



United States Department of the Interior

U.S. GEOLOGICAL SURVEY
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April 15, 2014

Ms. Rebecca Bjork, Public Works Director
Public Works Department
City of Santa Barbara
630 Garden Street
Santa Barbara, California 93102

Attention: Joshua Haggmark, Acting Water Resources Manager

Dear Ms. Bjork:

This letter replaces our letter dated February 7, 2014 and confirms discussions between our respective staffs, concerning the continuation of the cooperative water resources program between the Public Works Department City of Santa Barbara (City) and the U.S. Geological Survey (USGS) for the period November 1, 2013 to October 31, 2014.

At the request of City of Santa Barbara, the USGS completed a thorough investigation of the groundwater monitoring program. The network was evaluated using the available water-quality and water-level data to determine if adjustments to the monitoring program are needed. The changes outlined below will eliminate unnecessary data collection while enhancing the overall quality of the sampling and monitoring program.

Changes to the water quality and groundwater sampling program are as follows:

1. The bimonthly sampling schedule at five wells will be reduced to quarterly sampling at four wells during the months of March, June, September, and December. Samples will consist of pH (Lab Code 68), specific electrical conductance (Lab Code 69), dissolved solids (Lab Code 27) and dissolved chloride concentration (Lab Code 1571) as outlined in List B. June samples for these four wells however, will consist of chemical constituents outlined in List A. These twelve total yearly samples will be collected at the following four monitoring wells:
 - a. 4N/27W-23E5
 - b. 4N/27W-23F2
 - c. 4N/27W-23F3
 - d. 4N/27W-23F4

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If a 25% increase in chloride concentration is evident at 4N/27W-23E5, two additional wells located further inland (north) will be added to the quarterly sampling program, and sampling will increase to monthly intervals at a total of six monitoring wells. The two additional wells are 4N/27W-22A4 and 4N/27W-22G2.¹

If USGS water quality samples for 4N/27W-23E5 result in a 25% increase in chloride concentrations, City project coordinator will be notified immediately via email and sampling will be increased to monthly intervals. If water supply conditions result in increasing pumping of more than 750 AF over a 12 month period from Storage Unit 1, City project coordinator will contact the USGS project coordinator immediately via email.²

2. The following wells will be removed from the Water Quality monitoring schedule (Table 1):
 - a. 4N/27W-19A1 (triennial sample, slow to recover, not needed if 19A3 is sampled)
 - b. 4N/27W-19A2 (triennial sample, slow to recover, not needed if 19A3 is sampled)
 - c. 4N/27W-21F1 (annual sample, slow to recover, adjacent wells will provide adequate data)
 - d. 4N/27W-21F2 (annual sample, slow to recover, adjacent wells will provide adequate data)
 - e. 4N/27W-23H4 (annual sample, casing compromised)
3. The water quality sampling schedule for monitoring well 4N/27W-19A3 (upper producing zone) will be changed from triennial to annual. Two triennial wells from this cluster, 4N/27W-19A1 (lower producing zone) and 4N/27W-19A2 (middle zone), have been removed from the sampling program. Both 19A1 and 19A2 are slow to recover. The information from yearly sampling of 19A3 will provide the necessary information for this location of Storage Unit III. Additionally, it is reasonable to assume that there will not be changes in the water quality of the middle and lower producing zones, without first noticing a change in the upper producing zone.
4. The list of chemical constituents in List A has changed to include more sample analytes. The additional analytes will provide information to help differentiate “connate water” from seawater, and to help illustrate changes in the sources of sampled water. The previous sample schedules included Schedule 101 (nutrients), Schedule 117 (major ions), and Lab Code 27 (dissolved solids). New sample schedules include Schedule 1261 (major ions/trace metal), Schedule 101 (nutrients), and Schedule 1142 (stable isotopes). Please refer to List A.

¹ If additional sampling is needed, an additional cost of \$1,885 per well for each measurement of List B constituents, will be charged to the WY2015 agreement. Additional Federal Matching Funds (FMF) may not be available for this work.

² City Project Coordinator: Kelley Dyer, Water Supply Analyst, kdyer@SantaBarbaraCA.gov
USGS Project Coordinators: Matthew Melchiorson, Hydrologic Technician, mattm@usgs.gov; Matthew Scrudato, Santa Maria Field Office Chief, scrudato@usgs.gov.

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5. The following wells will be removed from the monthly water level monitoring schedule (Table 1):
 - a. 4N/27W-8L3 (well destroyed 2010)
 - b. 4N/27W-15Q10 (well destroyed 12/2013)
 - c. 4N/27W-23E6 (well obstructed)
 - d. 4N/27W-23H1 (casing compromised)
 - e. 4N/27W-23H4 (casing compromised)

6. The USGS will start with the monthly collection of water level measurements at 66 wells listed in Table 1 in March 2014. This water-level data will be stored in the USGS National Water Information System (NWIS). These wells were previously collected by City of Santa Barbara personnel, with the data furnished to the USGS for storage in NWIS. The total annual cost for this portion of the program is \$44,200.

The proposed program and associated costs are as follows:

1. Surface Water Gaging Stations

The U.S. Geological Survey (USGS) will continue to operate, maintain, and publish streamflow records for the following stations:

<u>Station number and name</u>		<u>City Funds</u>	<u>USGS Funds</u>	<u>Total Funds</u>
11119745	Mission Creek near Rocky Nook Park	\$13,550	\$ 6,850	\$20,400
11122000	Santa Ynez above Gibraltar Dam	13,550	6,850	20,400
11123000	Santa Ynez below Gibraltar Dam	13,550	6,850	20,400
11121900	Gibraltar Dam Diversion Weir at Gibraltar	7,900	-0-	7,900
11122010	Gibraltar Release Dam Weir at Gibraltar Dam	<u>7,900</u>	<u>-0-</u>	<u>7,900</u>
Subtotal		\$56,450	\$20,550	\$77,000

2. Groundwater Monitoring

Water-level monitoring:

City of Santa Barbara (City) personnel will make monthly water-level measurements at 66 wells as listed in Table 1 from October 2013 through February 2014 (5 months). Results of the measurements will be submitted to the USGS for storage in the National Water Information System (NWIS). USGS personnel will make monthly water-level measurements at the same 66 wells as listed in Table 1 from March 2014 through October 2014 (8 months). For the period of November 2013 to October 2014, USGS personnel will make monthly water-level measurements at 4N/27W-8M6 and continue to operate the continuous recorder at 4N/27W-8M5 (San Remo). The additional month is needed to bring the USGS field work in line with the period of performance of the agreement. Results of the measurements will be stored in NWIS.

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Water-quality monitoring:

The USGS will continue to operate a groundwater quality monitoring network per the plan started in 1989. Annual sampling for major dissolved ions, trace metal, stable isotopes, nutrients, and dissolved solids (List A) will occur in June at 18 wells, with 4 of these also sampled quarterly for specific electrical conductance, pH, dissolved solids, and dissolved chloride concentration (List B). Triennial sampling in June for major dissolved ions, trace metal, stable isotopes, nutrients, and dissolved solids will continue at 20 additional wells (List T), with 6 wells scheduled for 2014.

Alternate wells will be sampled in the event it is impossible to sample the primary wells. Alternate wells should be located within the same vicinity of the primary well and within the same storage unit.

See Table 1 for water level and water quality monitoring schedules.

The summary of the proposed program for this period and associated costs is as follows:

<u>Program components</u>	<u>City Funds</u>	<u>USGS Funds</u>	<u>Total Funds</u>
1. Surface-Water Gaging Stations	\$ 56,450	\$20,550	\$ 77,000
2. Groundwater Monitoring Water-levels (furnished by City Oct 2013-Feb 2014)	2,450	1,250	3,700
Groundwater Monitoring Water-levels (performed by USGS Mar 2014-Oct 2014)	27,750	1,950	29,700
Continuous Recorder (4N/27W-8M5)	4,750	2,400	7,150
Water Quality (Seawater Encroachment Monitoring)	16,000	8,500	24,500
Water Quality (June Samples Table 1)	<u>27,000</u>	<u>13,650</u>	<u>40,650</u>
TOTAL	\$134,400	\$48,300	\$182,700

Total cost of the proposed program is \$182,700. Cost to the City will be \$134,400, and subject to the availability of Federal matching funds, the USGS will provide \$48,300.

Enclosed are three updated originals of Joint Funding Agreement (JFA) 14WSCA03700, signed by our agency, for your approval. Please discard both pages of the JFA enclosed with the February 7 letter. Use only the originals enclosed with this letter. If you are in agreement with this proposed program, please return one fully executed JFA to our office. Work performed with funds from this agreement will be conducted on a fixed-price basis. Billing for this agreement will be rendered quarterly.

The USGS is required to have an agreement in place prior to any work being performed on a project. We request that a fully executed JFA be returned prior to May 23, 2014. If it is not received by May 23, we will be required to suspend operations until an agreement is received.

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If you have questions regarding this program, please contact Matthew Scudato, in our Santa Maria Field Office, at (805) 928-9539. If you have any administrative questions, please contact Tammy Seubert, in our Sacramento Office, at (916) 278-3040.

Sincerely,

A handwritten signature in blue ink, appearing to read "Eric G. Reichard", with a long horizontal flourish extending to the right.

Eric G. Reichard
Director, USGS California Water Science Center

Enclosures

cc: Matthew C. Scudato, USGS CAWSC

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Table 1 - Water Level and Water Quality monitoring schedule
 (M, monthly; A, annual; R, recording; Q, quarterly (March, June, Sept. Dec.)
 (XX), sample year; T, triennial); *, alternate
updated per M.C. Scrudato, City, 08-05-13

WATER LEVEL		WATER QUALITY		WATER LEVEL		WATER QUALITY	
STORAGE UNIT I				4N/27W-19A1	M	-	
4N/27W-8R2	M	(16)T		4N/27W-19A2	M	-	
4N/27W-9M1	M	-		4N/27W-19A3	M	A	
4N/27W-9Q1	M	(15)T		4N/27W-21E1	M	(16)T	
4N/27W-13R1	M	-		4N/27W-21E2	M	(15)T	
4N/27W-14K2	M	(14)T		4N/27W-21E3	M	(15)T	
4N/27W-14P1	M	-		4N/27W-21F1	M	-	
4N/27W-15E1	M	-		4N/27W-21F2	M	-	
4N/27W-15E2	M	-		4N/27W-21G1	M	-*	
4N/27W-15G1	M	-		4N/27W-21G2	M	-*	
4N/27W-15J2	M	-		4N/27W-22M1	M	-*	
4N/27W-15K1	M	(16)T		4N/27W-22M2	M	-*	
4N/27W-16C1	M	(14)T		4N/27W-22Q1	M	-	
4N/27W-16C2	M	(16)T		FOOTHILL			
4N/27W-16R1	M	-		4N/27W-5P1	M	-	
4N/27W-17J1	M	(16)T		4N/27W-7D1	M	(16)T	
4N/27W-21B1	M	(15)T		4N/27W-7R3	M	-	
4N/27W-22A2	M	A		4N/27W-8E1	M	-	
4N/27W-22A3	M	(14)T		San Roque Park #1			
4N/27W-22A4	M	A		4N/27W-8E4	M	-	
4N/27W-22B6	M	-		4N/27W-8M5	R	A	
4N/27W-22B8	M	A		4N/27W-8M6	M	A	
4N/27W-22B9	M	A		4N/27W-18B5	M	(14)T	
4N/27W-22B10	M	A		4N/28W-12C2	M	-	
4N/27W-22B11	M	A		4N/28W-12H4	M	-	
4N/27W-22C1	M	-		4N/28W-12R3	M	-	
4N/27W-22E1	M	A		HOPE RANCH			
4N/27W-22E2	M	A		4N/27W-18C2	M	(15)T	
4N/27W-22G2	M	A		4N/27W-18C3	M	(15)T	
4N/27W-22G3	M	(14)T		DISCONTINUED MONITORING WELLS			
4N/27W-22G4	M	-		4N/27W-8L3 – (FY14, M)			
4N-27W-23E5	M	A,Q		4N/27W-15Q10 – (FY13, M)			
4N/27W-23F2	M	A,Q		4N/27W-16R1 – (FY13, T)			
4N/27W-23F3	M	A,Q		4N/27W-23E6 – (FY12, M)			
4N/27W-23F4	M	A,Q		4N/27W-23H1 – (FY14, M)			
4N/27W-23F8	M	A		4N/27W-23H4 – (FY14, M, A)			
4N/27W-23F9	M	A					
STORAGE UNIT III							
4N/27W-17L2	M	(14)T					
4N/27W-17L3	M	(15)T					
4N/27W-17L4	M	(16)T					
4N/27W-17L5	M	-					
4N/27W-18Q1	M	-					
4N/27W-18Q4	M	-					

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List A

Chemical Constituents
(mg/L or as indicated)

Dissolved aluminum ($\mu\text{g/L}$)	Dissolved sodium
Dissolved arsenic ($\mu\text{g/L}$)	Dissolved strontium ($\mu\text{g/L}$)
Dissolved barium ($\mu\text{g/L}$)	Dissolved sulfate
Dissolved boron ($\mu\text{g/L}$)	Dissolved solids (sum)
Dissolved bromide	Sodium adsorption ratio
Dissolved calcium	Percent sodium
Dissolved chloride	Total alkalinity (CaCO_3)
Dissolved fluoride	Total hardness (CaCO_3)
Dissolved iodide	Temperature $^{\circ}\text{C}$
Dissolved iron ($\mu\text{g/L}$)	pH
Dissolved lithium ($\mu\text{g/L}$)	Specific Conductance ($\mu\text{S/cm}$)
Dissolved manganese ($\mu\text{g/L}$)	Stable isotopes
Dissolved magnesium	
Dissolved nitrogen (nitrate + nitrite)	
Dissolved orthophosphate (PO_4)	
Dissolved orthophosphorus (P)	
Dissolved potassium	
Dissolved silica	

Schedules used: 101 (nutrients), 1261 (major ions and trace), 1142 (stable isotopes)

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List B

Chemical Constituents
(mg/L or as indicated)

pH

Specific Conductance (microsiemens)

Dissolved Chloride

Dissolved solids (sum)

Lab Codes used: 68, 69, 1571, 27

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List T

Triennial Sampling Wells

(updated list 08/05/2013 by M. Scudato, USGS)

Site Name	Site Identification Number	2013	2014	2015	2016
STORAGE UNIT I					
4N/27W-8R2	342618119432501	■			■
4N/27W-9Q1	342618119423701			■	
4N/27W-14K2	342534119404301		■		
4N/27W-15K1	342538119413401	■			■
4N/27W-16C1	342603119430401		■		
4N/27W-16C2	342603119430402	■			■
4N/27W-17J1	342541119433501	■			■
4N/27W-21B1	342506119423801			■	
4N/27W-22A3	342506119412202		■		
4N/27W-22G3	342455119412402		■		
STORAGE UNIT III					
4N/27W-17L2	342533119435501		■		
4N/27W-17L3	342533119435502			■	
4N/27W-17L4	342533119435503	■			■
4N/27W-21E1	342502119431401	■			■
4N/27W-21E2	342502119431402			■	
4N/27W-21E3	342502119431403			■	
FOOTHILL					
4N/27W-7D1	342647119451701	■			■
4N/27W-18B5	342606119445201		■		
HOPE RANCH					
4N/27W-18C2	342600119445201			■	
4N/27W-18C3	342600119445202			■	

DISCONTINUED

- 4N/27W-16R1 (FY13)
- 4N/27W-23H4 (FY14)
- 4N/27W-19A1 (FY14)
- 4N/27W-19A2 (FY14)