



SANTA BARBARA GROUNDWATER MANAGEMENT PLAN AB303 GRANT APPLICATION FOR 2011 - 2012

ATTACHMENT 9: PAST PERFORMANCE

The following 2 pages chronicle the performance of the City of Santa Barbara over the past 5 years working on projects similar to the project outlined herein for development of a GWMP.

Project A

Surface Water and Groundwater Monitoring (City Council Agenda Report attached)

The City Water Resources Division and USGS have worked cooperatively on water resources monitoring and investigations for over 25 years, including an annual program of measuring surface water flows and monthly monitoring of groundwater levels, along with periodic water quality testing. This program has consistently been funded by the City and staffed by City Water Resources Division. This ongoing relationship demonstrates the City's commitment to managing its water supply and the ongoing value placed on the data that is collected and maintained.

Project B

Multiple Objective Optimization Model (MOOM) (press release, sent via email, attached)

The City Water Resources Division initiated a 3-year project with the USGS to update their Multiple Objective Optimization Model (MOOM) and added a 3-dimensional water quality component for more accurate assessment of seawater intrusion. Better indicators of basin fullness are expected to be developed. More importantly, the modeling of seawater intrusion effects in Santa Barbara Storage Basin 1 is expected to be made more accurate. This project will guide future placement of new wells in the basin, assist in scheduling well operation to minimize intrusion, and provide the ability to estimate the benefits of groundwater recharge for basin replenishment and creating barriers to seawater intrusion.

Project C

Water Conservation Technical Study (Executive Summary attached)

The City hired Maddaus Water Management (MWM), an engineering firm widely recognized for expertise in demand management, to analyze the existing conservation program and use its proprietary Demand Management Decision Support System (DSS) to model current and potential water conservation measures. The DSS also quantified the demand reduction effects of these measures along with the effects of plumbing codes and appliance standards. City staff worked extensively with MWM to obtain data, conduct workshops, and calibrate the model. Model results have been utilized in forecasting demand projections in support of the update of the City Long-term Water Supply Plan.



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Project D

California Statewide Groundwater Elevation Monitoring (CASGEM) (Memo Presented to City Water Commission attached)

The City Water Resources Division has volunteered to serve as the monitoring entity for the Groundwater Elevation Monitoring (CASGEM) program. The proposed monitoring wells have been approved by the DWR as of 12/29/2011. The City is in the process of proceeding with the monitoring and providing the data to DWR.

Project E

Smart Landscape Rebate Program (Email with FY2011-2012 data attached)

The City participates in many regional water conservation programs with neighboring water purveyors, one of which is the Smart Landscape Rebate Program. This program, funded in part by the United States Bureau of Reclamation (USBR), offers rebate incentives for the installation of water-wise plants, upgrades to irrigation systems to improve efficiency, and removal of turf. The program has been very successful and popular, with close to \$100,000 of grant funds distributed to date by the City alone. The Santa Barbara County Water Agency's regional water conservation program assists in the administration of this program. However, City staff perform the bulk of the implementation, such as pre and post inspections, data processing, and issuance of rebate checks.

Project F

William B. Cater Treatment Plant and Ortega Groundwater Treatment Plant Projects (City Council Agenda Report attached)

On November 17, 2009, the City Council adopted a resolution authorizing City officials to undertake actions required by a Notice of Application Acceptance (NOAA) issued by the California Department of Health (CDPH) to the for an approximately \$30 million Safe Drinking Water State Revolving Fund (SDWSRF) loan to finance Advanced Treatment (Ozone) to the City's William B Cater Water Treatment Plant and the Ortega Groundwater Treatment Plant Rehabilitation and Improvements project. These projects have been managed by the City's Water Division staff and have similar budget, schedule, and reporting requirements.

Project G

Free Rain Sensor Program (Memo summarizing program data attached)

The City received a grant from the USBR to distribute free rain sensors to City customers. Implementation of this program has included site visits, data processing, and issuance of rain sensors during water efficiency audits.



SANTA BARBARA GROUNDWATER MANAGEMENT PLAN
AB303 GRANT APPLICATION FOR 2011 - 2012

Project A
**Surface Water and Groundwater
Monitoring (City Council Agenda
Report)**



CITY OF SANTA BARBARA

COUNCIL AGENDA REPORT

AGENDA DATE: October 11, 2011

TO: Mayor and Councilmembers

FROM: Water Resources Division, Public Works Department

SUBJECT: Agreement For Surface Water And Groundwater Monitoring

RECOMMENDATION:

That Council authorize the Public Works Director to execute a joint funding agreement with the United States Geological Survey for water resources investigations related to surface water and groundwater measurements, for the period of November 1, 2011, through October 31, 2012, with a City cost share not to exceed \$111,150.

DISCUSSION:

The City and United States Geological Survey (USGS) have worked cooperatively on water resources monitoring and investigations for over 25 years, including on an annual program of measuring surface water flows and monitoring groundwater levels and water quality. As in the past, the proposed Fiscal Year 2012 program has two elements:

- **Surface Water Gauging Stations:** USGS will continue to operate, maintain, and publish stream flow records for four gauging and data collection stations on the Santa Ynez River, and one on Mission Creek. These stations provide real-time data and daily averages. The information is used to implement the Upper Santa Ynez River Operations Agreement, for general documentation and monitoring of operations at Gibraltar Reservoir, and for tracking recharge releases into Mission Creek.
- **Groundwater Monitoring:** City staff will continue to take monthly water level measurements at 71 monitoring well locations. USGS will maintain the database of water level data and continue a program of collecting and maintaining data on groundwater quality. The water level and water quality information is used in water supply forecasting and computer modeling of the City's groundwater supplies, including the potential impact from seawater intrusion into the downtown groundwater basin.

The data that is collected and maintained is an important part of managing the City's water supply.

BUDGET/FINANCIAL INFORMATION:

The overall program cost is \$174,750, to be shared by the City (\$111,150) and USGS (\$63,600). Funds for this program are appropriated in the Fiscal Year 2012 Water Fund Operating Budget.

PREPARED BY: Rebecca Bjork, Water Resources Manager BF/TL/mh

SUBMITTED BY: Christine F. Andersen, Public Works Director

APPROVED BY: City Administrator's Office



SANTA BARBARA GROUNDWATER MANAGEMENT PLAN
AB303 GRANT APPLICATION FOR 2011 - 2012

Project B
Multiple Objective Optimization Model
(MOOM) (press release, sent via email,
and City Council Agenda Report)

Ferguson, Bill

From: James Nickles [jnickles@usgs.gov]

Sent: Tuesday, March 23, 2010 10:01 AM

Subject: News release -- USGS to define sustainable level of groundwater pumping for Santa Barbara

March 23, 2010

For Immediate Release

Contacts:

USGS: Jim Nickles, 916/278-3016, cell 916/715-2253, (jnickles@usgs.gov)

City of Santa Barbara: Bill Ferguson, 805/564-5571

USGS to define sustainable level of groundwater pumping for Santa Barbara
Study will help city manage groundwater, balance it with other sources of water

The city of Santa Barbara, CA, has asked the U.S. Geological Survey to study the city's groundwater basins, develop new tools to provide the city with updated information on its groundwater supplies, and identify optimal water-resource management strategies that balance groundwater with other sources of water.

Santa Barbara formerly relied solely on local surface water and groundwater; however, pumping of groundwater resulted in seawater intrusion in one of its basins. Since 1997, State Water Project deliveries have reduced the demand for groundwater. Now, future urban growth, limits on the supply of imported water, and the decreased storage capacity of Gibraltar Reservoir due to sedimentation will increase the future demand for groundwater, especially during times of drought.

"Groundwater is a relatively small but very important part of the city's water supply," said Rebecca Bjork, Water Resources Manager for the city of Santa Barbara. "We depend on it during drought and other water supply interruptions. It's important that we understand how our local supplies can be best managed."

The three main study objectives are to:

- Understand the sustainability of the groundwater system – that is, how much groundwater can be pumped without causing unacceptable water-level declines or seawater intrusion.
- Develop tools that will allow the city to estimate its sustainable groundwater supply.
- Identify optimal water-resource management strategies – how to best balance groundwater with supplies from the State Water Project and local reservoirs.

Dr. Tracy Nishikawa, the USGS lead scientist, said one of the most important aspects of the study will be the development of a basin-scale seawater intrusion model. Seawater intrusion occurs when freshwater is pumped out of a basin and seawater from the coast moves in. Seawater intrusion can threaten the water quality of the basin.

"Seawater intrusion is a problem in many California coastal basins, including Los Angeles, Ventura and Santa Barbara," he said. "This will be one of the first studies the USGS has developed in Southern California that utilizes a basin-scale seawater intrusion model in conjunction with optimization techniques to identify water-management strategies to best use available surface-water and groundwater resources."

The city is paying about 70 percent of the cost for the three-year, \$546,000 study and the USGS is paying the balance.

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3/23/2010



CITY OF SANTA BARBARA

COUNCIL AGENDA REPORT

AGENDA DATE: December 15, 2009

TO: Mayor and Councilmembers

FROM: Water Resources Division, Public Works Department

SUBJECT: Contract For Groundwater Modeling Program

RECOMMENDATION: That Council:

- A. Approve a three-year cooperative water resources program between the City and the U.S. Geological Survey (USGS) to update and enhance groundwater models; evaluate the sustainable yield of the City's groundwater resources; and develop decision rules for use in managing supplies from groundwater; and
- B. Authorize the Public Works Director to execute annual Joint Funding Agreements with the USGS for Fiscal Years 2010, 2011, and 2012, to implement the three-year program, with the City's portion of the aggregate cost not to exceed \$376,925.

DISCUSSION:

Background

Groundwater is an important part of the City's water supply, supplying approximately 1,000 acre-feet per year (AFY) in normal years (7% of total demand), and up to 4,500 AFY during a critical drought period (32% of total demand). Groundwater is also the City's only readily available supply of potable water in the event deliveries from the Santa Ynez River are disrupted. The City's groundwater basins are relatively small compared to other local agencies and must be managed carefully to optimize their role in our water supply.

The City has a long standing relationship with USGS on groundwater supply as well as other issues. Over the years, USGS has written the definitive reports describing the geology and capacity of the City's groundwater basins. They have also developed and maintained groundwater models of each basin. The most recent effort was the development of the Multiple Objective Optimization Model (MOOM) in the early 1990's, which integrated modeling of groundwater with other City water supplies to identify optimal supply scenarios under various conditions. Intrusion of seawater into Storage Unit No. 1 (in the downtown area) is of particular concern because saline groundwater is drawn into the groundwater basin during periods of increased pumping, which occurs

during a drought. Groundwater levels recover relatively quickly after pumping is reduced, but the seawater interface is much slower to return to its prior location. Therefore, tracking this interface is important in terms of estimating the amount of pumping that can be done before the salt content in a given well renders it unusable for potable supply for a substantial period of time.

MOOM was used to evaluate groundwater supplies as a part of the development of the current Long Term Water Supply Program (LTWSP), adopted in 1994. In conjunction with the Plan Santa Barbara process, staff is reviewing information on all of the City's water supplies for use in developing a recommendation to the Water Commission and City Council for an updated LTWSP.

Proposed Cooperative Water Resources Program

The proposed program would consist of four phases conducted over a three-year period:

1. Quantify the present sustainable yield of the Santa Barbara groundwater basins;
2. Evaluate the future sustainable yield of the basins given historical weather variability as well as potential climate change effects;
3. Develop decision rules for evaluating the current status of the basins at any given time; and
4. Document the result of the work in one or more reports.

The work will include the development and calibration of a three-dimensional model of seawater intrusion, building on a two-dimensional model that was developed as part of the earlier MOOM effort. The result will be a more sophisticated model of the quantity of groundwater flow, as well as the quality, in terms of salt content and extent of intrusion. This will allow the City to estimate the location of the saltwater/freshwater interface and the rate at which it can be expected to move inland toward City wells if pumping were to continue in response to extended drought.

Since we never know when a drought will end, such information will be important in managing our supplies and planning for the contingency of one or more additional years of drought. Similar analyses will be conducted for the City's other groundwater basins, focusing on public and private pumping demands and the effect on overall groundwater levels and sustainable yield.

One of the products of this analysis will be a series of graphs that can be used to assess the amount of available groundwater production, based on field measurements that reflect the current level of groundwater in the basins. The reporting phase will include archiving of all input data sets, and data output and preparation of a peer-reviewed article documenting the work effort.

Staff anticipates using the expertise of USGS personnel and early modeling results in developing recommendations on the groundwater component of the LTWSP update. Upon completion of the three-year study, the developed tools will contribute to the “adaptive management” of the City’s water supply, in a manner similar to that proposed to monitor other City resources being assessed in the *Plan Santa Barbara* process. The proposed three-year study was presented to the City Water Commission at its meeting of October 12, 2009, at which time there was a consensus of strong support for utilizing the expertise of USGS to update the City’s groundwater analysis tools.

BUDGET/FINANCIAL INFORMATION:

The total cost of the three-year program is estimated at \$546,055. USGS proposes to contribute \$169,130, with a City share of \$376,925. The work would be approved by each party in three annual contracts. The payment obligations are subject to available appropriations, and either party can withdraw if appropriations are not available. Staff anticipates a first-year contract amount of approximately \$191,530, with a City share of \$133,500. Funds are available in the 2010 Water Fund Operating Budget for the entire three-year City share.

PREPARED BY: Rebecca Bjork, Water Resources Manager/BF/mh

SUBMITTED BY: Christine F. Andersen, Public Works Director

APPROVED BY: City Administrator’s Office



SANTA BARBARA GROUNDWATER MANAGEMENT PLAN
AB303 GRANT APPLICATION FOR 2011 - 2012

Project C Water Conservation Technical Study (Maddus Water Management Executive Summary)



EXECUTIVE SUMMARY

Introduction

This conservation technical analysis was conducted by Maddaus Water Management (MWM) for the City of Santa Barbara (City). The purpose of the analysis is to:

1. Evaluate current conservation measures and identify new conservation measures that will reduce future water demand.
2. Estimate the costs and water savings of these measures.
3. Combine the measures into increasingly more aggressive programs and evaluate the costs and water savings of these programs.

Long-Term Conservation Program Analysis

A list of 92 potential conservation measures was developed from known water saving technologies and services. Twenty-three conservation measures, selected by the City and local stakeholders during an evaluation workshop, were further analyzed by the Least Cost Planning Decision Support System Model (DSS Model). The DSS Model is a planning tool that assists water planners with evaluating alternative water conservation programs. The model itself is an end use model that calculates water savings, costs and benefits from individual measures, and programs of a number of measures. Projections of future water demand with and without water conservation programs are made for the City water service area. Calculations are made for every year in the 30-year analysis period. In addition, twenty one measures, both current and potential future measures, were put into a “Tool Kit” for further qualitative evaluation.

Based on analysis by the model, conservation measures were grouped into alternative programs of increasingly higher water savings and implementation costs (Table ES-1). Conservation Program A consists of 10 measures that are part of the existing City water conservation program. Conservation Program B includes all of Program A, plus those additional measures that have an individual benefit-cost ratio of 0.9 or greater, for a total of 17 measures. Conservation Program C includes all measures evaluated, except for Measure 5 which is replaced with the enhanced Measure 6. The measures included in Conservation Programs A, B, and C are identified in Table ES-1 in the columns at the right. Figure ES-1 shows the projected demand without the effects of the plumbing code, with the plumbing code effects, and with the plumbing code and three conservation program alternates. Water savings were evaluated and benefit-cost ratios computed for 20-year period of 2011 to 2030, coinciding with the City’s water supply planning period. Savings were then calculated to the year 2030 for each of these programs (see Table ES-2).

Table ES-3 shows the relative demand reductions in the year 2030, conservation program costs for the utility, present value economic information, and the utility cost of water saved for each of the alternate programs. Demand reduction by 2030 is measured from the 14,825 AFY projected 2030 demand without the effects of the plumbing code. Additional resources and customer contacts as embodied in the conservation programs identified in this memorandum, are required to reach higher levels of potential water savings. Utility costs include the cost to the City to run the program, including staff time, rebates, any contracted services, expense, etc. While utility cost is the primary consideration, this

memorandum also considers customer costs and community costs to some extent, as described in the body of the memorandum. The plumbing code is included as passive baseline savings in addition to the long-term conservation program in Programs A-C. Most of the future program water savings consist of outdoor landscape improvements.

A Benefit-Cost ratio, which is the ratio of the present value of benefits to the present value of costs, is the most accurate indicator of cost-effectiveness. When the ratio of the Present Value of the benefits to the Present Value of the costs is greater than 1.0 for a particular program of measures, that program can be said to be cost-effective. Benefits for the utility can also be expressed as the value to the utility of the saved water. For the City, the value of the saved water is the cost savings from not producing the water that is saved. This could range from not treating pumped groundwater to not buying water from the State Water Project. An assessment was made by the City and the value of the saved water was determined to be \$600 per acre-foot. This value is hereafter referred to as the City's "Avoided Costs".

Program A reflects estimated water savings derived from the plumbing code and continuing the current program. The additional measures that create programs B and C produce increasing incremental water savings and costs. Figure ES-2 illustrates there are apparent diminishing returns when measures are added beyond Program B. Demand reductions for year 2030 range from 920 to 1,919 AF/Yr. As the plumbing code water savings do not cost the City any money, the graph starts at the plumbing code water savings in 2030.

**Table ES-1
Conservation Measures Selected for Programs**

No.	Measure Name (ND = Requirements for New Development)	Program		
		A	B	C
1	Promote Water Efficiency in Green Buildings		✓	✓
2	ND Require High Efficiency Toilets		✓	✓
3	ND Require High Efficiency Faucets and Showerheads		✓	✓
4	Fixture Replacement SB 407		✓	✓
5	Financial Incentives for Irrigation and Landscape Upgrades (Current)	✓	✓	
6	Financial Incentives for Irrigation and Landscape Upgrades			✓
7	Washer Rebates	✓	✓	✓
8	Washer Rebates for High Efficiency Machines			✓
9	High Efficiency Toilet (HET) Rebates	✓	✓	✓
10	Single Family Water Check Up	✓	✓	✓
11	Multifamily Water Check Up	✓	✓	✓
12	Existing Commercial Washer Rebate	✓	✓	✓
13	Cisterns/Rain Catchments			✓
14	Gray water Retrofit SF			✓
15	Current High Efficiency Urinal Rebate (<0.25 gallon)	✓	✓	✓
16	ND Require 0.5 gal/flush or less urinals in new buildings		✓	✓
17	School Building Retrofit		✓	✓
18	Irrigation (Landscape) Water Budgets	✓	✓	✓
19	Irrigation Water Surveys	✓	✓	✓
20	Mulch Program			✓
21	CII Water Check Up Level 1	✓	✓	✓
22	CII Water Check Up Level 2		✓	✓
23	Customized CII Incentive Program			✓
	Total Measures in each Program	10	17	22

Figure ES-1

Long Term Demands with Conservation Programs
 (Demand is measured by total water system production, including potable and recycled water)

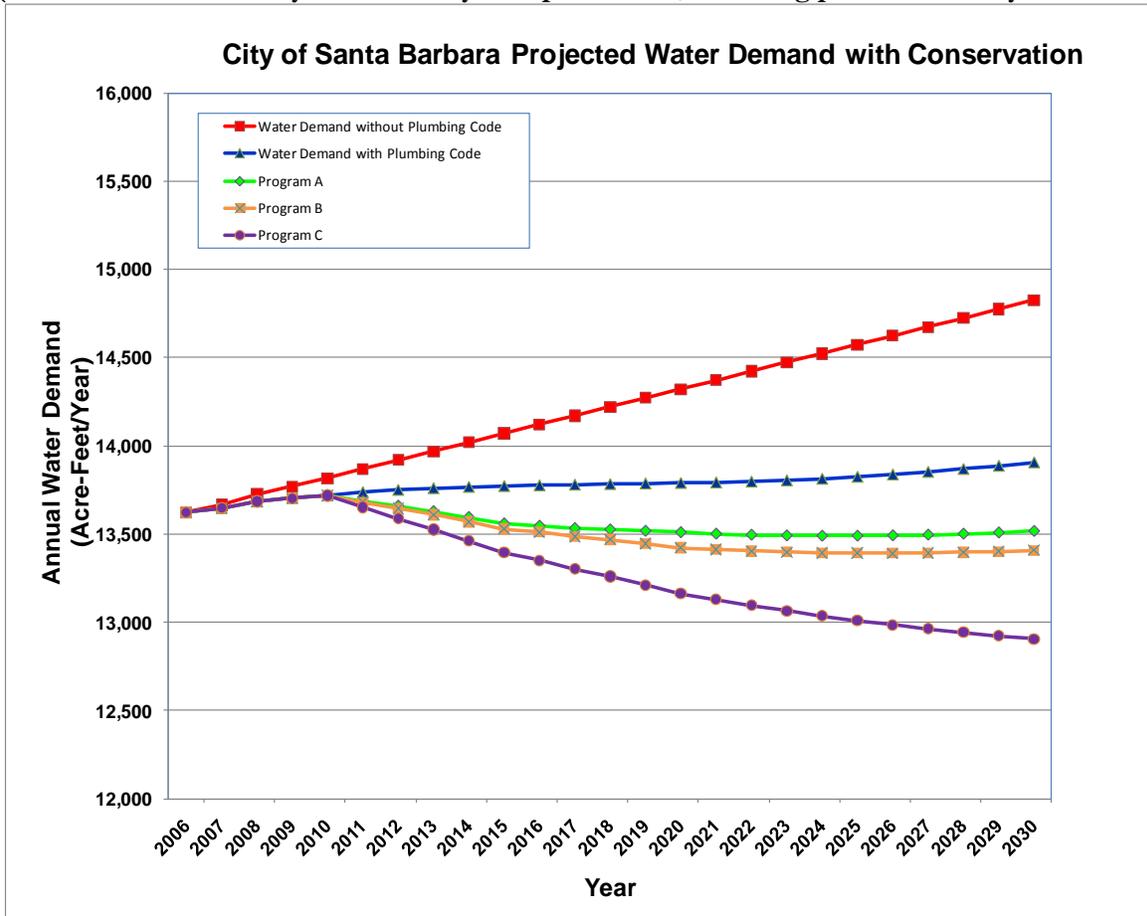


Table ES-2

Conservation Program Description and Future Water Savings

Conservation Program	Description	2030 Demand Reduction (AF/Yr)
-	No Conservation Programs, Plumbing Code Only	919
A	Continue Current Conservation Program (10 measures) and Plumbing Code	1,308
B	Add 7 Cost-Effective Measures to Current Program A and Plumbing Code	1,417
C	Add 5 More Measures to Program B and Plumbing Code	1,919

**Table ES-3
Economic Summary of Long-Term Conservation Programs
(Excluding Tool Kit Measures)**

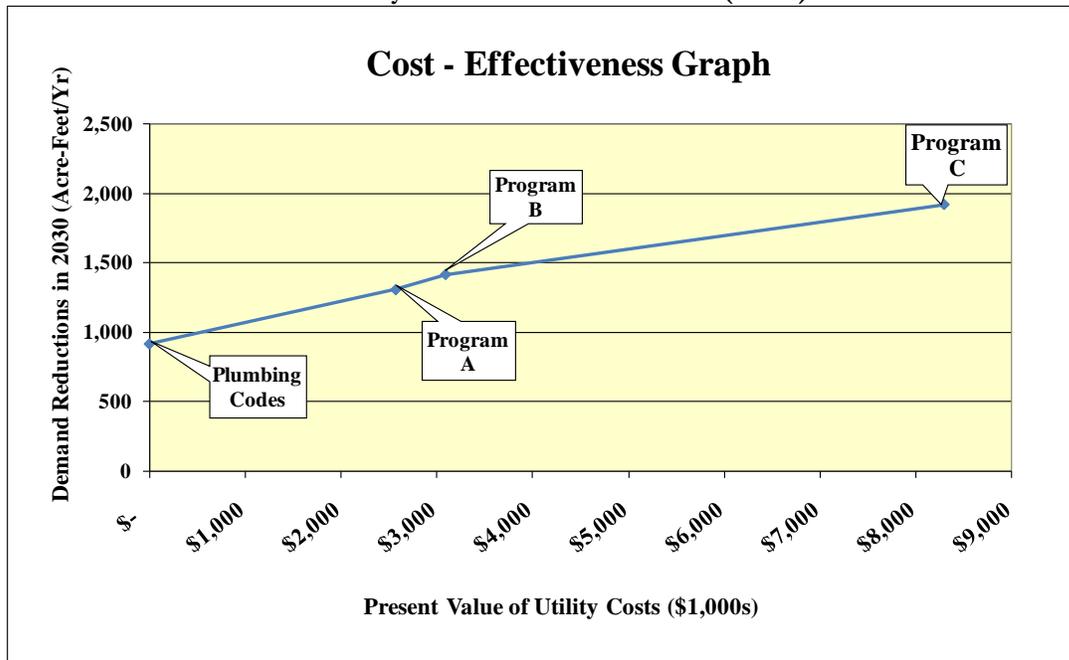
Conservation Program	Demand Reduction by 2030 (AFY)	Total 20-Year Conservation Program Water Savings (AF)	Average Annual Program Cost to Utility (\$)	Present Value of Utility Benefits (\$)	Present Value of Utility Costs (\$)	Utility Benefit - Cost Ratio	Utility Cost of Water Saved (\$/AF)
Plumbing Code Only	919	11,085	NA	NA	NA	NA	NA
Program A + Plumbing Code	1,308	16,419	\$194,000	\$2,455,000	\$2,570,000	0.96	\$482
Program B + Plumbing Code	1,417	17,801	\$233,200	\$3,131,000	\$3,089,000	1.01	\$460
Program C + Plumbing Code	1,919	23,193	\$629,400	\$5,867,000	\$8,287,000	0.71	\$684

Notes:

1. The DSS model is a 30-year model. It was run for 2006 to 2036 to include the base year of 2006 and the 20-year conservation program period of 2011 to 2030.
2. Demand Reduction by 2030 is measured from the 14,825 AFY projected 2030 demand without the effects of the Plumbing Code.
3. Average Annual Program Cost excludes any potential costs for the 21 measures in the Tool Kit
4. Utility Cost of Water Saved somewhat undervalues the cost of savings because program costs are discounted to present value and the water benefit is not. Utility Benefit-Cost ratio is the most accurate measure of cost effectiveness, because it accounts for the time value of money.

Figure ES- 2

Present Value of Utility Costs versus Cumulative (Total) Water Saved





SANTA BARBARA GROUNDWATER MANAGEMENT PLAN
AB303 GRANT APPLICATION FOR 2011 - 2012

Project D
California Statewide Groundwater
Elevation Monitoring (CASGEM) (Memo
Presented to City Water Commission)



City of Santa Barbara
Public Works Department

Interoffice Memorandum

DATE: July 3, 2012
TO: Board of Water Commissioners
FROM: Rebecca Bjork, Water Resources Manager
SUBJECT: Update on Groundwater Level Monitoring

This is to update the Commission on our efforts to monitor groundwater levels in the City's groundwater basins. As you may recall, the State is encouraging local entities to participate in the California Statewide Groundwater Elevation Monitoring Program (CASGEM). The program is in response to recent State legislation aimed at more closely monitoring the use of groundwater Statewide. It is administered by the Department of Water Resources (DWR). In lieu of having the State step in and dictate how our basins would be monitored, we agreed to be the reporting agency for the Santa Barbara and Foothill Groundwater Basins. Fortunately, this aligns with our interest in working more actively with monthly groundwater level data collected at City monitoring wells and correlating it with modeling results we expect to start seeing soon from the USGS update of our groundwater models

Attached is a conceptual plan that we submitted to DWR to illustrate the monitoring wells we identified to comply with the program guidelines. They were selected based on the following criteria:

- Avoid using production wells, due to effects of pumping
- Avoid wells located near creeks
- Avoid wells near potential groundwater recharge sites
- Avoid wells that are perforated across multiple aquifers

We have used this State program as an opportunity to coordinate with USGS to update information and measurement procedures on these wells. A USGS training session on water level measurement in Santa Maria was attended by several of our staff. USGS is completing new GPS surveys of our monitoring wells. We are looking into whether it makes sense to add wells at key locations, such as at Coastal Monitoring Site #1 at Cabrillo Ballfield, where it is apparent that only the lower of our two producing zones is being monitored. Once the list of monitoring wells is finalized and approved by the State we will develop a long-term database of water level data as an alternative to relying solely on the water level charts available on the USGS website.

We look forward to your input at our next meeting.

BF/

Attachment

City of Santa Barbara – CASGEM Groundwater Level Monitoring Plan
Proposed Monitoring Wells

Section 1 – Santa Barbara Groundwater Basin (DWR Basin 3-17)

The basin includes Storage Unit #I and Storage Unit #3. (Storage Unit #II, along with the former Goleta East Subbasin, are now considered to make up the Foothill Basin.) Storage Unit #I has an area of approximately 6 square miles and is the principal groundwater source in the Santa Barbara Basin. The depth of the basin ranges from 200 to 900 feet. The unit gets deeper in the southwesterly direction as it approaches the Mesa Fault and in the southeasterly direction as it approaches the Pacific Ocean. An offshore fault is believed form the southern boundary of the unit, though it is not an effective barrier to seawater intrusion. Groundwater is produced from the “Upper Producing Zone” and the “Lower Producing Zone,” both of which are mostly confined. The principle challenges in managing this unit are the potential for seawater intrusion during heavy pumping and the relatively small groundwater storage volume. Monitoring wells have been selected with preference for dedicated monitoring wells where possible and avoiding proximity to production wells and creeks.

Storage Unit #III is quite small, with an area of approximately 2.5 square miles. It is not regularly used as a source of municipal groundwater due to inferior groundwater quality, but remains an option in times of severe water supply interruption. Some private wells operate in this unit. The eastern half of the unit is quite shallow, in most places less than 100 feet in depth. Depth increases to about 300 feet in the western portion.

The boundaries and principal geologic features of the Santa Barbara Basin are illustrated in the attached “Figure 1. Geology and streamflow stations...” taken from the 1984 USGS report on the Santa Barbara Groundwater Basin. Attached Figure 2 from the same report illustrates geologic sections of the basin.

Section 2 – Foothill Groundwater Basin (DWR Basin 3-53)

Since the publishing of the 1989 USGS report on the Foothill Basin, the Goleta East Subbasin and Storage Unit No. I of the Santa Barbara Basin have been considered a separate “Foothill Basin.” The basin has an area of approximately 4.5 square miles. Pumpage is primarily by the City of Santa Barbara and the La Cumbre Mutual Water Company, with some additional private pumpage. Water is produced primarily from the lower, confined portion of the Santa Barbara Formation, ranging in thickness from less than 100 feet to about 300 feet.

The boundaries and principal geologic features are illustrated in the attached “Figure 3. Location of Geologic Sections” and “Figure 4. Geologic Sections of the Foothill Basin” from the 1989 USGS report.

1978 (Hutchinson, 1979), resulted in the construction of eight monitor wells at two sites along the coast. These wells were designed to provide an early warning of saltwater intrusion into the freshwater aquifer. At each site, wells were installed at four different depths to enable determination of the vertical distribution of water levels and water quality. The purpose of this second phase of the program is to analyze and evaluate the effect of ground-water pumping on the water levels and on water quality of the ground-water basin. The third and final phase of the program will be the development of a digital flow model for the ground-water basin; such a model will help in defining the hydrology and in managing the water resources of the basin.

The current phase of the program includes:

1. Describing the geohydrology of the Santa Barbara ground-water basin, with particular reference to the water-bearing deposits, the quantity of recharge to and discharge from the basin, and ground-water levels and movement.

2. Describing the vertical variations in ground-water quality in the basin.
3. Determining the effect of pumping on water levels and water quality in the ground-water basin.

Description of the Area

The Santa Barbara ground-water basin is on the south coast of Santa Barbara County (fig. 1). The basin is bounded on the north by foothills of the Santa Ynez Mountains, on the west by the Goleta ground-water basin, on the south by the Pacific Ocean, and on the east by the Montecito ground-water basin. Hydrologically, the basin is divided into three storage units by the Mesa and Mission Ridge faults (fig 1). The principal area of our concern is Storage Unit I, which encompasses about 7 mi².

The Santa Barbara area has a Mediterranean-type climate of warm, dry summers and mild winters. The area has distinct wet and dry seasons; 95 percent

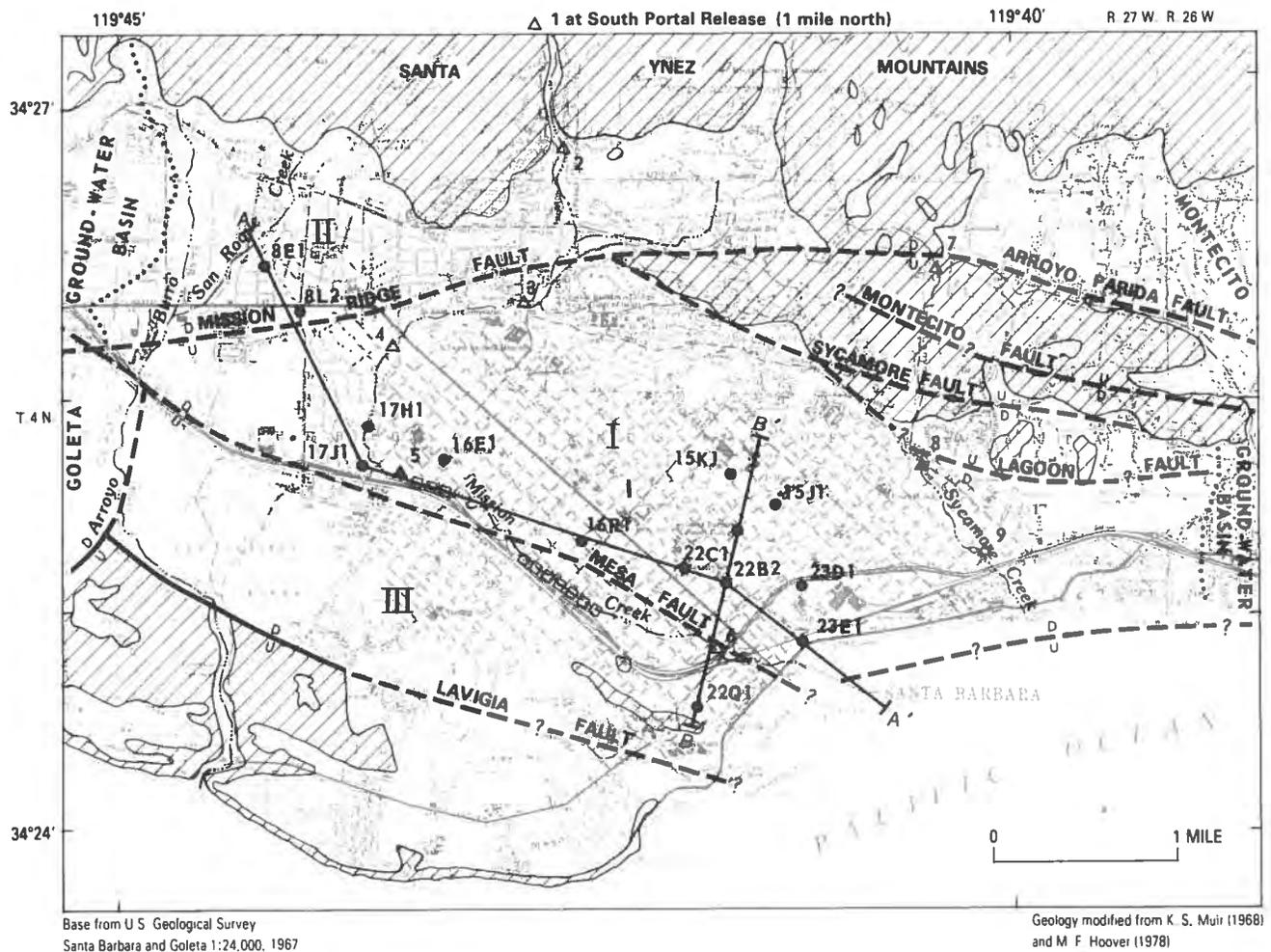


Figure 1. Geology and streamflow stations. Unnamed offshore fault as identified by K. S. Muir (1968).

GEOHYDROLOGY

Definition of the Aquifer System

For this report the lithologic units mapped by Dibblee (1966) and Muir (1968) were generalized in the Santa Barbara area into "consolidated rocks" and "unconsolidated deposits." Figure 1 shows the outcrop pattern of the formations, and figure 2 shows their stratigraphic and structural relations.

Consolidated rocks of Tertiary age underlie the ground-water basin and compose the surrounding hills. These consolidated rocks are sedimentary rocks, predominantly marine in origin, that are nearly impermeable except for slightly permeable sandstones, and in fracture zones. Neither the sandstones nor the fracture zones constitute an important source of ground water.

The unconsolidated deposits consist of the Santa Barbara Formation, of late Pliocene and early Pleistocene age, and alluvium of Holocene age. The Santa Barbara Formation lies unconformably on the consolidated rocks and, in most of the basin, underlies the alluvium. This formation is of marine origin, consists of fine to coarse sand, silt, and greenish-gray clay, and has occasional gravel layers. A layer of permeable, fossiliferous sand and gravel occurs near the base of the formation in most of the basin. The alluvium, as

used in this report, includes terrace deposits, older alluvium, and younger alluvium. It consists of poorly sorted sand, gravel, silt, yellowish-brown clay, and occasional cobbles and boulders.

The greatest thickness of unconsolidated deposits is more than 1,000 ft and is found in Storage Unit I, adjacent to the northeast side of Mesa fault near the Pacific Ocean. From here the unconsolidated

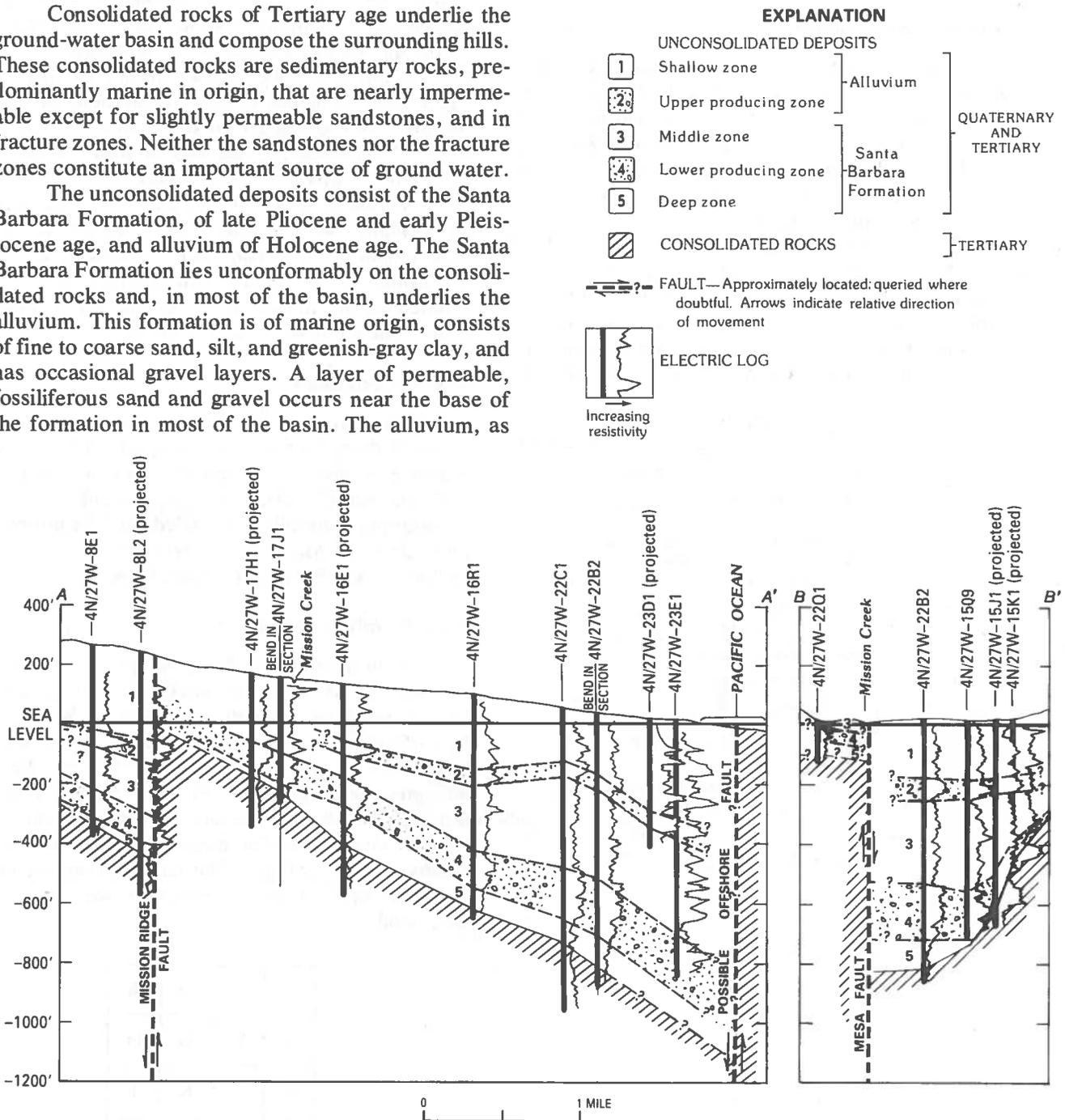
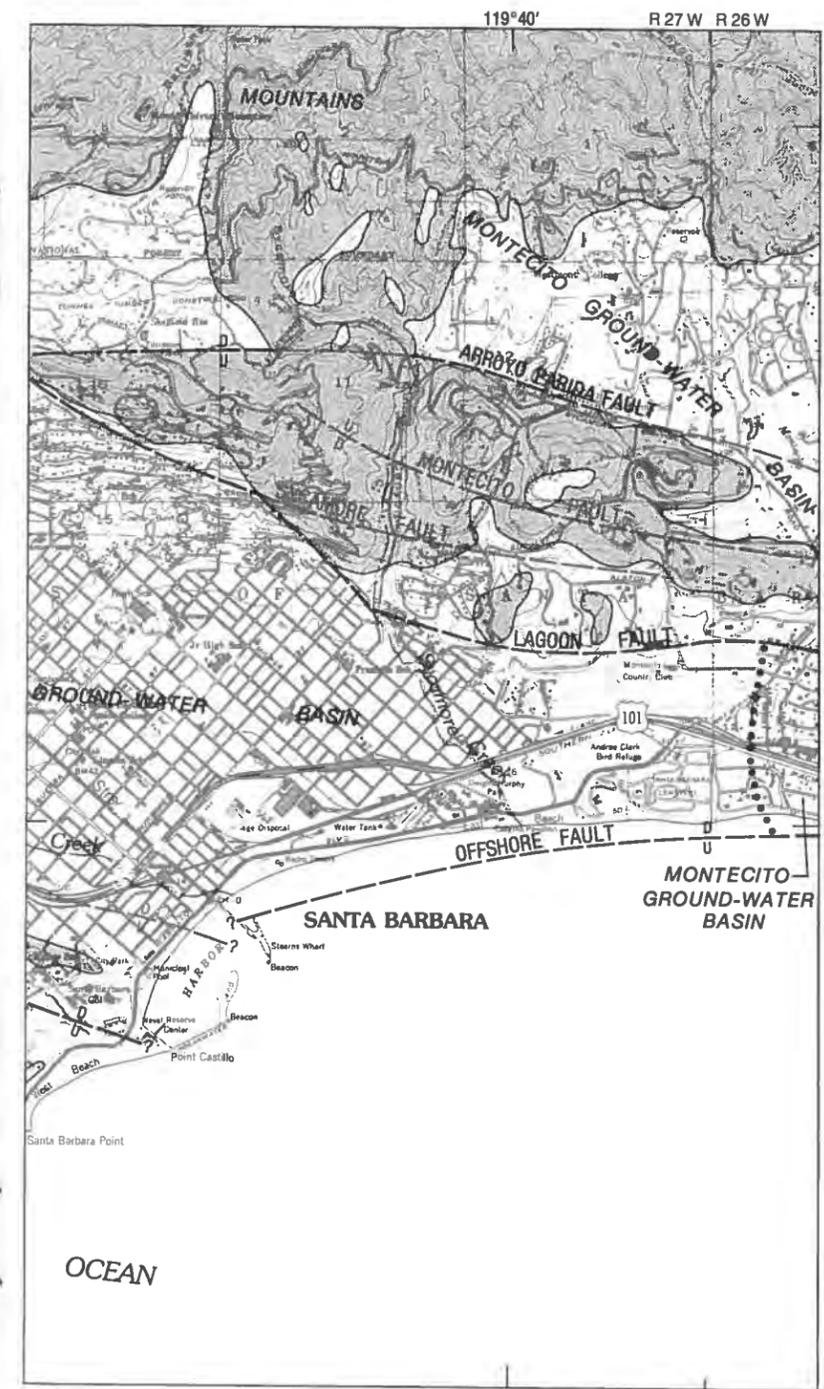


Figure 2. Geologic sections.



Base from U.S. Geological Survey, Santa Barbara and Goleta 1:24,000, 1967

FIGURE 3.—Location of geologic sections.



Geology modified from J.E. Upson (1951), K.S. Muir (1968), and M.F. Hoover (1978)

FIGURE 3.—Continued.

- EXPLANATION**
-  UNCONSOLIDATED DEPOSITS (QUATERNARY AND TERTIARY)
 -  CONSOLIDATED ROCKS (TERTIARY)
 -  FAULT—Dashed where approximately located; queried where doubtful. u, upthrown side; d, downthrown side. Black indicates boundary of ground-water basin
 -  GEOLOGIC CONTACT
 -  LINE OF GEOLOGIC SECTION—Sections shown in figure 4
 -  GROUND-WATER STORAGE UNIT—Former designation of storage unit and subbasin name in parentheses
 -  GROUND-WATER DIVIDE
 -  FORMER GROUND-WATER DIVIDE
 -  WELL AND NUMBER

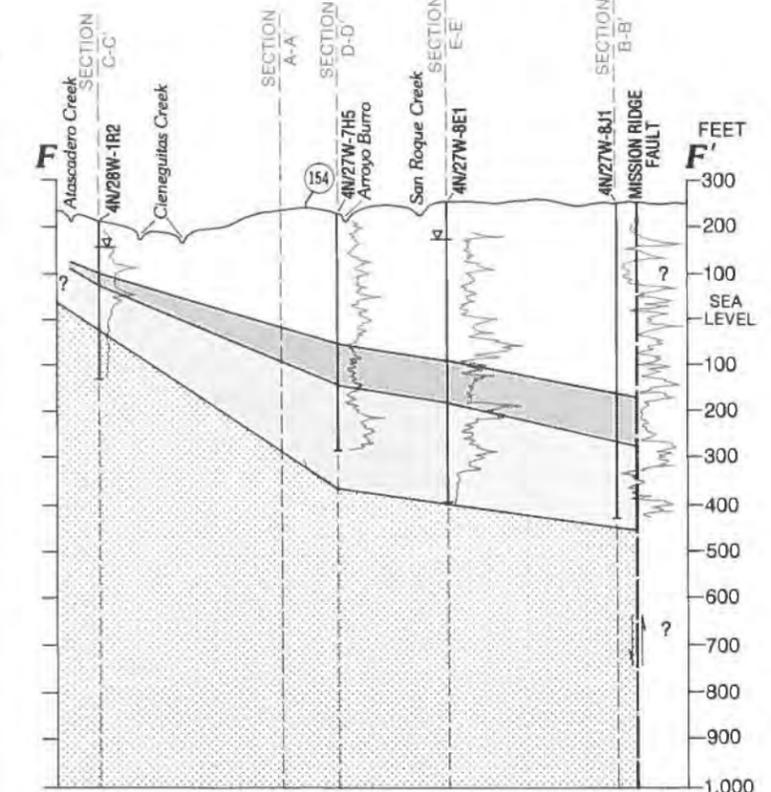
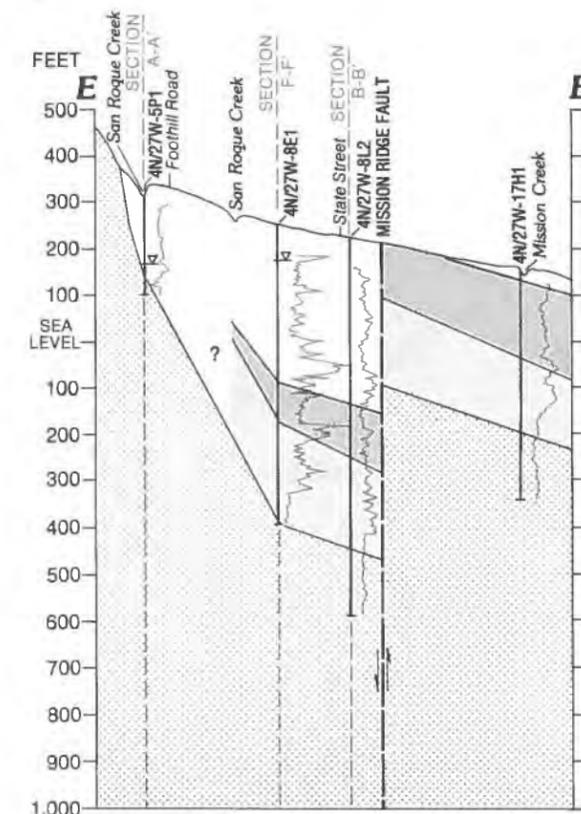
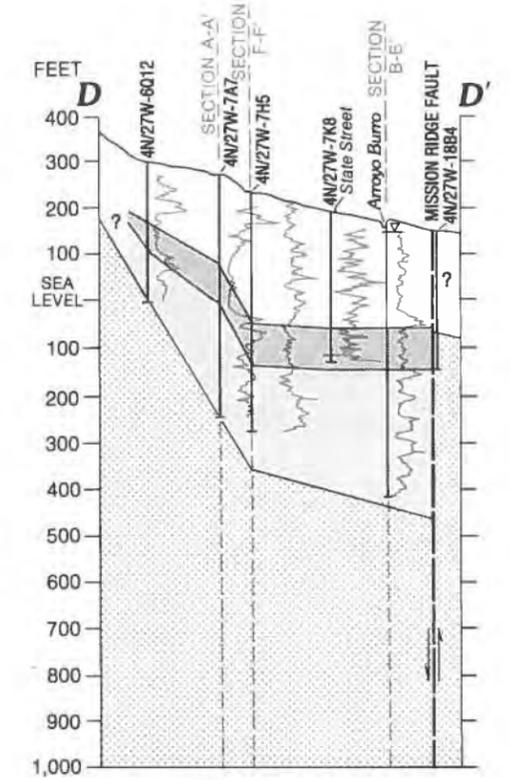
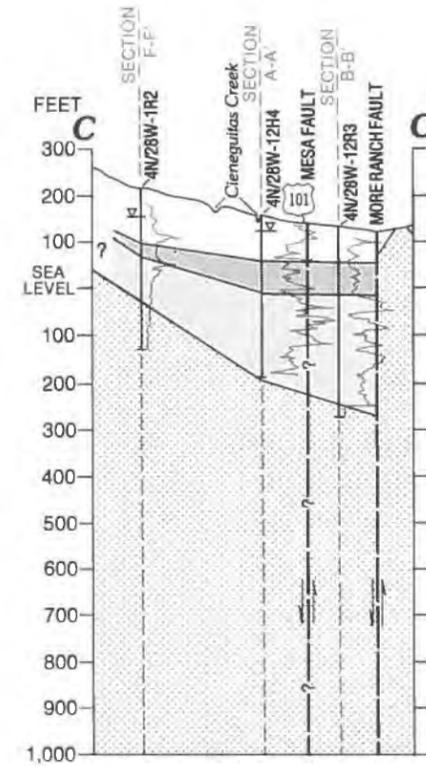
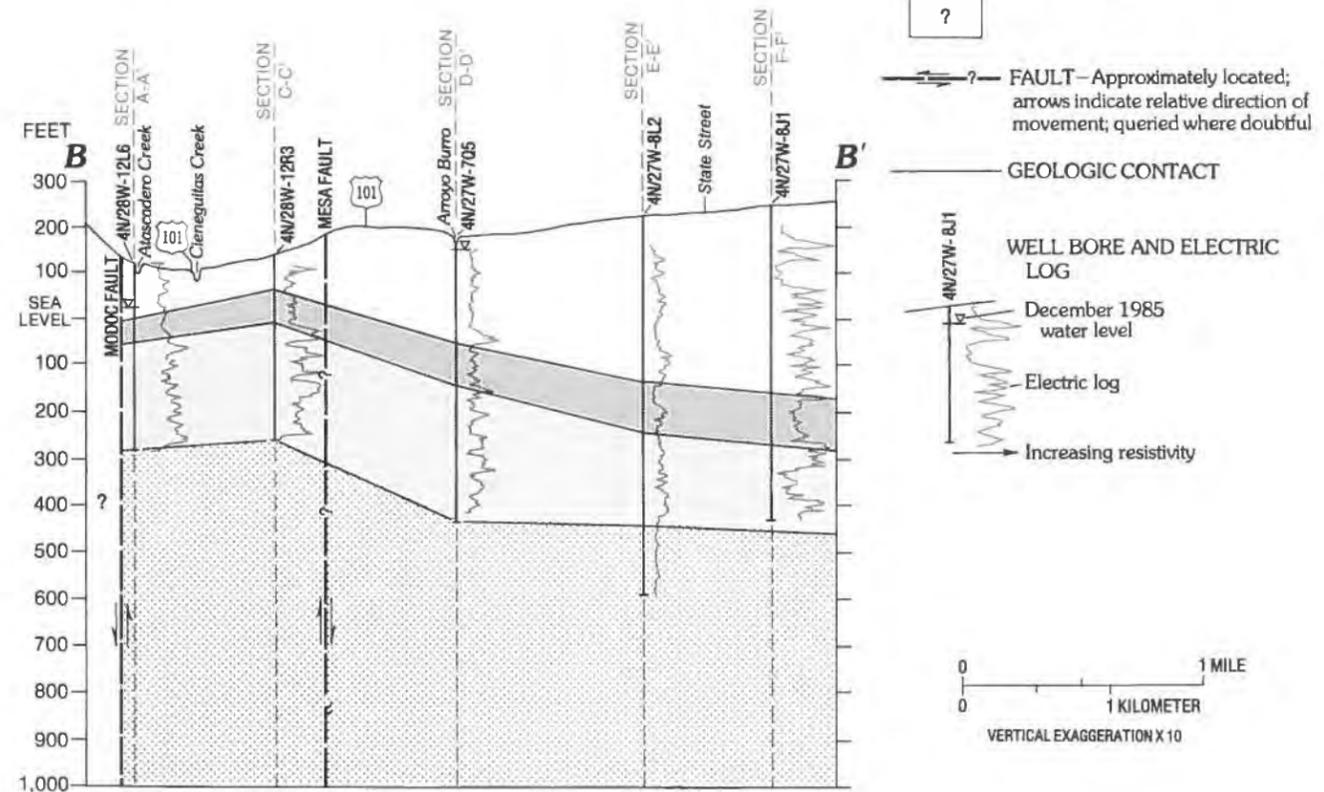
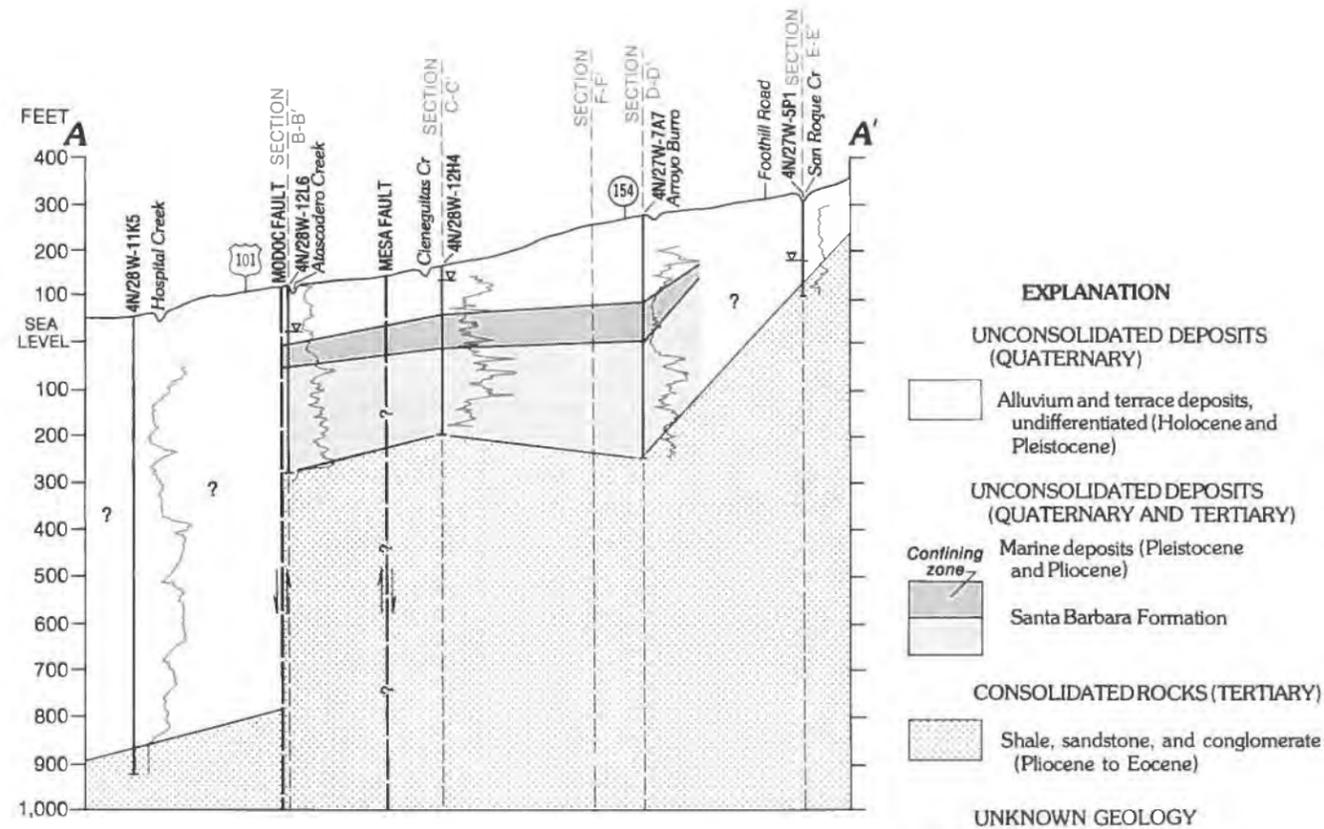


FIGURE 4.—Geologic sections of the Foothill ground-water basin.

FIGURE 4.—Continued.

Foothill Groundwater Basin

Proposed CASGEM Groundwater Level Monitoring Wells





SANTA BARBARA GROUNDWATER MANAGEMENT PLAN
AB303 GRANT APPLICATION FOR 2011 - 2012

Project E
Smart Landscape Rebate Program (Email
with FY 2011–2012 data)



Santa Barbara County Public Works Department
Flood Control & Water Agency

May 7, 2012

Ms. Angela Anderson
Water Conservation Specialist
U.S. Bureau of Reclamation
2800 Cottage Way (MP-410)
Sacramento, CA 95825

Re: **RO9AP20053: Smart Landscape Rebate Program in Santa Barbara County**

Dear Ms. Anderson:

Enclosed please find a "Federal Financial Report" form 425 for the subject grant agreement. In late April I sent you our Progress Report #5 for this grant.

Also attached is a Form 270 to request reimbursement for expenditures through March 31, 2012.

If you have any questions on the enclosed information, please let me know. My contact information remains the same: Santa Barbara County Water Agency, 123 E. Anapamu St., Santa Barbara, CA 93101; or 805-568-3545 and lflecken@cosbpw.net

Sincerely,

A handwritten signature in cursive script that reads "Len Fleckenstein".

Len Fleckenstein
Santa Barbara County Water Agency

Enclosures:

- Federal Financial Report, Form 425
- Request for Advance or Reimbursement, SF 270
- Excel worksheet data on local match for project costs

FEDERAL FINANCIAL REPORT

(Follow form instructions)

1. Federal Agency and Organizational Element to Which Report is Submitted <p style="text-align: center;">U.S. Bureau of Reclamation</p>	2. Federal Grant or Other Identifying Number Assigned by Federal Agency (To report multiple grants, use FFR Attachment) <p style="text-align: center;">R09AP20053</p>	Page <p style="font-size: 24px;">1</p>	of <p style="font-size: 24px;">1</p>	pages
--	---	---	---	-------

3. Recipient Organization (Name and complete address including Zip code)

Santa Barbara County Water Agency, 123 E. Anapamu St., Santa Barbara, CA 93101

4a. DUNS Number 120-55-7967	4b. EIN 95-6002833	5. Recipient Account Number or Identifying Number (To report multiple grants, use FFR Attachment) WC8570	6. Report Type <input type="checkbox"/> Quarterly <input checked="" type="checkbox"/> Semi-Annual <input type="checkbox"/> Annual <input type="checkbox"/> Final	7. Basis of Accounting <input checked="" type="checkbox"/> Cash <input type="checkbox"/> Accrual
------------------------------------	---------------------------	--	--	---

8. Project/Grant Period From: (Month, Day, Year) <p style="text-align: center;">Sept. 22, 2009</p>	To: (Month, Day, Year) <p style="text-align: center;">Oct. 1, 2012</p>	9. Reporting Period End Date (Month, Day, Year) <p style="text-align: center;">3, 31, 2012</p>
--	---	--

10. Transactions Cumulative

(Use lines a-c for single or multiple grant reporting)

Federal Cash (To report multiple grants, also use FFR Attachment):	
a. Cash Receipts	\$116,583.55
b. Cash Disbursements	\$116,583.55
c. Cash on Hand (line a minus b)	\$0.00

(Use lines d-o for single grant reporting)

Federal Expenditures and Unobligated Balance:	
d. Total Federal funds authorized	\$165,200.00
e. Federal share of expenditures	\$122,312.83
f. Federal share of unliquidated obligations	
g. Total Federal share (sum of lines e and f)	\$122,312.83
h. Unobligated balance of Federal funds (line d minus g)	\$42,887.17
Recipient Share:	
i. Total recipient share required	\$165,200.00
j. Recipient share of expenditures	\$183,497.53
k. Remaining recipient share to be provided (line i minus j)	(\$18,297.53)
Program Income:	
l. Total Federal program income earned	\$0.00
m. Program income expended in accordance with the deduction alternative	
n. Program income expended in accordance with the addition alternative	
o. Unexpended program income (line l minus line m or line n)	\$0.00

11. Indirect Expense	a. Type	b. Rate	c. Period From	Period To	d. Base	e. Amount Charged	f. Federal Share
g. Totals:							

12. Remarks: Attach any explanations deemed necessary or information required by Federal sponsoring agency in compliance with governing legislation:

13. Certification: By signing this report, I certify that it is true, complete, and accurate to the best of my knowledge. I am aware that any false, fictitious, or fraudulent information may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)

a. Typed or Printed Name and Title of Authorized Certifying Official Lynn Hogan, Accountant, Santa Barbara County Water Agency	c. Telephone (Area code, number and extension) <p style="text-align: center;">(805) 568-3128</p> d. Email address <p style="text-align: center;">SHOGAN@cosbpw.net</p>
b. Signature of Authorized Certifying Official 	e. Date Report Submitted (Month, Day, Year) <p style="text-align: center;">5,07,12</p> 14. Agency use only:

Standard Form 425
 OMB Approval Number: 0348-0061
 Expiration Date: 10/31/2011

Paperwork Burden Statement
 According to the Paperwork Reduction Act, as amended, no persons are required to respond to a collection of information unless it displays a valid OMB Control Number. The valid OMB control number for this information collection is 0348-0061. Public reporting burden for this collection of information is estimated to average 1.5 hours per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0061), Washington, DC 20503.

REQUEST FOR ADVANCE OR REIMBURSEMENT

(See instructions on back)

OMB APPROVAL NO.

0348-0004

PAGE 1 OF 2 PAGES

1. TYPE OF PAYMENT REQUESTED

a. "X" one or both boxes

ADVANCE REIMBURSEMENT

b. "X" the applicable box

FINAL PARTIAL

2. BASIS OF REQUEST

CASH

ACCRUAL

3. FEDERAL SPONSORING AGENCY AND ORGANIZATIONAL ELEMENT TO WHICH THIS REPORT IS SUBMITTED

Bureau of Reclamation

4. FEDERAL GRANT OR OTHER IDENTIFYING NUMBER ASSIGNED BY FEDERAL AGENCY

R09AP20053

5. PARTIAL PAYMENT REQUEST NUMBER FOR THIS REQUEST

1

6. EMPLOYER IDENTIFICATION NUMBER

95-6002833

7. RECIPIENT'S ACCOUNT NUMBER OR IDENTIFYING NUMBER

3050-054-WC8570

8. PERIOD COVERED BY THIS REQUEST

FROM (month, day, year)

10/1/2011

TO (month, day, year)

3/31/2012

9. RECIPIENT ORGANIZATION

Name: Santa Barbara County Water Agency

Number and Street: 123 E. Anapamu St.

City, State and ZIP Code: Santa Barbara, CA 93101

10. PAYEE (Where check is to be sent if different than item 9)

Name:

Number and Street:

City, State and ZIP Code:

11. COMPUTATION OF AMOUNT OF REIMBURSEMENTS/ADVANCES REQUESTED

PROGRAMS/FUNCTIONS/ACTIVITIES ►	(a)	(b)	(c)	TOTAL
a. Total program outlays to date (As of date)	\$ 305,810.36	\$	\$	\$ 305,810.36
b. Less: Cumulative program income				0.00
c. Net program outlays (Line a minus line b)	305,810.36	0.00	0.00	305,810.36
d. Estimated net cash outlays for advance period				0.00
e. Total (Sum of lines c & d)	305,810.36	0.00	0.00	305,810.36
f. Non-Federal share of amount on line e	183,497.53			183,497.53
g. Federal share of amount on line e	122,312.83			122,312.83
h. Federal payments previously requested	116,583.55			116,583.55
i. Federal share now requested (Line g minus line h)	5,729.28	0.00	0.00	5,729.28
j. Advances required by month, when requested by Federal grantor agency for use in making prescheduled advances	1st month			0.00
	2nd month			0.00
	3rd month			0.00

12. ALTERNATE COMPUTATION FOR ADVANCES ONLY

a. Estimated Federal cash outlays that will be made during period covered by the advance	\$
b. Less: Estimated balance of Federal cash on hand as of beginning of advance period	
c. Amount requested (Line a minus line b)	\$ 0.00

AUTHORIZED FOR LOCAL REPRODUCTION

(Continued on Reverse)

STANDARD FORM 270 (Rev. 7-97)
Prescribed by OMB Circulars A-102 and A-110

CERTIFICATION

I certify that to the best of my knowledge and belief the data on the reverse are correct and that all outlays were made in accordance with the grant conditions or other agreement and that payment is due and has not been previously requested.

SIGNATURE OR AUTHORIZED CERTIFYING OFFICIAL



DATE REQUEST SUBMITTED

May 7, 2012

TYPED OR PRINTED NAME AND TITLE

Lynn Hogan, Water Agency Accountant

TELEPHONE (AREA CODE, NUMBER, EXTENSION)

805-568-3128

This space for agency use

Public reporting burden for this collection of information is estimated to average 60 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0004), Washington, DC 20503.

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

INSTRUCTIONS

Please type or print legibly. Items 1, 3, 5, 9, 10, 11e, 11f, 11g, 11i, 12 and 13 are self-explanatory; specific instructions for other items are as follows:

<u>Item</u>	<u>Entry</u>
2	Indicate whether request is prepared on cash or accrued expenditure basis. All requests for advances shall be prepared on a cash basis.
4	Enter the Federal grant number, or other identifying number assigned by the Federal sponsoring agency. If the advance or reimbursement is for more than one grant or other agreement, insert N/A; then, show the aggregate amounts. On a separate sheet, list each grant or agreement number and the Federal share of outlays made against the grant or agreement.
6	Enter the employer identification number assigned by the U.S. Internal Revenue Service, or the FICE (institution) code if requested by the Federal agency.
7	This space is reserved for an account number or other identifying number that may be assigned by the recipient.
8	Enter the month, day, and year for the beginning and ending of the period covered in this request. If the request is for an advance or for both an advance and reimbursement, show the period that the advance will cover. If the request is for reimbursement, show the period for which the reimbursement is requested.

Note: The Federal sponsoring agencies have the option of requiring recipients to complete items 11 or 12, but not both. Item 12 should be used when only a minimum amount of information is needed to make an advance and outlay information contained in item 11 can be obtained in a timely manner from other reports.

11 The purpose of the vertical columns (a), (b), and (c) is to provide space for separate cost breakdowns when a project has been planned and budgeted by program, function, or

<u>Item</u>	<u>Entry</u>
11a	Enter in "as of date," the month, day, and year of the ending of the accounting period to which this amount applies. Enter program outlays to date (net of refunds, rebates, and discounts), in the appropriate columns. For requests prepared on a cash basis, outlays are the sum of actual cash disbursements for goods and services, the amount of indirect expenses charged, the value of in-kind contributions applied, and the amount of cash advances and payments made to subcontractors and subrecipients. For requests prepared on an accrued expenditure basis, outlays are the sum of the actual cash disbursements, the amount of indirect expenses incurred, and the net increase (or decrease) in the amounts owed by the recipient for goods and other property received and for services performed by employees, contracts, subgrantees and other payees.
11b	Enter the cumulative cash income received to date, if requests are prepared on a cash basis. For requests prepared on an accrued expenditure basis, enter the cumulative income earned to date. Under either basis, enter only the amount applicable to program income that was required to be used for the project or program by the terms of the grant or other agreement.
11d	Only when making requests for advance payments, enter the total estimated amount of cash outlays that will be made during the period covered by the advance.
13	Complete the certification before submitting this request.

activity. If additional columns are needed, use as many additional forms as needed and indicate page number in space provided in upper right; however, the summary totals of all programs, functions, or activities should be shown in the "total" column on the first page.

11a Enter in "as of date," the month, day, and year of the ending of the accounting period to which this amount applies. Enter program outlays to date (net of refunds, rebates, and discounts), in the appropriate columns. For requests prepared on a cash basis, outlays are the sum of actual cash disbursements for goods and services, the amount of indirect expenses charged, the value of in-kind contributions applied, and the amount of cash advances and payments made to subcontractors and subrecipients. For requests prepared on an accrued expenditure basis, outlays are the sum of the actual cash disbursements, the amount of indirect expenses incurred, and the net increase (or decrease) in the amounts owed by the recipient for goods and other property received and for services performed by employees, contracts, subgrantees and other payees.

11b Enter the cumulative cash income received to date, if requests are prepared on a cash basis. For requests prepared on an accrued expenditure basis, enter the cumulative income earned to date. Under either basis, enter only the amount applicable to program income that was required to be used for the project or program by the terms of the grant or other agreement.

11d Only when making requests for advance payments, enter the total estimated amount of cash outlays that will be made during the period covered by the advance.

13 Complete the certification before submitting this request.

Financial Report #5: SB County Smart Landscape Rebate Program

5th Performance Period: 10/1/2011 - 3/31/2012

	Carpinteria Valley WD	Santa Barbara	Goleta WD	Lompoc	Vandnbg Village	SB County (see printout)	Totals for Period	<i>Totals to date (9/22/2009 - 3/31/2012)</i>
\$ amount of rebates	\$333.00	\$9,649.32	\$0.00	\$1,000.00	\$476.25	\$0.00	\$11,458.57	\$ 173,322.56
# Staff hours /period	42.5	213	0	6	3	49	313.5	1061.5
Staffing Cost	\$2,337.50	\$11,715.00	\$0.00	\$330.00	\$165.00	\$3,009.56	\$17,557.06	\$132,487.78
Rebate Cash from purveyor	\$166.50	\$4,824.66	\$0.00	\$500.00	\$238.13	\$0.00	\$5,729.29	\$51,009.75
Total Local Share	\$2,504.00	\$16,539.66	\$0.00	\$830.00	\$403.13	\$3,009.56	\$23,286.35	\$183,497.53
Federal USBR Share	\$166.50	\$4,824.66	\$0.00	\$500.00	\$238.12	\$0.00	\$5,729.28	\$ 122,312.83
Total Program Costs							\$29,015.63	\$305,810.36

Labor Summary

From 10/1/2011 to 3/31/2012

Selection Criteria: Fund = 3050; Project = WC8570

Layout Options: Summarized By = Fund; Page Break At = Fund

Fund 3050 -- Water Agency

Employee ID	Employee Name	Amount	Prod Hours	Prod Rate
	*** NOT ON FILE ***	-127.73	0.00	--
9918	FLECKENSTEIN, LEONARD	1,998.35	28.00	71.37
12831	TURNER, RANDY MICHAEL	1,138.94	21.00	54.24
Total Water Agency		3,009.56	49.00	61.42





SANTA BARBARA GROUNDWATER MANAGEMENT PLAN
AB303 GRANT APPLICATION FOR 2011 - 2012

Project F
William B. Cater Treatment Plant and
Ortega Groundwater Treatment Plant
Projects (City Council Agenda Report)



CITY OF SANTA BARBARA

COUNCIL AGENDA REPORT

AGENDA DATE: March 15, 2011

TO: Mayor and Councilmembers

FROM: Water Resources Division, Public Works Department

SUBJECT: Safe Drinking Water State Revolving Fund Loan Acceptance And Increase Of Appropriations And Revenues In The Water Capital Fund

RECOMMENDATION: That Council:

- A. Accept a loan in the amount of \$29,283,000 from the Safe Drinking Water State Revolving Fund (SDWSRF) for the Cater Water Treatment Plant Advanced Treatment and Ortega Groundwater Treatment Plant Rehabilitation Projects; and
- B. Increase Water Capital Fund appropriations and estimated revenues by \$29,283,000.

DISCUSSION:

The City of Santa Barbara's William B. Cater Water Treatment Plant (Cater) treats drinking water for the City of Santa Barbara and the Montecito and Carpinteria Valley Water Districts. In 2012, the new Stage 2 Disinfection By-Products Rule (Stage 2 Rule) will go into effect, lowering the allowable limits of disinfection by-products in drinking water. The proposed Advanced Treatment Project at Cater (Cater Project) and the Ortega Groundwater Treatment Plant Rehabilitation and Improvements Project (Ortega Project) both address compliance with the upcoming Stage 2 Rule, making them eligible for funding through a low-interest SDWSRF loan.

The Cater Project includes an ozone pretreatment process at Cater which has been determined to be the best solution for complying with the upcoming Stage 2 Rule. Using ozone as a pretreatment makes the precursors for disinfection by-products more amenable to filtration in the treatment process.

The Ortega Project will assist the City in complying with the upcoming Stage 2 Rule by treating groundwater which contains trace amounts of disinfection by-products, and blending it with treated surface water to lower disinfection by-product levels in the water distribution system.

Council Agenda Report
Safe Drinking Water State Revolving Fund Loan Acceptance And Increase Of
Appropriations And Revenues In The Water Capital Fund
March 15, 2011
Page 2

On January 13, 2009, City Council authorized the City Administrator to apply for an SDWSRF loan for the Cater and Ortega Projects on behalf of the City, and the City's loan application was accepted by the State.

On November 17, 2009, Council adopted Resolution No. 09-090, authorizing a Notice of Application Acceptance for a SDWSRF loan and authorizing officers to act on behalf of the City. Council amended this Resolution on November 16, 2010 to clarify the source of City funds for loan repayment, and to add language pledging and dedicating the revenue source for the loan.

On January 24, 2011, the City received a funding agreement for a 20-year loan in the amount of \$29,283,000, at an interest rate of 2.5017%, from the California Department of Public Health. The City anticipates receiving executed loan documents in late March, 2011.

FUNDING:

The SDWSRF loan will fund both the Cater and the Ortega Projects. \$20,000,000 of the loan will be appropriated for the Cater Project, of which 60.3% will be repaid by the City, and 39.7% will be repaid by the Montecito and Carpinteria Valley Water Districts. The remaining \$9,283,000 will be appropriated for the Ortega Project, which will be completely repaid by the City.

PREPARED BY: Catherine Taylor, Water System Manager/LS/mh

SUBMITTED BY: Christine F. Andersen, Public Works Director

APPROVED BY: City Administrator's Office



SANTA BARBARA GROUNDWATER MANAGEMENT PLAN
AB303 GRANT APPLICATION FOR 2011 - 2012

Project G

Free Rain Sensor Program (Memo summarizing program data)



City of Santa Barbara
Public Works Department

Interoffice Memorandum

DATE: March 6, 2012
TO: Alison Jordan, Water Resources Supervisor
FROM: Cathie Paré, Water Resources Specialist
SUBJECT: Success of the Rain Sensor Program

The Rain Sensor program began in 2007 and it continues as a part of our Irrigation Checkup and Smart Landscape Rebate Program.

The period compared is: pre-installation vs. post-installation of the winter rain months of December – March.

The *irrigation accounts* have a very positive percentage change:

36% reduction in consumption in the rain months with the sensor installed
142 HCF saved
105,987 gallons saved for a sunny day

The *residential* and *multi-residential* mixed meter accounts of which we have 313 installations show a positive percentage change as well!

16 % reduction of water consumption. (that is the average, we had many reducing their winter months by more than 75%! We also had a few with higher than average, maybe new owners, new landscapes, I removed the properties with documented leaks from the data averaging.)
1,898 HCF saved
1,419,704 gallons saved! Or **4.36 Acre Feet** saved for a sunny day.

Well done Water Conservation Program!

Cc: TL, MW, RW, DM

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