION WORK SHALL BEGIN ON OR BEFORE NINE MONTHS FROM DATE OF PERMIT AND SHALL THEREAFTER BE PROSECUTED WITH REASONABLE DILIGENCE, AND IF NOT SO COMMENCED AND PROSECUTED, THIS PERMIT MAY BE REVOKED. (0000007)

8. SAID CONSTRUCTION WORK SHALL BE COMPLETED ON OR BEFORE DECEMBER 1, 1975. (0000008)

9. COMPLETE APPLICATION OF THE WATER TO THE PROPOSED USE SHALL BE MADE ON OR BEFORE DECEMBER 1, 1980. (0000009)

10. PROGRESS REPORTS SHALL BE SUBMITTED PROMPTLY BY PERMITTEE WHEN REQUESTED BY THE STATE WATER RESOURCES CONTROL BOARD UNTIL LICENSE IS ISSUED. (0000010)

11. ALL RIGHTS AND PRIVILEGES UNDER THIS PERMIT AND UNDER ANY LICENSE ISSUED PURSUANT THERETO, INCLUDING METHOD OF DIVERSION, METHOD OF USE, AND QUANTITY OF WATER DIVERTED, ARE SUBJECT TO THE CONTINUING AUTHORITY OF THE STATE WATER RESOURCES CONTROL BOARD IN ACCORDANCE WITH LAW AND IN THE INTEREST OF THE PUBLIC WELFARE TO PREVENT WASTE, UNREASONABLE USE, UNREASONABLE METHOD OF USE, OR UNREASONABLE METHOD OF DIVERSION OF SAID WATER.

THIS CONTINUING AUTHORITY OF THE BOARD MAY BE EXERCISED BY IMPOSING SPECIFIC REQUIREMENTS OVER AND ABOVE THOSE CONTAINED IN THIS PERMIT WITH A VIEW TO MINIMIZING WASTE OF WATER AND TO MEETING THE REASONABLE WATER REQUIREMENTS OF PERMITTEE WITHOUT UNREASONABLE DRAFT ON THE SOURCE. PERMITTEE MAY BE REQUIRED TO IMPLEMENT SUCH PROGRAMS AS (1) REUSING OR RECLAIMING THE WATER ALLOCATED; (2) RESTRICTING DIVERSIONS SO AS TO ELIMINATE AGRICULTURAL TAILWATER OR TO REDUCE RETURN FLOW; (3) SUPPRESSING EVAPORATION LOSSES FROM WATER SURFACES; (4) CONTROLLING PHREATOPHYTIC GROWTH; AND (5) INSTALLING, MAINTAINING, AND OPERATING EFFICIENT WATER MEASURING DEVICES TO ASSURE COMPLIANCE WITH THE QUANTITY LIMITATIONS OF THIS PERMIT AND TO DETERMINE ACCURATELY WATER USE AS AGAINST REASONABLE WATER REQUIREMENTS FOR THE AUTHORIZED PROJECT. NO ACTION WILL BE TAKEN PURSUANT TO THIS PARAGRAPH UNLESS THE BOARD DETERMINES, AFTER NOTICE TO AFFECTED PARTIES AND OPPORTUNITY FOR HEARING, THAT SUCH SPECIFIC REQUIREMENTS ARE PHYSICALLY AND FINANCIALLY FEASIBLE AND ARE APPROPRIATE TO THE PARTICULAR SITUATION. (0000012)

12. THE QUANTITY OF WATER DIVERTED UNDER THIS PERMIT AND UNDER ANY LICENSE ISSUED PURSUANT THERETO IS SUBJECT TO MODIFICATION BY THE STATE WATER RESOURCES CONTROL BOARD IF, AFTER NOTICE TO THE PERMITTEE AND AN OPPORTUNITY FOR HEARING, THE BOARD FINDS THAT SUCH MODIFICATION IS NECESSARY TO MEET WATER QUALITY OBJECTIVES IN WATER QUALITY CONTROL PLANS WHICH HAVE BEEN OR HEREAFTER MAY BE ESTABLISHED OR MODIFIED PURSUANT TO DIVISION 7 OF THE WATER CODE. NO ACTION WILL BE TAKEN PURSUANT TO THIS PARAGRAPH UNLESS THE BOARD FINDS THAT (1) ADEQUATE WASTE DISCHARGE REQUIREMENTS HAVE BEEN PRESCRIBED AND ARE IN EFFECT WITH RESPECT TO ALL WASTE DISCHARGES WHICH HAVE ANY SUBSTANTIAL EFFECT UPON WATER QUALITY IN THE AREA INVOLVED, AND (2) THE WATER QUALITY OBJECTIVES CANNOT BE ACHIEVED SOLELY THROUGH THE CONTROL OF WASTE DISCHARGES. (0000013)

13. PERMITTEE SHALL ALLOW REPRESENTATIVES OF THE STATE WATER RESOURCES CONTROL BOARD AND OTHER PARTIES AS MAY BE AUTHORIZED FROM TIME TO TIME BY SAID BOARD REASONABLE ACCESS TO PROJECT WORKS TO DETERMINE COMPLIANCE WITH THE TERMS OF THIS PERMIT. (0000011)

14. PERMITTEE SHALL ACCORD TO THE PUBLIC, FOR THE PURPOSE OF FISHING, REASONABLE RIGHT OF ACCESS TO THE WATERS IMPOUNDED IN LOCH LOMOND RESERVOIR DURING THE OPEN SEASON FOR THE TAKING OF FISH SUBJECT TO THE REGULATIONS OF THE FISH AND GAME COMMISSION. (0030045)

15. IN ORDER TO PREVENT DEGRADATION OF THE QUALITY OF WATER DURING AND AFTER CONSTRUCTION OF THE PROJECT, PRIOR TO COMMENCEMENT OF CONSTRUCTION PERMITTEE SHALL FILE A REPORT PURSUANT TO WATER CODE SECTION 13260 AND SHALL COMPLY WITH ANY WASTE DISCHARGE REQUIREMENTS IMPOSED BY THE CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, CENTRAL COAST REGION, OR BY THE STATE WATER RESOURCES CONTROL BOARD. (0000100)

16. FOR THE PROTECTION OF FISH, NO DIVERSION SHALL BE MADE DURING THE MONTH OF OCTOBER WHICH DEPLETES THE FLOW OF THE STREAM TO LESS THAN 25 CUBIC FEET PER SECOND NOR TO LESS THAN 20 CUBIC FEET PER SECOND DURING THE PERIOD NOVEMBER 1 TO THE SUCCEEDING MAY 31. NO WATER SHALL BE DIVERTED UNTIL PERMITTEE HAS INSTALLED IN THE STREAM IMMEDIATELY BELOW ITS POINT OF DIVERSION A STAFF GAGE, OR OTHER DEVICE SATISFACTORY TO THE STATE WATER RESOURCES CONTROL BOARD, SHOWING THE WATER LEVELS WHICH CORRESPOND TO THE ABOVE-MENTIONED FLOWS IN CUBIC FEET PER SECOND. AS A CONDITION OF CONTINUING DIVERSION, SAID MEASURING DEVICE SHALL BE PROPERLY MAINTAINED. (0140060)

This permit is issued and permittee takes it subject to the following provisions of the Water Code:

Section 1390. A permit shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code), but no longer.

Section 1391. Every permit shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a permit is issued takes it subject to the conditions therein expressed.

Section 1392. Every permittee, if he accepts a permit, does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any permit granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any permittee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any permittee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Dated: JUL 23 1973

STATE WATER RESOURCES CONTROL BOARD

K. L. Woodward

Chief, Division of Water Rights

Permit 16601

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

In the Matter of Request for Modification of Terms of Permits 16123 and 16601 by CITY OF SANTA CRUZ	Decision 1464

DECISION TEMPORARILY MODIFYING PERMIT TERMS

BY BOARD MEMBER ADAMS:

On March 8, 1977, the State Water Resources Control Board held a public hearing in the above-entitled matter pursuant to Section 736.1 of Title 23, California Administrative Code. This hearing was held to determine whether the Board should exercise its continuing authority under Term 11 of Permits 16123 and 16601 to modify permit conditions regarding bypasses for preservation of fish and wildlife. The City of Santa Cruz, Department of Fish and Game and other interested parties having appeared and presented evidence; the evidence received at the hearing having been duly considered, the Board finds as follows:

Permittee's Water Supply System

1. Permittee's water system provides service to about 58,000 customers within and without the city limits. Permittee's major sources of water are the San Lorenzo River, coastal streams and wells.

2. Permittee holds Permits 16123 and 16601 which authorize diversion from San Lorenzo River at Felton diversion offstream storage in Loch Lomond Reservoir. These permits together limit the total quantity diverted at the Felton diversion to 3,000 acre-feet per annum (afa). The annual safe yield estimate for the remaining components of permittee's water supply is as follows: Newell Creek, 2,300 afa; San Lorenzo River at Crossing Street, 6,190 afa; wells, 450 afa; and coastal streams, 1,360 afa. The total annual safe yield estimate for the City's system, including the Felton diversion, is 13,300 afa.

3. Evidence established the existence of a bonafide drought and that because of the existing drought conditions the City would have a deficiency of 2,832 acre-feet (af) in estimated total annual safe yield at the end of this year, assuming normal usage.

Water Conservation Measures

4. On March 1, 1977, the City of Santa Cruz adopted a water conservation ordinance (Ordinance No. 77-6) which declares the presence of a drought emergency, reduces water use, and prescribes penalties for violations. The water usage provisions are substantially as follows:

Residential usage:

Persons per house	Bimonthly Amount	Equivalent Gallons per day	Equivalent Gallons per day per person
1	900 cf	112	112
2	1500 cf	187	94
3	2000 cf	250	83
4	2400 cf	300	75
Each additional person	400 cf	50	

All other uses, including commercial, industrial, and irrigation, are limited to 70 percent of use in 1975.

5. A priority system for water use based upon need was not established by the ordinance, and the ordinance is specifically found to be deficient in this respect. Moreover, testimony was presented, including that of a witness representing the County of Santa Cruz, generally critical of the daily per capita domestic water consumption allowed by the ordinance. One witness characterized the measure as a "water wasting" ordinance. Nevertheless, it is found that the measure does require a substantial reduction in "normal" water usage in the permittee's service area. The Board is reluctant to review the judgment of permittee's City Council, at this time, with respect to the specifics of its water conservation measures.

6. The water conservation measures noted above would, by permittee's estimate, reduce water consumption by 3,500 af by the end of this year. This saving in consumption, less the

deficit identified in paragraph 3 would result in a net savings of 700 af to permittee's system for use after 1977.

Availability of Alternative Supplies

7. Evidence established that the most likely source of an alternative water supply is increased use of groundwater. However, neither this source nor increased diversion from the San Lorenzo River at Crossing Street is available at this time. It is further found that permittee in the past has not diligently pursued development of alternative supplies.

Permittee's Request

8. By letter of February 9, 1977, permittee requested a temporary modification of Term 16 of Permit 16601. (Since the same restriction is imposed by Term 14 of Permit 16123, modification of that term was also considered at the hearing.) The effect of these terms relevant to this proceeding is to require bypass of 20 cubic-feet per second (cfs) or the natural flow, whichever is the less, until May 31, the end of the diversion season, for preservation of fish and wildlife. Permittee requested that this bypass requirement be reduced to 10 cfs.

9. Since the effect of the water conservation measures taken by permittee will be to achieve a net saving of 700 af this year for use next year, it is found that permittee's supply will not be exhausted this year. Therefore, the reason for the request to modify the bypass requirement is to further increase availability of water to the system should the

drought continue into 1978. The City estimates it can increase storage in Loch Lomond by 750-900 af by May 31, 1977, if its request to reduce the bypass flow is granted.

Impact on the Fishery

10. Evidence presented by the Department of Fish and Game established that the existing bypass requirement of 20 cfs is a minimum flow needed to provide transportation for migrating salmon and steelhead.

11. Department of Fish and Game evidence further established that a flow of 14.1 cfs existed on March 1 and flows immediately prior to the date of hearing were about 10.4 cfs, all of which flows, pursuant to the relevant permit terms, were being bypassed. As a result of these low flows, the San Lorenzo River fishery has been and will continue to be damaged. Such flows do not allow migration, but will only serve to keep a small population of fish alive in pools in which they are stranded.

12. Department of Fish and Game evidence further established that modification of the relevant terms to require bypass of 10 cfs for the remainder of the diversion season will not have a significant additional adverse impact on the already damaged fishery, but that any significant storm flows occurring between now and the end of the diversion season at the Felton diversion should be bypassed through the diversion to allow temporary fish movement to mitigate the drought's adverse impact upon the fishery.

13. The Board should, upon any request of Permittee for modification of bypass terms to be effective when the diversion season resumes next fall, hold further hearing to consider the suitability of permittee's water conservation measures and pursuit of alternate supplies.

14. The Department of Fish and Game also recommended that the fishery be given a "credit" in the form of a right to release from storage in a normal water year within five years, at a rate specified by the Department, the amount of water diverted to storage as the result of any modification. The record in this matter discloses considerable concern over the adequacy, in normal years, of the existing fish and wildlife preservation conditions of the permits governing the Felton diversion. Moreover, the record also discloses the existence of an on-going joint local-state program to develop a Waterway Management Plan for the San Lorenzo River. Accordingly, rather than acting upon the Department's recommendation to establish a "credit" for the diversions allowed by the modification, the Board announces its intention to review the adequacy of these existing permit terms in the light of the completed Waterway Management Plan and with the aid of further input by the Department of Fish and Game, permittee, and other interested parties. The Board may, on its own motion or upon request of any interested party, hold a hearing at the appropriate time to conduct such review.

DETERMINATION OF ISSUE

Cause exists for modification of the relevant permit terms regarding minimum bypass flows, upon suitable conditions, in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion of water.

ORDER

1. Condition 14 of Permit 16123 is temporarily modified to read:

"14. Permittee shall bypass 10 cubic feet per second or the natural flow, whichever is less, from September 1 through May 31 for the preservation of fish and wildlife; provided, that diversion shall be made only during such times as flow at the diversion exceeds 12.5 cubic feet per second." (0030045)

2. Condition 16 of Permit 16601 is temporarily modified to read:

"16. For the protection of fish, no diversion shall be made during the month of October which depletes the flow of the stream to less than 25 cubic feet per second nor to less than 10 cubic feet per second during the period November 1 to the succeeding May 31. No water shall be diverted until permittee has installed in the stream immediately below its point of diversion a staff gage, or other device satisfactory to the State Water Resources Control Board, showing the water levels which correspond

to the above-mentioned flows in cubic feet per second. As a condition of continuing diversion, said measuring device shall be properly maintained. Diversion shall be made only during such times as flow at the diversion exceeds 12.5 cubic feet per second."

3. The following additional condition, appropriately numbered, is added to Permits 16123 and 16601:

"The duration of the modification of Condition (14/16) authorized by State Water Resources Control Board Decision 1464, and of this condition shall be from March 17, 1977, through May 31, 1977, and shall thereafter be of no force or effect. From and after June 1, 1977, said condition (14/16) shall be as it existed immediately prior to the effective date of such modification. In addition, the following conditions shall be observed during the effective period of the modification of condition (14/16):

a. During any period when flow at the diversion exceeds 20 cfs, permittee shall bypass 20 cfs for the preservation of fish and wildlife. When, following any such period, such flow recedes to 20 cfs or less but is greater than 18 cfs, permittee shall make no diversion until such flow recedes to 18 cfs or less, whereupon permittee may divert in accordance with modified condition (14/16).

b. Approval of permittee's gage system and rating table was required by State Water Resources Control Board Decision 1459. Interim approval thereof until March 31, 1977, as granted by letter from the Chief, Division of Water Rights, dated November 18, 1976, (333:MLS:22318), is hereby extended through May 31, 1977."

(0140060)

Dated: MAR 17 1977

WE CONCUR:

/s/ W. W. Adams
W. W. Adams, Member

/s/ John E. Bryson
John E. Bryson, Chairman

/s/ W. Don Maughan
W. Don Maughan, Vice Chairman

/s/ Roy E. Dodson
Roy E. Dodson, Member

/s/ Jean Auer
Jean Auer, Member

FORM 64

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES

License for Diversion and Use of Water

LICENSE 1553 PERMIT 2372 APPLICATION 4017

THIS IS TO CERTIFY, *That* City of Santa Cruz of Santa Cruz, California

has made proof to the satisfaction of the Division of Water Resources of California of a right to the use of the waters of San Lorenzo River, surface and sub-surface flow, in Santa Cruz County

tributary of Pacific Ocean

for the purpose of municipal and domestic uses *under Permit* 2372 *of the Division of Water Resources and that said right to the use of said waters has been perfected in accordance with the laws of California, the rules and regulations of the Division of Water Resources and the terms of the said permit; that the priority of the right herein confirmed dates from* June 9, 1924,

that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to the amount actually beneficially used for said purposes and shall not exceed six and two tenths (6.2) cubic feet per second from either or all points of diversion combined from January 1st to December 31st of each season.

The points of diversion of such water are located:

DIVERSION DAM: N. 25°00' E., 196.53 feet thence N. 65°00' W., 44 feet from the point of intersection of the eastern line of River Street with the northwestern line of Crossing Street; being within the SE¼ of NW¼ of projected Section 12, T 11 S, R 2 W, M.D.B.&M.

WELL NO. 1: N. 25°00' E., 150 feet thence S. 65°00' E., 116 feet from the point of intersection of the eastern line of River Street with the southeastern line of Crossing Street; being within the SE¼ of NW¼ of projected Section 12, T 11 S, R 2 W, M.D.B.&M.

WELL NO. 2: On southern line of Crossing Street, 461 feet westerly from the point of intersection of the western line of Ocean Street with the southern line of Crossing Street; being within the NE¼ of NW¼ of projected Section 12, T 11 S, R 2 W, M.D.B.&M.

WELL NO. 3: On Southern line of Crossing Street, 270 feet westerly from the point of intersection of the western line of Ocean Street with the southern line of Crossing Street; being within the NE¼ of NW¼ of projected Section 12, T 11 S, R 2 W, M.D.B.&M.

WELL NO. 4: S. 72°40' W., 322.58 feet thence N. 17°20' W., 135 feet from the point of intersection of northern line of Crossing Street with the western line of Ocean Street; being within the NE¼ of NW¼ of projected Section 12, T 11 S, R 2 W, M.D.B.&M.

A description of the lands or the place where such water is put to beneficial use is as follows: The City of Santa Cruz, and that area east of the City of Santa Cruz, bounded on the west by the eastern boundary of the City of Santa Cruz, on the south by the Bay of Monterey, on the east by the eastern line of 41st Avenue and a line from the intersection of the eastern line of 41st Avenue with the southern line of the Santa Cruz-Watsonville Highway at a right angle to said southern line of Santa Cruz-Watsonville Highway extending to the north boundary of Section 9, T 11 S, R 1 W, M.D.B.&M.; and bounded on the north by the north boundary of Sections 8 and 9, T 11 S, R 1 W, M.D.B.&M.; as shown on map entitled "Map to Accompany Petition to Amend Application 4017, Permit 2372 to Appropriate Waters of the San Lorenzo River for Area outside of the City of Santa Cruz" filed April 15, 1935, with the Division of Water Resources.

The right to the diversion and use of the water aforesaid hereby confirmed is restricted to the point of diversion herein specified and to the lands or place of use herein described.

1

This license is granted and said appropriator takes all rights herein mentioned subject to the terms and conditions set forth in Section 20 of Chapter 586, Statutes 1913, which is as follows:

SEC. 20. All permits and licenses for the appropriation of water shall be under the terms and conditions of this act, and shall be effective for such time as the water actually appropriated under such permits and licenses shall actually be used for the useful and beneficial purpose for which said water was appropriated, but no longer; and every such permit or license shall include the enumeration of conditions therein which in substance shall include all of the provisions of this section and likewise the statement that any appropriator of water, to whom said permit or license may be issued, shall take the same subject to such conditions as therein expressed; *provided*, that if, at any time after the expiration of twenty years after the granting of a license, the state, or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the state shall have the right to purchase the works and property occupied and used under said license and the works built or constructed for the enjoyment of the rights granted under said license; and in the event that the said state, city, city and county, municipal water district, irrigation district, lighting district or political subdivision of the state so desiring to purchase and the said owner of said works and property can not agree upon said purchase price, said price shall be determined in such manner as is now or may hereafter be determined in eminent domain proceedings. If it shall appear to the state water commission at any time after a permit or license is issued as in this act provided that the permittee or licensee, or the heirs, successors or assigns of said permittee or licensee, has not put the water granted under said permit or license to the useful or beneficial purpose for which the permit or license was granted, or that the permittee or licensee, or the heirs, successors or assigns of said permittee or licensee, has ceased to put said water to such useful or beneficial purpose, or that the permittee or licensee, or the heirs, successors or assigns of said permittee or licensee has failed to observe any of the terms and conditions in the permit or license as issued, then and in that case the said commission, after due notice to the permittee, licensee, or the heirs, successors or assigns of such permittee or licensee, and a hearing thereon, may revoke said permit or license, and declare the water to be unappropriated and open to further appropriation in accordance with the terms of this act. And the findings and declaration of said commission shall be deemed to be prima facie correct until modified or set aside by a court of competent jurisdiction; *provided*, that any action brought so to modify or set aside such finding or declaration must be commenced within thirty days after the service of notice of said revocation on said permittee or licensee, his heirs, successors or assigns. And every licensee or permittee under the provisions of this act if he accepts such permit or license shall accept the same under the conditions precedent that no value whatsoever in excess of the actual amount paid to the state therefor shall at any time be assigned to or claimed for any permit or license granted or issued under the provisions of this act, or for any rights granted or acquired under the provisions of this act, in respect to the regulations by any competent public authority of the services or the price of the services to be rendered by any permittee or licensee, his heirs, successors or assigns or by the holder of any rights granted or acquired under the provisions of this act, or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the state or any city, city and county, municipal water district, irrigation district, lighting district or any political subdivision of the state, of the rights and property of any permittee or licensee, or the possessor of any rights granted, issued, or acquired under the provisions of this act. The application for a permit by municipalities for the use of water for said municipalities or the inhabitants thereof for domestic purposes shall be considered first in right, irrespective of whether they are first in time; *provided, however*, that such application for a permit or the granting thereafter of permission to any municipality to appropriate waters, shall not authorize the appropriation of any water for other than municipal purposes; *and providing, further*, that where permission to appropriate is granted by the state water commission to any municipality for any quantity of water in excess of the existing municipal needs therefor, that pending the application of the entire appropriation permitted, the state water commission shall have the power to issue permits for the temporary appropriation of the excess of such permitted appropriation over and above the quantity being applied from time to time by such municipality; *and providing, further*, that in lieu of the granting of such temporary permits for appropriation, the state water commission may authorize such municipality to become as to such surplus a public utility, subject to the jurisdiction and control of the railroad commission of the State of California for such period or periods from and after the date of the issuance of such permission to appropriate, as may be allowed for the application to municipal uses of the entire appropriation permitted; *and provided, further*, that when such municipality shall desire to use the additional waters granted in its said application it may do so upon making just compensation for the facilities for taking, conveying and storing such additional water rendered valueless for said purposes, to the person, firm or corporation which constructed said facilities for the temporary use of said excess waters, and which compensation, if not agreed upon between the municipality and said person, firm or corporation, may be determined in the manner provided by law for determining the value of property taken by and through eminent domain proceedings.

Witness my hand and the seal of the Department of Public Works of the State of California, this seventh *day of* May, *19* 35.

EDWARD HYATT
State Engineer

By Harold Conkling
Deputy

LICENSE 1553

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES

LICENSE
TO APPROPRIATE WATER

ISSUED TO City of Santa Cruz

DATED May 7, 1935

2842 4-33 1M CALIFORNIA STATE PRINTING OFFICE

2

STATE OF CALIFORNIA—STATE WATER RIGHTS BOARD

License for Diversion and Use of Water

APPLICATION 5215 PERMIT 2738 LICENSE 7200

THIS IS TO CERTIFY, *That*

City of Santa Cruz
P. O. Box 919
Santa Cruz, California

has made proof as of July 10, 1963, *(the date of inspection) to the satisfaction of the State Water Rights Board of a right to the use of the water of* San Lorenzo River in Santa Cruz County

tributary to Pacific Ocean

for the purpose of municipal and domestic uses *under Permit* 2738 *of the State Water Rights Board and that said right to the use of said water has been perfected in accordance with the laws of California, the Rules and Regulations of the State Water Rights Board and the terms of the said permit; that the priority of the right herein confirmed dates from* September 20, 1926, *and that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to the amount actually beneficially used for said purposes and shall not exceed* six (6) cubic feet per second to be diverted from January 1 to December 31 of each year.

The points of diversion of such water are located:

Diversion Dam: North twenty-five degrees no minutes east (N25° 00'E) one hundred ninety-six and fifty-three hundredths (196.53) feet thence north sixty-five degrees west (N65°W) forty-four (44) feet from point of intersection of eastern line of River Street with northwestern line of Crossing Street, being within SE¼ of NW¼ of projected Section 12, T11S, R2W, MDB&M.

Well No. 2: On southern line of Crossing Street, four hundred sixty-one (461) feet westerly from point of intersection of western line of Ocean Street with southern line of Crossing street, being within NE¼ of NW¼ of projected Section 12, T11S, R2W, MDB&M.

Well No. 3: On southern line of Crossing Street, two hundred seventy (270) feet westerly from point of intersection of western line of Ocean Street with southern line of Crossing Street, being within NE¼ of NW¼ of projected Section 12, T11S, R2W, MDB&M.

Well No. 4: South seventy-two degrees forty minutes west (S72° 40'W) three hundred twenty-two and fifty-eight hundredths (322.58) feet thence north seventeen degrees twenty minutes west (N17° 20'W) one hundred thirty-five (135) feet from point of intersection of northern line of Crossing Street with western line of Ocean Street, being within NE¼ of NW¼ of projected Section 12, T11S, R2W, MDB&M.

A description of the lands or the place where such water is put to beneficial use is as follows:

Within the boundaries of the City of Santa Cruz and environs as shown on map filed with State Water Rights Board on October 14, 1963, and being within projected sections of the public land survey as follows:

Sections 29, 31, and 32, T10S, R1W, MDB&M.

Sections 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20, and 21, T11S, R1W, MDB&M.

Sections 35 and 36, T10S, R2W, MDB&M.

Sections 1, 2, 10, 11, 12, 13, 14, 15, 22, 23, 24, 26, and 27, T11S, R2W, MDB&M.

All rights and privileges under this license including method of diversion, method of use and quantity of water diverted are subject to the continuing authority of the State Water Rights Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion of said water.

Reports shall be filed promptly by licensee on appropriate forms which will be provided for the purpose from time to time by the State Water Rights Board.

The right hereby confirmed to the diversion and use of water is restricted to the point or points of diversion herein specified and to the lands or place of use herein described.

This license is granted and licensee accepts all rights herein confirmed subject to the following provisions of the Water Code:

Section 1625. Each license shall be in such form and contain such terms as may be prescribed by the board.

Section 1626. All licenses shall be under the terms and conditions of this division (of the Water Code).

Section 1627. A license shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code) but no longer.

Section 1628. Every license shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a license is issued takes the license subject to the conditions therein expressed.

Section 1629. Every licensee, if he accepts a license does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any license granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any licensee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any licensee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Section 1630. At any time after the expiration of twenty years after the granting of a license, the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State shall have the right to purchase the works and property occupied and used under the license and the works built or constructed for the enjoyment of the rights granted under the license.

Section 1631. In the event that the State, or any city, city and county, municipal water district, irrigation district, lighting district, or political subdivision of the State so desiring to purchase and the owner of the works and property cannot agree upon the purchase price, the price shall be determined in such manner as is now or may hereafter be provided by law for determining the value of property taken in eminent domain proceedings.

Dated: MAR 1 0 1965

L. K. Hill
Executive Officer

LICENSE 7200

STATE OF CALIFORNIA
STATE WATER RIGHTS BOARD

LICENSE
TO APPROPRIATE WATER

ISSUED TO City of Santa Cruz

DATED MAR 1 0 1965

72548 3-65 1M Ⓘ SPO

2

State Water Resources Control Board

Division of Water Rights
1001 I Street, 14th Floor ♦ Sacramento, California 95814 ♦ 916.341.5300
P.O. Box 2000 ♦ Sacramento, California 95812-2000
Fax: 916.341.5400 ♦ www.waterrights.ca.gov

Linda S. Adams
Secretary for
Environmental Protection

Arnold Schwarzenegger
Governor

NOTICE OF PETITIONS FOR EXTENSION OF TIME FOR PERMITS 16601 AND 16123 (APPLICATIONS 23710 AND 22318) AND PETITIONS FOR CHANGE OF METHOD OF DIVERSION FOR PERMITS 16601 AND 16123 (APPLICATIONS 23710 AND 22318) AND LICENSE 9847 (APPLICATION 17913)

COUNTY: Santa Cruz

STREAM SYSTEM: San Lorenzo River and Newell Creek

City of Santa Cruz (Petitioner) has filed a petition for a 25-year extension of time and petitions for change of method of diversion. The Petitioner request to change a portion of the storage rights to direct diversion. Any correspondence directed to the Petitioner should be addressed to City of Santa Cruz c/o Water Department, P.O. Box 682, Santa Cruz, CA 95061.

Summary of Permits 16601 and 16123

Source:	San Lorenzo River tributary to Pacific Ocean
Point of Diversion(POD):	Present: POD to offstream storage within NE¼ of SW¼ of Project Section 22, T10S, R2W, MDB&M for storage in Loch Lomond Reservoir Proposed: Addition of direct diversion at present POD.
Amount:	3,000 acre-feet per annum by storage under each permit. The maximum combined rate of diversion to offstream storage to exceed 20 cubic feet per second (cfs) a maximum combined limit of 3,000 acre-feet per annum (afa) by storage under both rights.
Season:	Permit 16123: September 1 of each year to June 1 of the succeeding year. Permit 16601: October 1 of each year to June 1 of the succeeding year.
Purpose of Use:	Municipal
Place of Use:	City of Santa Cruz water service area within T10 to 11S, R1 to 3W, MDB&M.

Summary of License 9847

Source:	Newell Creek
Point of Diversion:	Present: POD from Newell Creek at Newell Dam within NW¼ of SW¼ of Section 34, T9N, R2W, MDB&M for storage in Loch Lomond Reservoir Proposed: Addition of direct diversion at present POD.
Amount:	Annual collection of 5,600 afa. Total storage is 8,624 acre-feet in Loch Lomond Reservoir.
Season:	September 1 of each year to July 1 of each succeeding year
Purpose of Use:	Domestic, fire protection, industrial, municipal, and recreational
Places of Use:	Loch Lomond Reservoir, San Lorenzo Basin, Upper San Lorenzo Valley, Scotts Valley, and Santa Cruz within T8 to 11S, R1 to 3W, MDB&M.

Project information, procedures for protesting and protest forms are available at: www.waterrights.ca.gov. The contact person for this matter is Norm Ponferrada at (916) 341-5362, or by e-mail at nponferrada@waterboards.ca.gov.

Protests must be received by the Division of Water Rights by 4:30 p.m. on November 10, 2008

Date of Notice: October 9, 2008

NFP: DCC: 10/07/08
U:\PERDRV\NPonferrada\22318, 23710, & 17913 City of Santa Cruz\Notice Petition

Appendix D

Selected figures from:

(1) Soquel Creek Water District and Central Water District Groundwater Management Plan (SqCWD and CWD, 2007) and

(2) Groundwater Assessment of Alternative Conjunctive Use Scenarios (Johnson et. al, 2004)

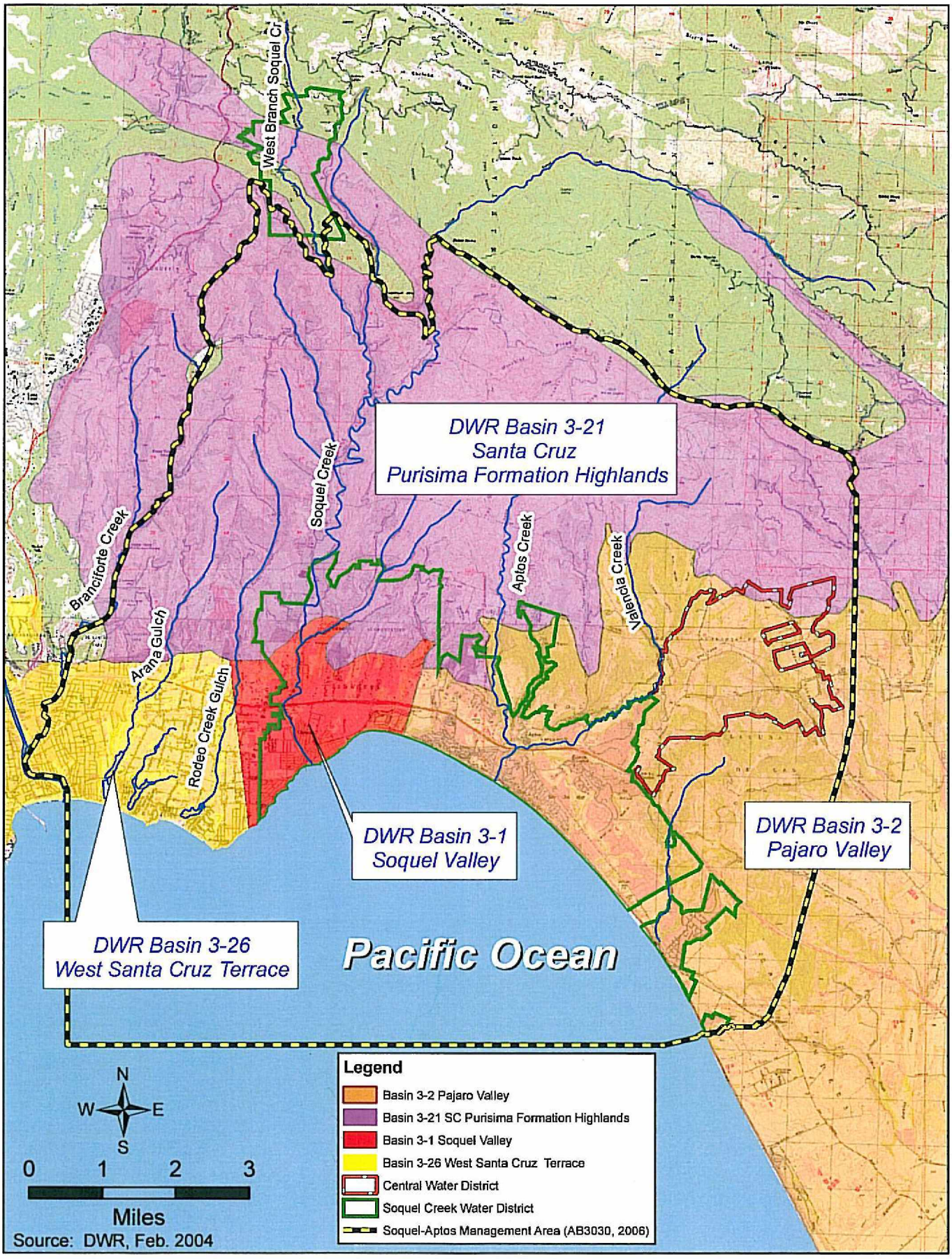


Figure 3-3
DWR Groundwater Basins

Figure D-1

Source: *Soquel Creek Water District and Central Water District Groundwater Management Plan* (SqCWD and CWD, 2007)

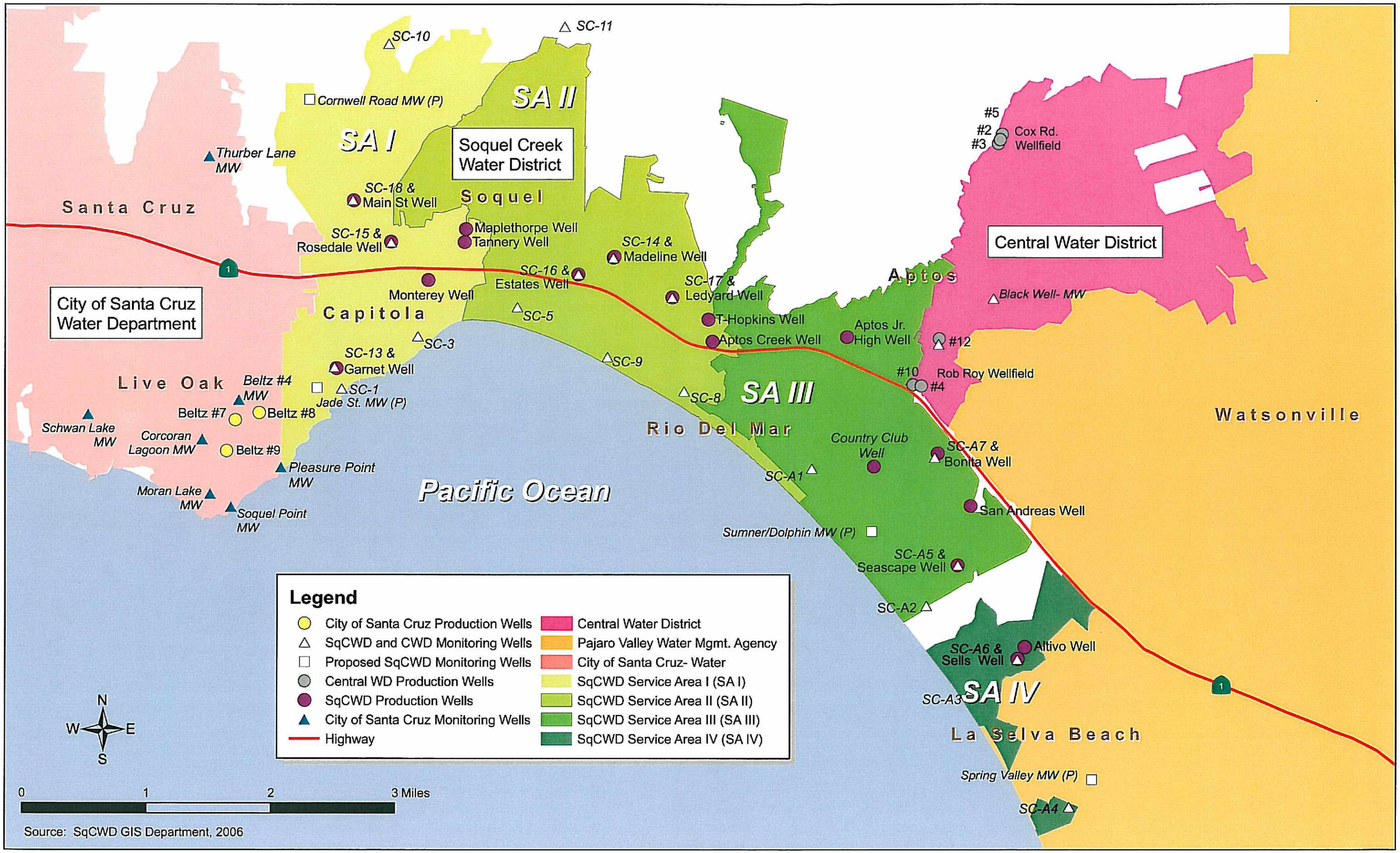


Figure 3-25
SqCWD, CWD, and City of Santa Cruz Service Areas
Production and Monitoring Wells

Figure D-2

Source: *Soquel Creek Water District and Central Water District Groundwater Management Plan* (SqCWD and CWD, 2007)

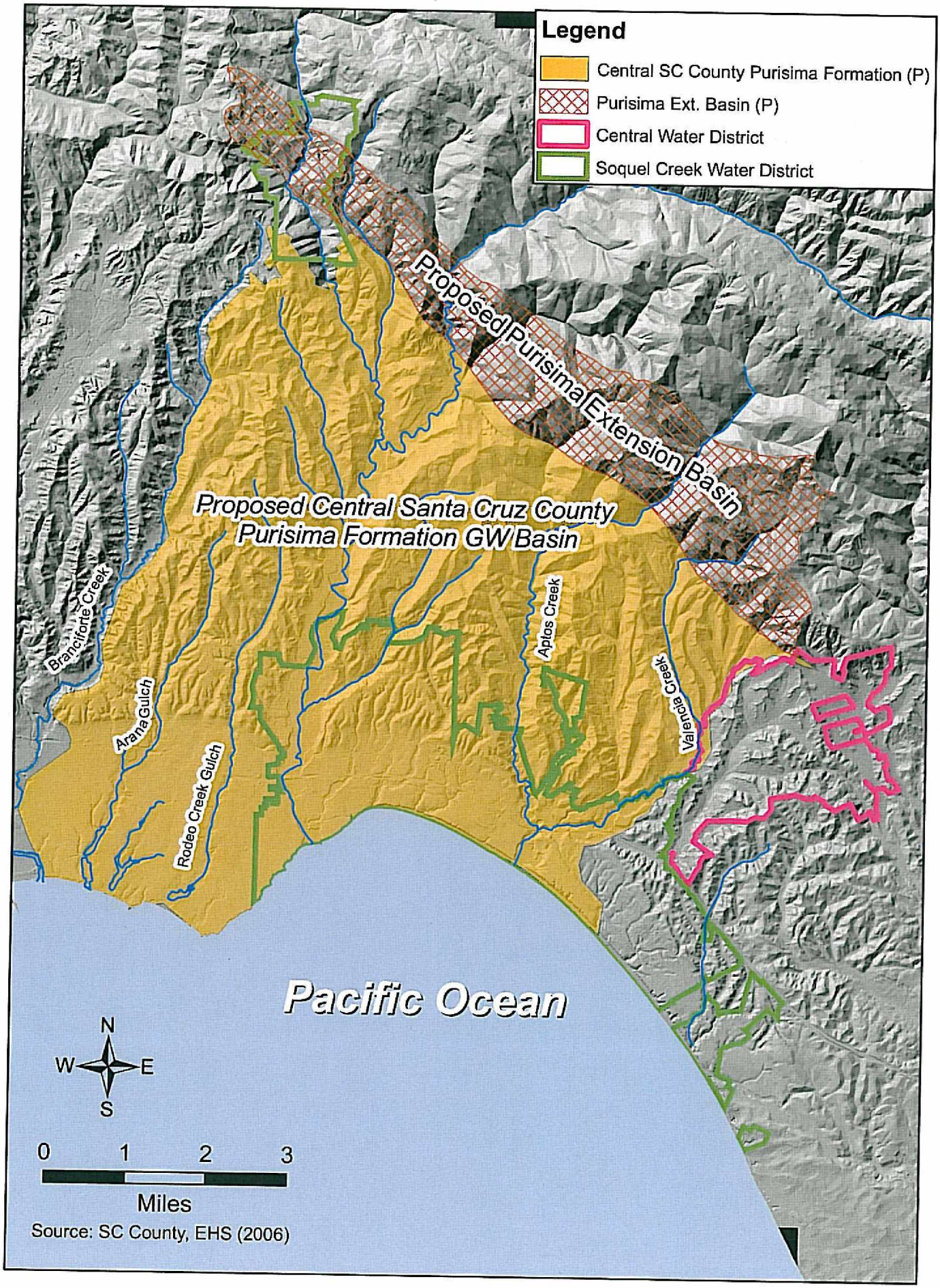


Figure 3-6
RWQCB Basin Plan- Boundary Proposal

Figure D-3

Source: *Soquel Creek Water District and Central Water District Groundwater Management Plan* (SqCWD and CWD, 2007)

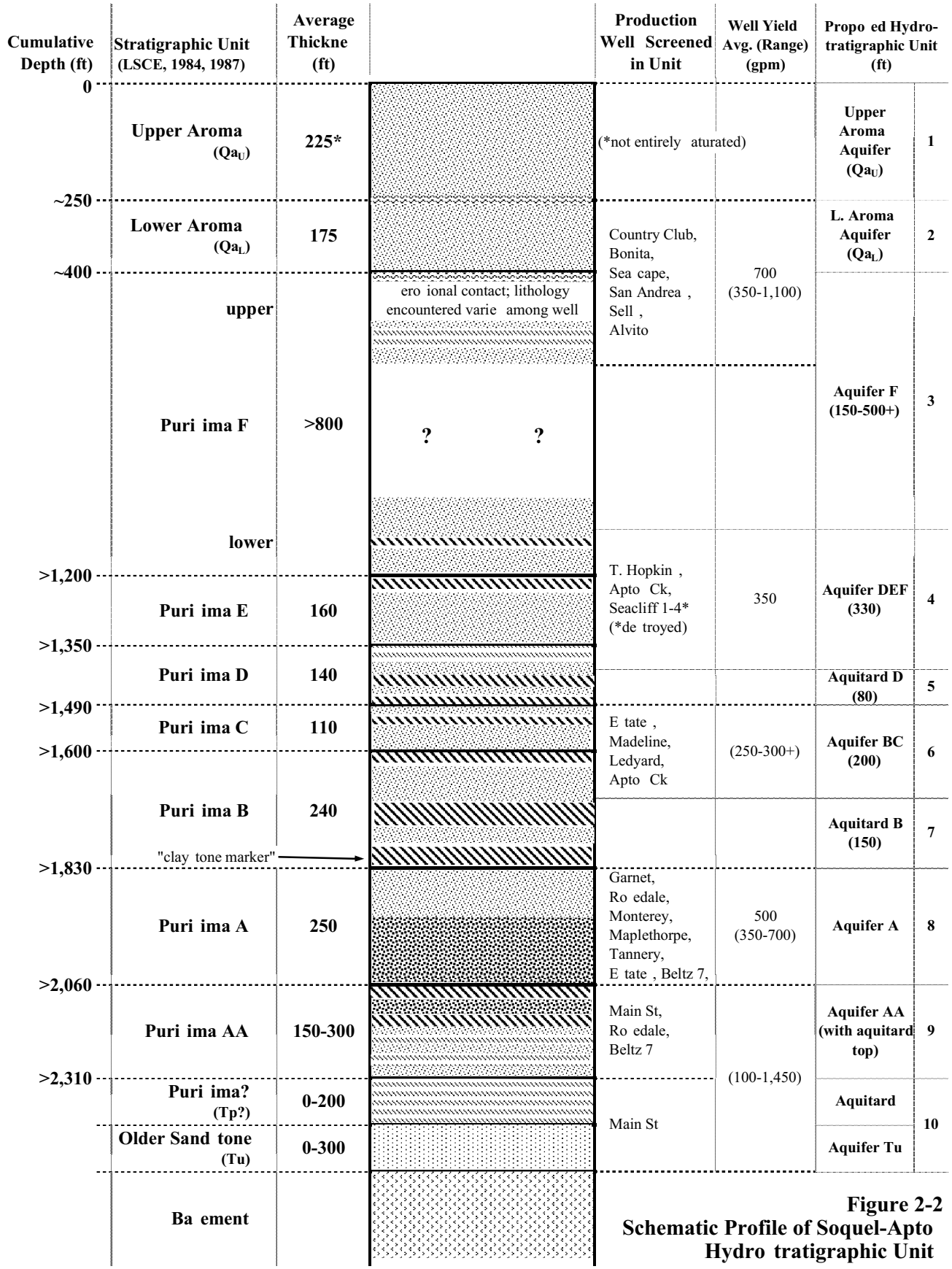


Figure 2-2
Schematic Profile of Soquel-Apto Hydro tratigraphic Unit

Stippling indicate relatively coar e-grained ediment, hatchuring indicate predominantly ilt and clay.

Source: *Groundwater Assessment of Alternative Conjunctive Use Scenarios* (Johnson et. al, 2004)

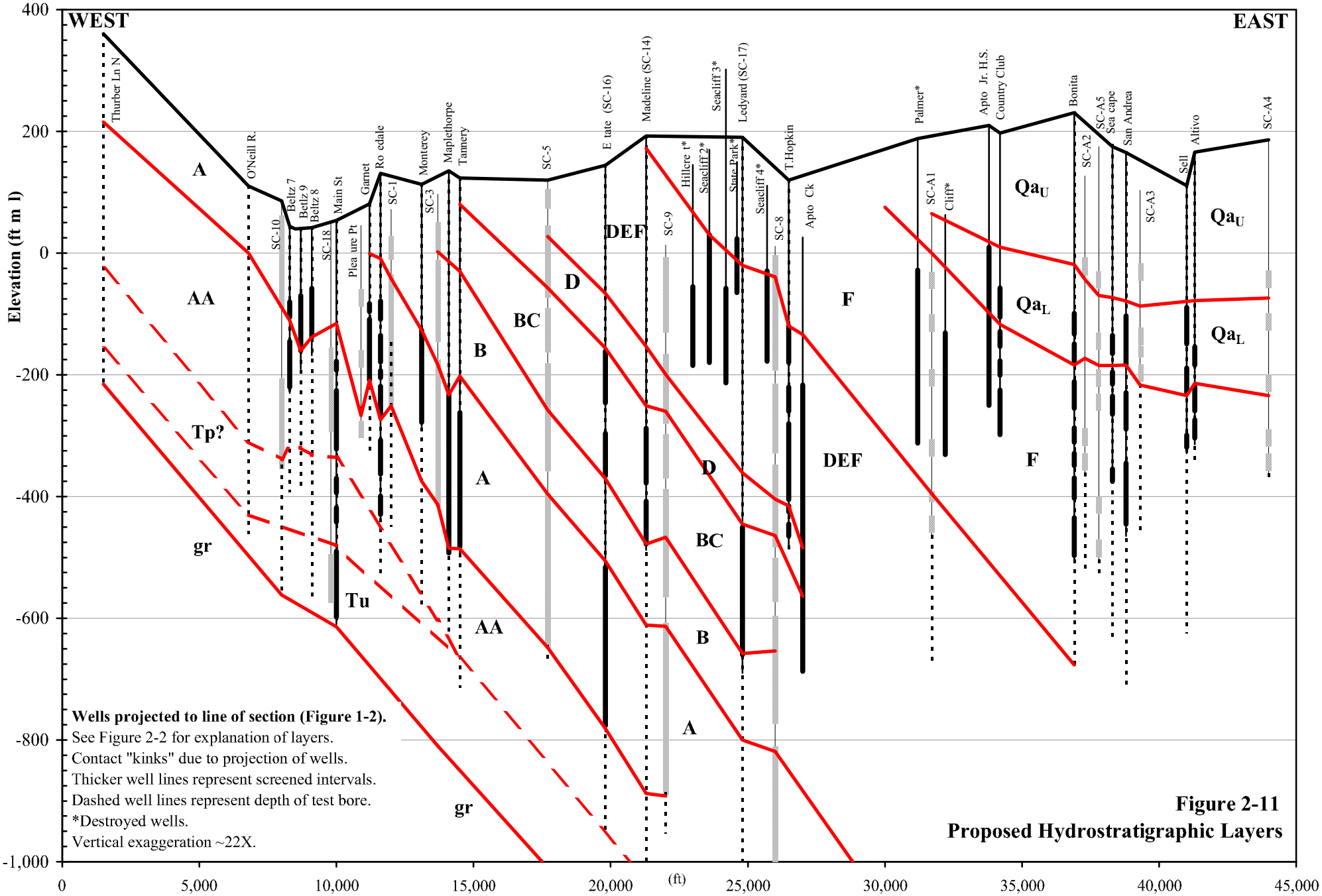


Figure 2-11
Proposed Hydrostratigraphic Layers

Source: *Groundwater Assessment of Alternative Conjunctive Use Scenarios* (Johnson et. al, 2004)

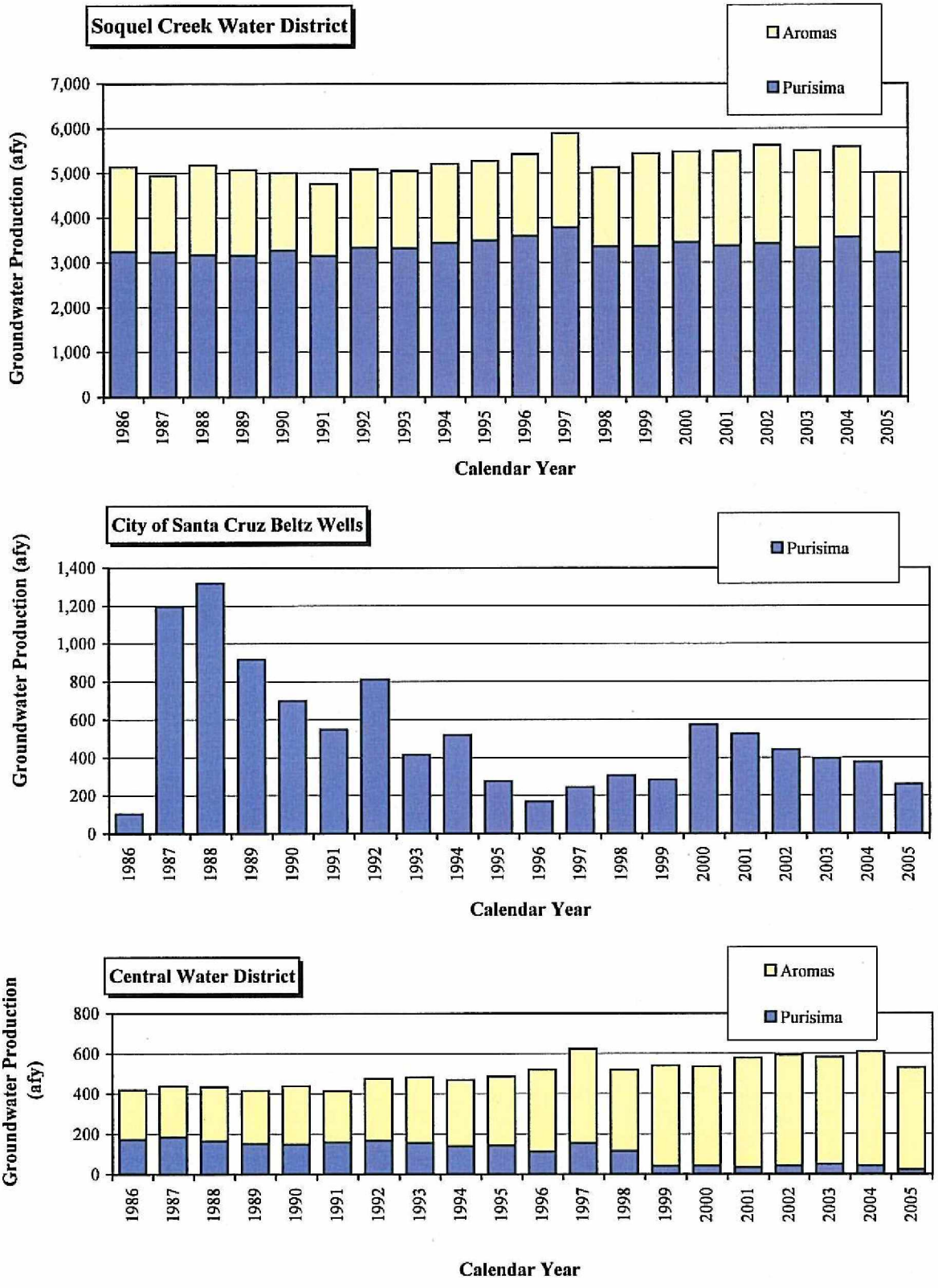


Figure 3-24
Soquel Creek Water District, City of Santa Cruz, and Central Water District
Annual Groundwater Production

Figure D-6

Source: *Soquel Creek Water District and Central Water District Groundwater Management Plan* (SqCWD and CWD, 2007)

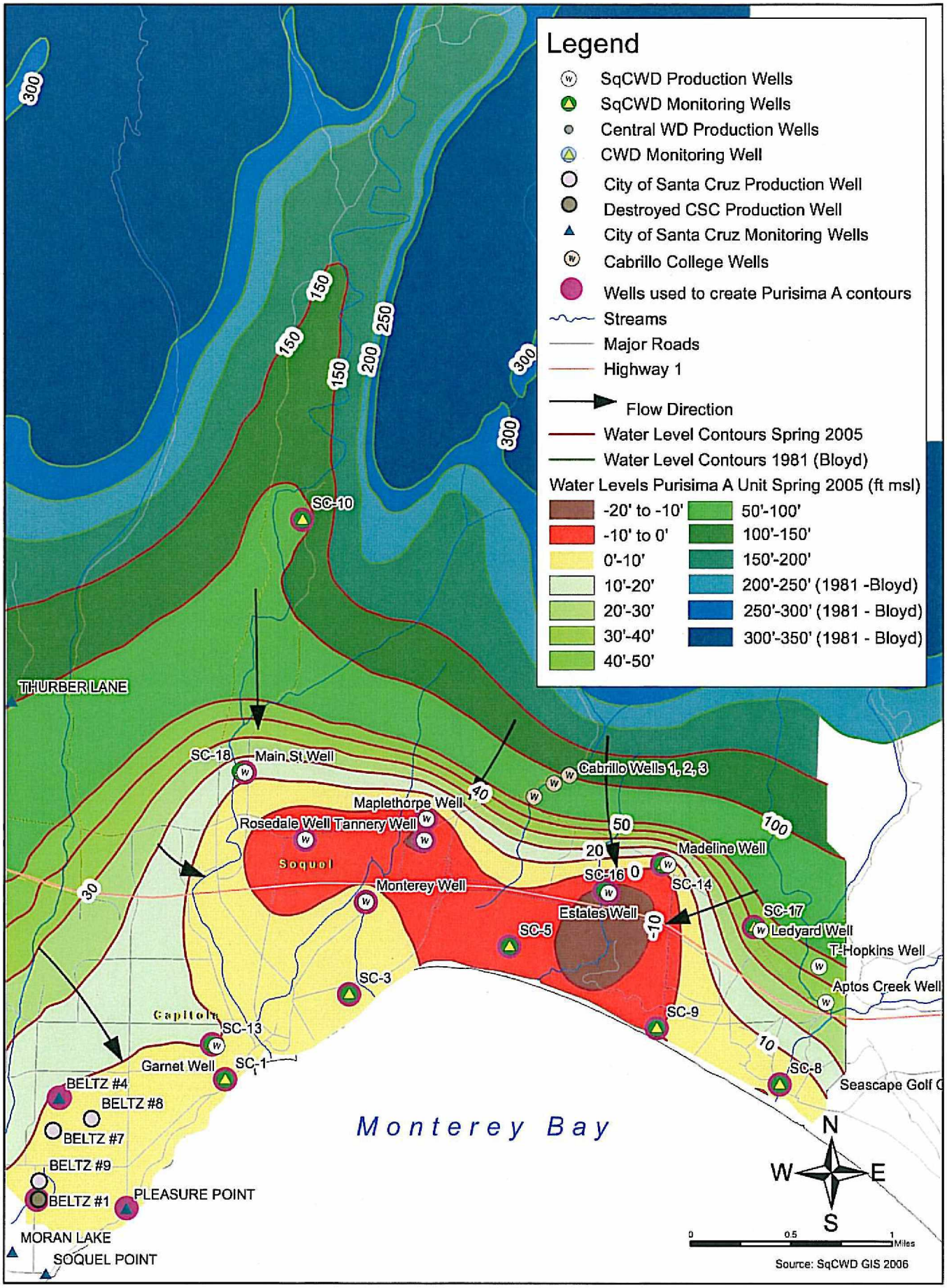


Figure 3-13
Water Levels - Purisima Formation (A Unit) Spring 2005

Source: *Soquel Creek Water District and Central Water District Groundwater Management Plan* (SqCWD and CWD, 2007)

Figure D-7

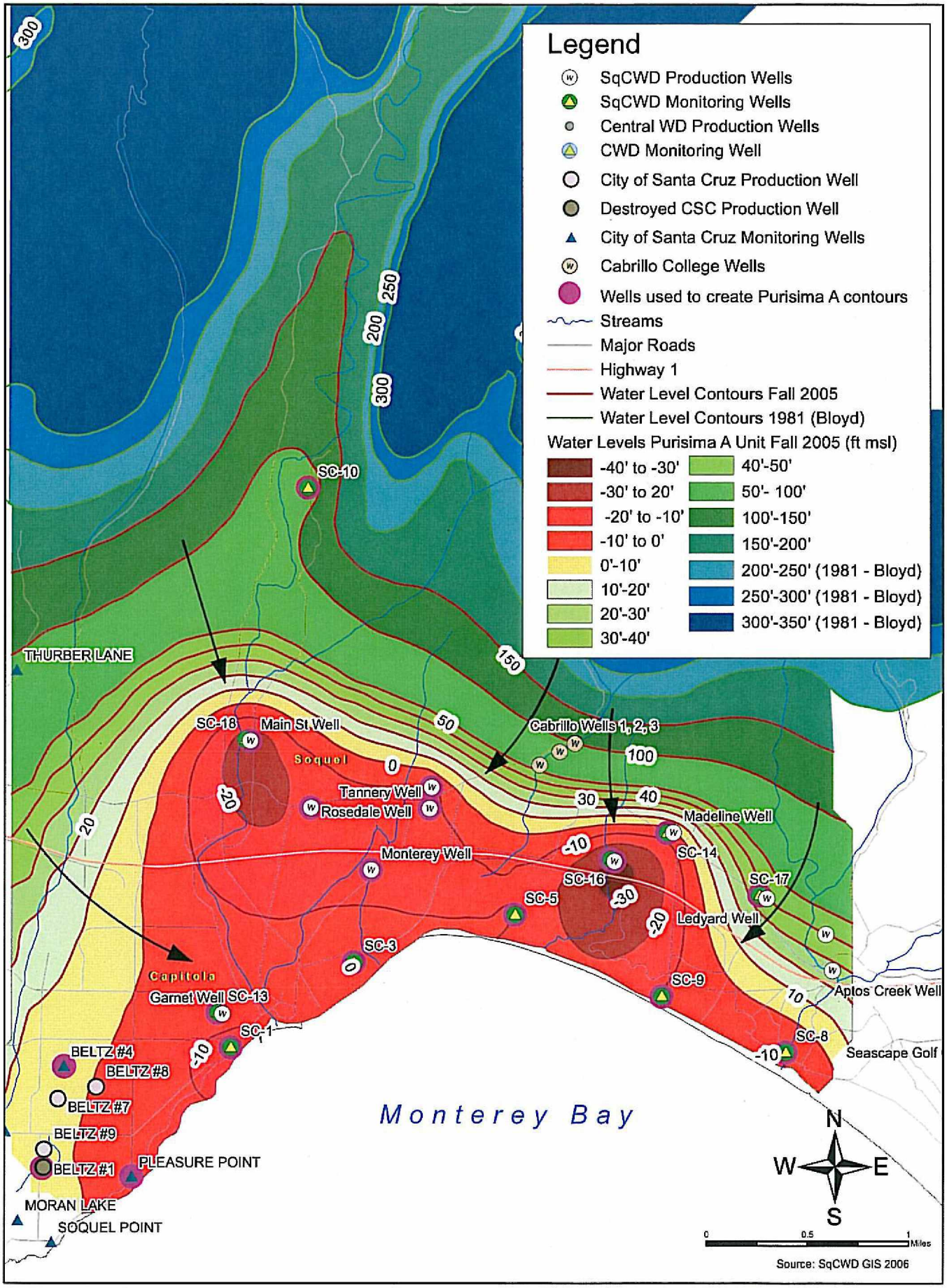


Figure 3-14
Water Levels - Purisima Formation (A Unit) Fall 2005

Source: *Soquel Creek Water District and Central Water District Groundwater Management Plan* (SqCWD and CWD, 2007)

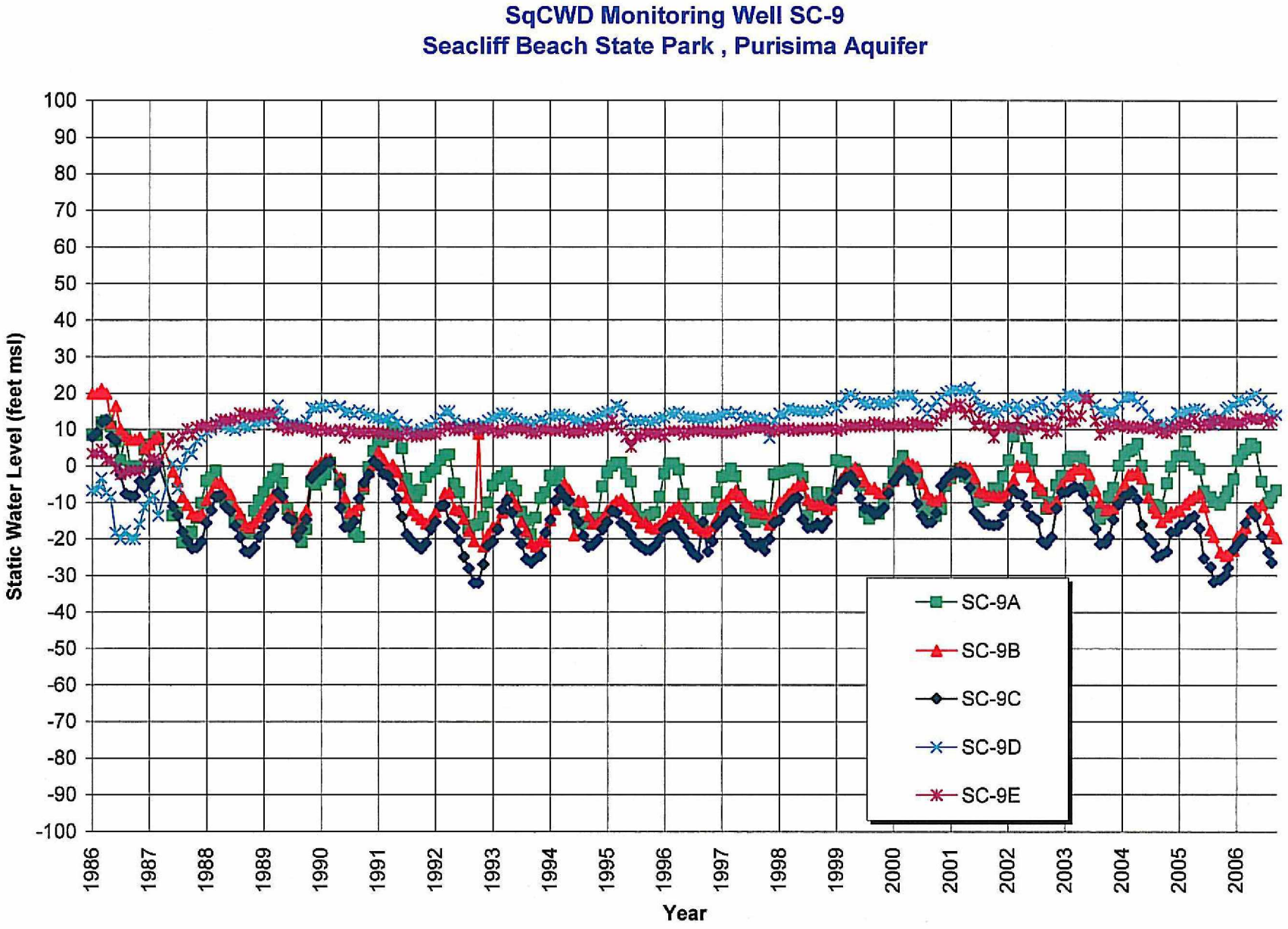


Figure 3-17
Hydrographs for SqCWD Monitoring Well SC-9

Source: *Groundwater Assessment of Alternative Conjunctive Use Scenarios* (Johnson et. al, 2004)

Figure D-9

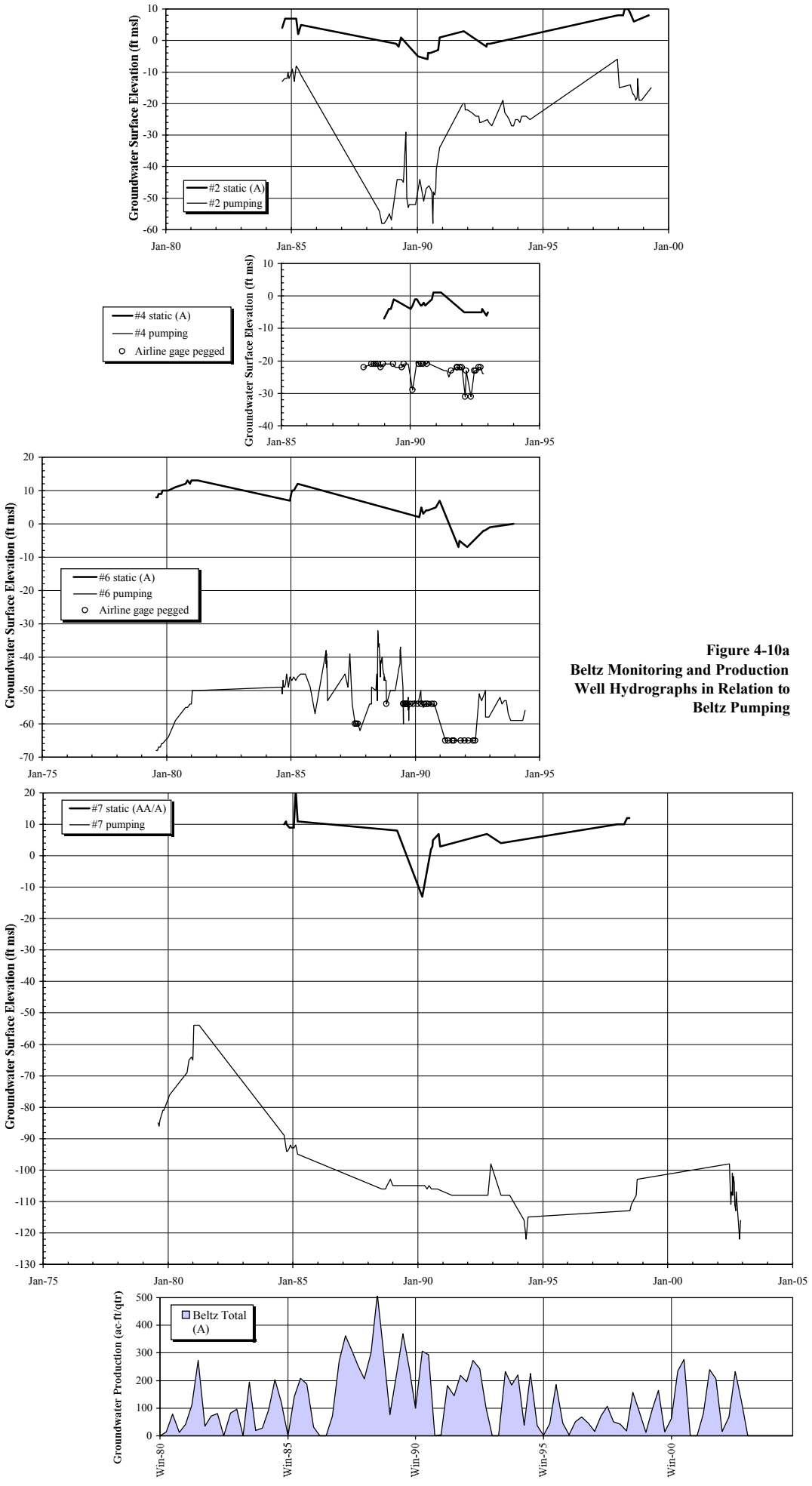
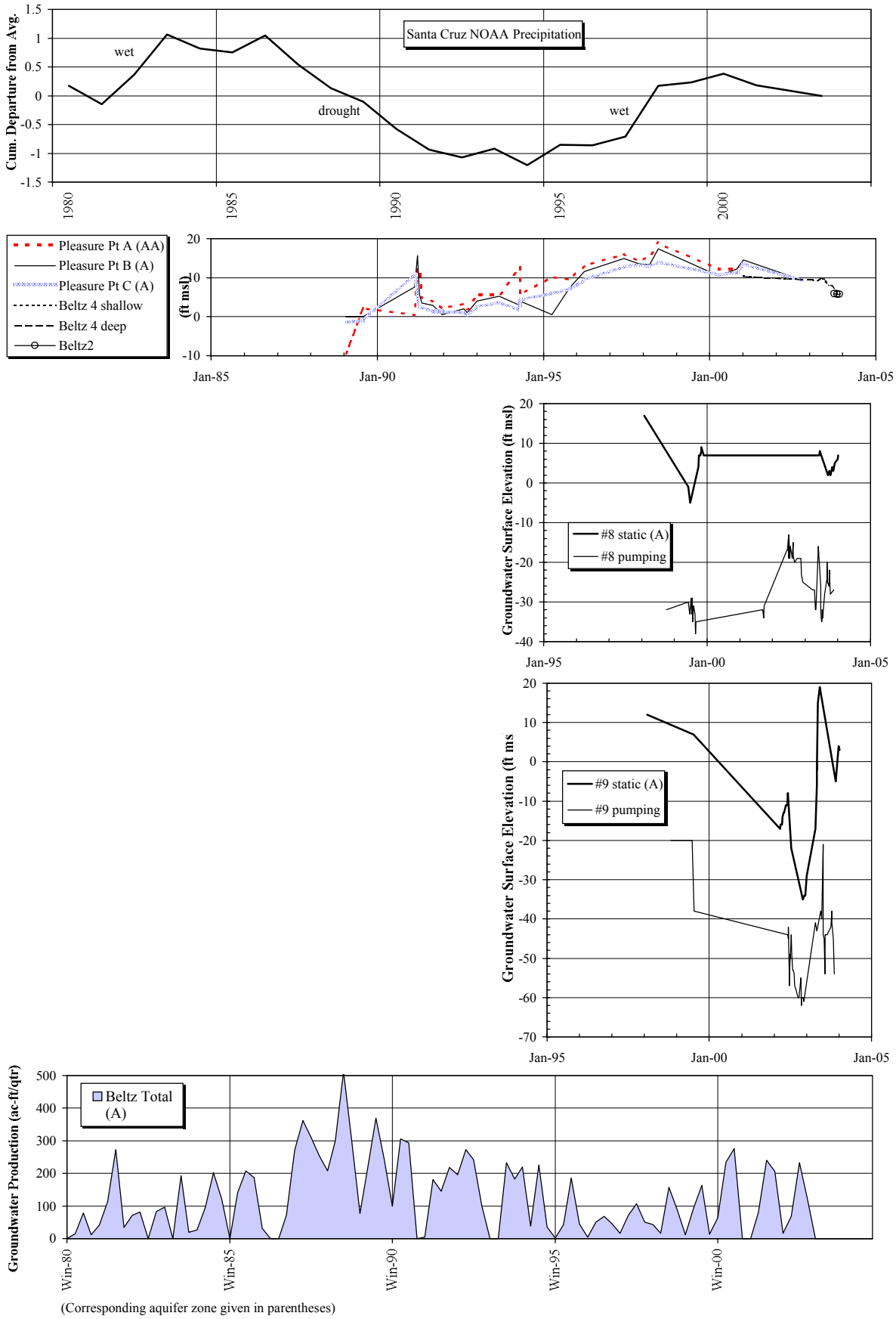


Figure 4-10a
Beltz Monitoring and Production Well Hydrographs in Relation to Beltz Pumping

Figure D-10a

Source: *Soquel Creek Water District and Central Water District Groundwater Management Plan* (SqCWD and CWD, 2007)



(Corresponding aquifer zone given in parentheses)

Figure 4-10b

Beltz Monitoring and Production Well Hydrographs in Relation to Beltz Pumping

Figure D-10b

Source: *Soquel Creek Water District and Central Water District Groundwater Management Plan* (SqCWD and CWD, 2007)

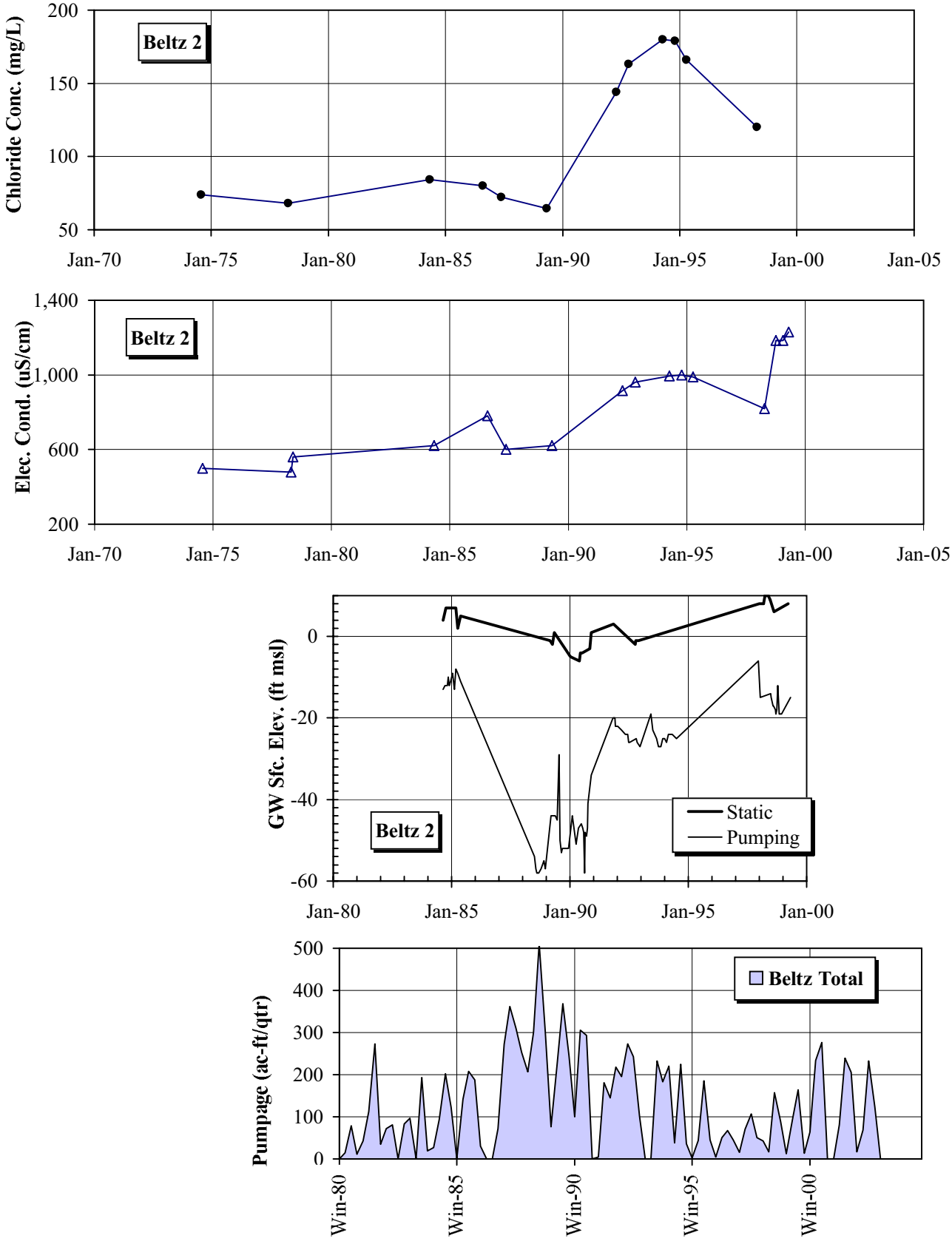


Figure 6-19
Beltz 2 Chloride, Water Level , and Pumping

Figure D-10c

Source: *Soquel Creek Water District and Central Water District Groundwater Management Plan* (SqCWD and CWD, 2007)

Appendix E

Cooperative Agreement for Groundwater Management between the Soquel Creek Water District, City of Santa Cruz, Central Water District, and the County of Santa Cruz.

COOPERATIVE AGREEMENT
FOR GROUNDWATER MANAGEMENT WITHIN THE SOQUEL-APTOS BASIN

THIS COOPERATIVE AGREEMENT, made and entered into this 1st day of November, two thousand and five, by and between Soquel Creek Water District, City of Santa Cruz, Central Water District, and the County of Santa Cruz, all of which represent agencies with interests in groundwater management within the area known regionally as the Soquel-Aptos Basin, hereby join together for a common and specific purpose.

ARTICLE I. BACKGROUND AND OBJECTIVES

RECITALS

1. The parties to this interagency cooperative agreement, pursuant to their respective statutory authorizations, are engaged in programs and projects intended to further the assurance of a long–term, sustainable, reliable, good quality groundwater supply in Santa Cruz County;

2 In 1994 and 1996, the Soquel Creek Water District and the Central Water District entered into a Joint Exercise of Powers Agreement and created the *Ground-Water Management Plan – Soquel-Aptos Area*, respectively, to manage the groundwater in their service areas under the provisions of AB3030, as set forth in Part 2.75 of Division 6 of the California Water Code;

3. The Department of Water Resources (DWR) has added Amendments to Sections 10750 et.seq. whereby the managing entity shall "involve other agencies that enables the local agency to work cooperatively with other public entities whose service area or boundary overlies the groundwater basin." (Water Code # 10753.7 (a)(2)) The County of Santa Cruz and the City of Santa Cruz are both agencies whose boundaries overlie the Soquel-Aptos Area groundwater basin;

4. The Soquel-Aptos Basin is currently in overdraft and susceptible to seawater intrusion and, in an effort to include locales that are outside the existing AB 3030 boundaries in order to provide consistent, basin wide management practices, the parties to this agreement are interested in developing an expanded regional Groundwater Management Plan (GWMP);

5. The City of Santa Cruz and the County of Santa Cruz have agreed to join the continued efforts by Soquel Creek Water District and Central Water District to manage the basin and update/expand the GWMP, although the extent of their participation has not yet been defined;

6. All parties to this agreement wish to join in a common effort to create an updated/expanded GWMP which shall include, but not be limited to: 1) Establishing management objectives for the Soquel-Aptos Basin, including components relating to monitoring and controlling saline intrusion, monitoring and managing groundwater levels and storage, groundwater quality, inelastic land surface subsidence, and changes in surface flow and surface water quality that directly affect groundwater levels or quality or are caused by groundwater pumping; and 2) Adopting monitoring protocols for the above referenced components;

7. The parties to this agreement are empowered by law to enter into this agreement.

ARTICLE II. STATEMENT OF WORK

NOW THEREFORE, the parties to this agreement mutually agree to:

1) Establish the Soquel-Aptos Groundwater Management Alliance (SAGMA). The agency members of the Alliance shall form a committee comprised of one representative from each party to this agreement, accompanied by support staff and consultants, as needed. The committee shall meet on a regular basis and establish programs and policies consistent with the alliance's objectives, review data and coordinate groundwater pumping to the extent possible to both meet demand and avoid exacerbating undesirable coastal groundwater conditions.

2) Undertake ongoing and comprehensive efforts to collect, maintain, and share groundwater data with respect to water levels and quality.

3) Support and provide technical assistance in updating the 1996 AB 3030 Groundwater Management Plan for the Soquel-Aptos Area.

4) Collaboratively review and update the database for private wells within the Soquel-Aptos Basin.

5) Prepare a map showing the area of the groundwater basin(s), as defined by DWR Bulletin 118, with area(s) subject to the Groundwater Management Plan as well as the boundaries of other local agencies that overlie the Soquel-Aptos Basin.

6) Develop and foster relationships with regional, state, and local governments, individuals, and other interested organizations to develop protocols that recognize the importance of groundwater management practices to preserve and protect this natural resource.

7) Establish cooperative relationships with state, local, and other public entities within this region that regulate groundwater matters.

8) Undertake cooperative research and resource management initiatives that are regional in scope and disseminate information resulting from these activities.

9) Establish and implement management objectives (MOs) for the Soquel-Aptos Groundwater Basin (Water Code 10753.7 (a)(1)).

10) Coordinate Urban Water Management Plans and Groundwater Emergency Plans.

11) Jointly pursue groundwater management grants or studies, such as grants available from the State under AB303 and Proposition 50 and studies undertaken by the University of California or United States Geological Survey.

12) Consider the benefits of and form for entering into an arrangement that expands the AB3030 Groundwater Management Authority established under the Joint Exercise of Powers Agreement between Soquel Creek Water District and Central Water District to include those areas within the Soquel-Aptos Groundwater Basin that are under the jurisdiction of the City and/or County of Santa Cruz.

13) Review land use plans and coordinate with land use planning agencies to assess activities and potential impacts of activities that have an impact on groundwater quantity and quality.

14) Produce and share relevant informational materials among the members of SAGMA

15) Recommend to the respective governing boards actions necessary to protect the groundwater basin.

ARTICLE III. TERM OF AGREEMENT

GWB by staff

This agreement shall be evaluated and reviewed no later than one year after its implementation at which time, recommendations for improvements and modifications shall be considered by all ~~parties~~ approving bodies GWB. Any amendment or modification to this agreement shall be in writing, agreed upon by all signatories, executed by the

duly authorized representatives of the parties hereto, and incorporated into this agreement by reference.

ARTICLE IV. KEY OFFICIALS

Laura D. Brown, General Manager, Soquel Creek Water District
Clarke Wales, General Manager, Central Water District
Bill Kocher, Director, City of Santa Cruz Water Department
John Ricker, Water Resources Program Coordinator, Santa Cruz County Environmental Health Services

ARTICLE V. AWARD

This basic agreement does not provide for any financial obligation and is a vehicle for determining agency agreement on basic premises, goals, and objectives. Subsequent work requiring the transfer of funds between member agencies may be made by amendment of this basic document with the approval of the legislative bodies of the participating agencies and the SAGMA.

Preliminary discussions regarding any costs associated with projects developed under this agreement may use a formula based on estimated net pumpage from the basin by member agencies.

ARTICLE VI. TERMINATION

Agencies can terminate their participation in the Soquel-Aptos Groundwater Management Alliance by providing 60 days written notice to all signatory parties.

SIGNATURES

Laura D. Brown
General Manager
Soquel Creek Water District

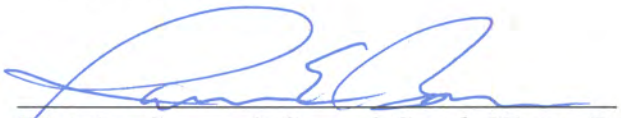
~~Bill Kocher~~ Richard C. Wilson 10/07/05
~~Director~~ City Manager
City of Santa Cruz, ~~Water Department~~

Clarke Wales
General Manager
Central Water District

~~John Ricker~~ Rama Khalsa
~~Water Resources Program Coordinator~~ Health Services Agency Director
County of Santa Cruz ~~Environmental Health Services~~

Approved as to Form:

Bosso Williams



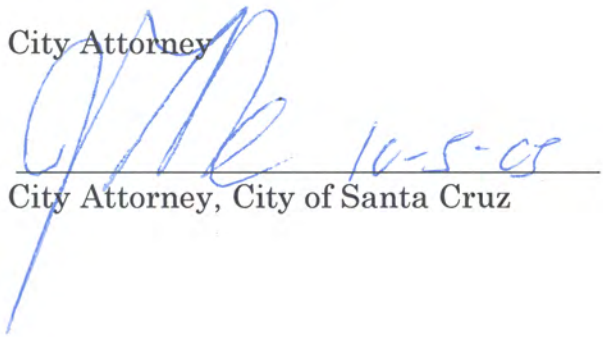
District Counsel, Soquel Creek Water District & Central Water District

County Counsel

/Harry A. Oberhelman III 8/14/05

County Counsel, County of Santa Cruz

City Attorney



City Attorney, City of Santa Cruz

Appendix F

Potential Permits and Approvals Needed for the Desalination Plan

POTENTIAL PERMITS AND APPROVALS FOR THE PROJECT		
Agency or Department	Permit or Approval	Required for
FEDERAL AGENCIES		
Monterey Bay National Marine Sanctuary (MBNMS)	Review and coordination of all Corps, RWQCB 404, Section 10, and NPDES permits	• Activities/discharges into waters and wetlands
U.S. Fish and Wildlife Service (USFWS)	Endangered Species Act compliance (ESA Section 7 consultation)	• Incidental take of federally listed species.
	Fish and Wildlife Coordination Act (16 U.S.C. 661-667e; the Act of March 10, 1934; ch. 55; 48 stat. 401)	• Provide comments to prevent loss of and damage to wildlife resources.
National Oceanic & Atmospheric Administration (NOAA) – Fisheries	Endangered Species Act compliance (ESA Section 7 consultation)	• Incidental take of federally listed species.
Army Corps of Engineers (Corps)	Nationwide Permit No. 6, Survey Activities	• Survey activities, such as core sampling, seismic exploratory operations, soil surveys, sampling, and historic resources surveys.(Offshore geophysical survey)
	Nationwide Section 404 Permit (CWA, 33 USC 1341)	• Discharge of dredge/fill into Waters of the United States, including wetlands (Intake Construction)
	Nationwide Permit No. 7, Outfall Structures and Associated Intake Structures	• Activities related to the construction or modification of outfall structures and associated intake structures where the effluent is authorized by NPDES, Section 402 of the Clean Water Act.. (I
	Section 10, Rivers and Harbors Act Permit (33 U.S.C. 403)	• Activities, including the placement of structures, affecting navigable waters (Intake)
U.S. Coast Guard	Federal Consultation	• Coastal Commission Coastal Development Permit and ACOE Section 10 Permit
STATE AGENCIES		
State Water Resources Control Board, Regional Water Quality Control Board	General Construction Activity Storm Water Permit (WQO 99-08-DWQ)	• Storm water discharges associated with construction activity
	401 Water Quality Certification (CWA Section 401)	• Discharge into waters and wetlands (see USACE Section 404 Permit) (brine disharge)
	National Pollutant Discharge Elimination System (NPDES) Permit (CWA Section 402)	• Discharge into waters and wetlands (brine discharge)

POTENTIAL PERMITS AND APPROVALS FOR THE PROJECT		
Agency or Department	Permit or Approval	Required for
California State Lands Commission	Right-of-Way Permit (Land Use Lease) (California Public Resource Code Section 1900) Lease Amendment	• Issuance of a grant of right-of-way across state lands (intake facilities in tidal and submerged lands). • Modification of Wastewater Outfall lease (brine discharge)
California Department of Fish and Game (CDFG)	Incidental Take Permits (CESA Title 14, Section 783.2)	• Activity where a State-listed candidate, threatened, or endangered species under California ESA may be present in the project area and a State agency is acting as lead agency for CEQA compliance.
California Coastal Commission (CCC)	Coastal Development Permit. (Public Resources Code 30000 et seq.)	• Development within the Coastal Zone, excluding areas where local jurisdictions have approved Local Coastal Plans in place.
California Department of Public Health (CDPH)	Permit to Operate a Public Water System (California Health and Safety Code Section 116525)	• Operation of a public water system. (Amendment only)
California State Historic Preservation Officer (SHPO)	Section 106 Consultation, National Historic Preservation Act (16 USC 470)	• Consult with project applicant, appropriate land management agencies, and others regarding activities potentially affecting cultural resources.
LOCAL AGENCIES		
Santa Cruz County Public Works Department	Encroachment Permit	• Activities within County right-of-way.
Santa Cruz County Environmental Health Services	Hazardous Materials Management Plan	• Delivery, storage, handling of hazardous materials in quantities equal to or greater than threshold quantities
Santa Cruz County Planning Department	Use Permit	• Activities whose use is conditional in a particular zone
	Coastal Development Permit / Exemption	• Development within the Coastal Zone where County has jurisdiction through existing Local Coastal Plans. If a Coastal Development Permit is issued for the entire project by the California Coastal Commission, a county permit.is not required.
	Grading Permit	• Excavation and fill activities
	Electrical Permit	• New electric meter
	Erosion Control Permit	• Building, grading and land clearing
Monterey Bay Unified Air Pollution	Authority To Construct.	• Constructing, modifying, or operating a facility or equipment that

POTENTIAL PERMITS AND APPROVALS FOR THE PROJECT		
Agency or Department	Permit or Approval	Required for
Control District (MBUAPCD)		might emit pollutants from a stationary source
	Permit To Operate. (Local district rules)	• Operating equipment that might emit pollutants from a stationary source.
City of Santa Cruz Planning & Community Development Department	Building Permit	• Building code compliance and inspection.
City of Santa Cruz Public Works Department	Encroachment Permit	• Activities within City rights-of-way.