

Attachment 6 –Budget

ATTACHMENT 6 - BUDGET

- *The budget must be consistent with and support the work plan and schedule. The budget attachment should consist of a budget table (Table 3) and explanatory text.*
- *In the table, for each work plan task, a budget line item estimate should be presented, as well as a breakdown of the applicant's funding match and requested grant funds.*

The City has included a detailed budget table that is both consistent and supports the scope of work outlined in Attachment 5 of this grant application. The Proposed Project budget is presented and broken down as follows:

- Project Budget Summary Table
- Project Non-State Funding Breakdown Table
- Project Budget Detail per Task/Hourly Rates

The City has an existing agreement with USGS to perform the work items identified in the Project Scope of Work. Included in this attachment is USGS's cost estimate for the work to be performed.

The USGS will be responsible for the construction of a new monitoring well and re-development of existing monitoring wells. Permits will be required from the Los Angeles County Department of Public Works and Los Angeles County Department of Public Health. The USGS will be providing the drill rig, the development rig, and the personnel to operate both rigs. Expenses associated with the rigs include normal repair and replacement of the equipment such as drill bits, fuel, and mobilization to the sites. In addition, the USGS will need to obtain the casing for the well, gravel pack and material for the surface seal.

USGS personnel will install probes in the monitoring well network for the collection of groundwater levels and water temperature. USGS personnel will collect the data from these probes on a quarterly basis. USGS personnel will collect water quality samples from the monitoring well network. Expenses that will be incurred during the collection of data include the groundwater level and temperature probes, the device for reading the data from the probes and the laboratory expenses.

BUDGET SUMMARY TABLE				
Task No.	Task Description	Non-State Share	Requested Grant Funding	Total
1	Project Management	\$19,570		\$19,570
2	Grant Administration and Reporting	\$14,580		\$14,580
3	Well Permitting	\$2,980		\$2,980
4	Groundwater Monitoring Well Construction	\$36,000	\$130,000	\$166,000
5	Groundwater Monitoring Program	\$31,000		\$31,000
6	Groundwater Model Update	\$5,000	\$120,000	\$125,000
7	Final Reporting	\$6,952		\$6,952
Total		\$116,082	\$250,000	\$366,082

NON-STATE FUNDING BREAKDOWN					
Task No.	Task Description	In-Kind Contribution (Hrs)	Monetary Contribution	USGS	Total
1	Project Management	\$14,550		\$5,020	\$19,570
2	Grant Administration and Reporting	\$14,580			\$14,580
3	Well Permitting	\$0		\$2,980	\$2,980
4	Groundwater Monitoring Well Construction	\$0		\$36,000	\$36,000
5	Groundwater Monitoring Program	\$0		\$31,000	\$31,000
6	Groundwater Model Update	\$0		\$5,000	\$5,000
7	Final Reporting	\$0	\$1,952	\$5,000	\$6,952
Total		\$29,130	\$1,952	\$85,000	\$116,082

BUDGET DETAILS								
Task No.	Task Description	Labor					Equipment and Expenses	Total Cost
		Senior Professional 2 \$218	Senior Professional 1 \$169	Associate \$140	USGS Professional \$110	Cost		
1	Project Management	20	90			\$19,570		\$19,570
2	Grant Administration and Reporting		20	80		\$14,580		\$14,580
3	Well Permitting				18	\$1,980	\$1,000	\$2,980
4	Groundwater Monitoring Well Construction				840	\$92,400	\$73,600	\$166,000
5	Groundwater Monitoring Program				184	\$20,240	\$10,760	\$31,000
6	Groundwater Model Update				1,136	\$125,000		\$125,000
7	Final Reporting		8	40		\$6,952		\$6,952
Total		20	118	120	2,178	\$280,722	\$85,360	\$366,082



IN REPLY REFER TO:

United States Department of the Interior

U. S. GEOLOGICAL SURVEY

California Water Science Center

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DRAFT June 21, 2012

Mr. Gordon Phair, Senior Civil Engineer
City of Palmdale
Public Works
38250 Sierra Highway
Palmdale, California 93550

Dear Mr. Phair:

This letter confirms discussions between our respective staffs concerning the proposed cooperative water-resources program between the City of Palmdale and the U.S. Geological Survey (USGS) for the period October 1, 2012 to October 31, 2013. The work proposed is a continuation of the study to characterize and evaluate the potential artificial-recharge site for conjunctive use located along the Amargosa Creek. The proposed program consists of three main tasks, 1) monitoring-site construction, 2) collection of water-level, water-quality, and temperature data at monitoring sites near the Amargosa Creek Recharge Project (ACRP) in FFY-13, and 3) update the numerical groundwater-flow model developed by the USGS (Christensen and others, in review). The USGS will present the results and summarize the data collected as part of this cooperative agreement in a letter of findings.

Progress to Date

The purpose of this study is to improve the understanding of hydrology and geochemistry of the aquifer system underlying the study area and the potential hydrologic effects of proposed artificial-recharge along Amargosa Creek. The USGS compiled existing well data; completed geophysical surveys including regional gravity, seismic refraction and reflection, and resistivity; drilled and installed monitoring wells near the proposed recharge project; collected water-level data; and water samples for chemical analysis. These data were used to develop a local-scale numerical groundwater-flow model of the groundwater system and to simulate the effects of various recharge scenarios. Preliminary model simulations indicate that between 3,400 and 9,400 acre feet per year may be recharged at the site. Data collected and results of the local-scale numerical groundwater-flow model are documented in the USGS Scientific Investigations report "*Feasibility and Potential Effects of the Proposed Amargosa Creek Recharge Project, Palmdale, California*" (Christensen and others, in review).

Task 1) Monitoring-Site Construction

As part of the previous work, the USGS documented the locations of several previously unknown faults down gradient of the proposed ACRP site (fig. 1). Water-level data indicate that these faults are partial barriers to groundwater flow. Understanding how these faults may affect

groundwater flow is needed to determine the feasibility for recharge in the area and to refine the current groundwater-flow model. To date, data collected only documents the existence of these faults and limited information about hydraulic properties. To better determine the hydraulic properties of these faults, the USGS is proposing to construct a multiple-well monitoring site (Site 4) in the vicinity of ACRP (fig. 1). In addition to providing hydraulic properties of faults, the new site will provide information about vertical and horizontal differences in water level and quality, aquifer properties, and will be used to update the groundwater-flow model. The site will be constructed with multiple 2-inch diameter PVC piezometers; the perforated intervals will be determined from analysis of cuttings and geophysical logs collected during drilling at the site. Drilling operations will be conducted on a 12-hour-per-day basis by USGS personnel. Soil cores will be collected at changes in lithology, and if feasible, from the bottom of the hole. All construction equipment and supplies needed for the well construction and instrumentation of the site will be provided by the USGS. A USGS hydrologist will be on-site during the entire drilling and construction process to analyze and log the drill cuttings, interpret the borehole geophysical logs, and provide the final monitoring-site design. The estimated cost of the monitoring site is \$166,000. These costs do not include cutting disposal fees.

An itemized list of the drilling costs is as follows:

Planning and well design	8,000
Drilling	
Mobilization	8,000
Drilling	78,500
Geophysical Logs	2,000
Well Construction	18,000
Well-construction materials	16,000
Well development	4,000
Site preparation and cleanup	3,000
Travel	6,000
On-Site Hydrologist	15,000
Instrumentation for site 4	
Instruments (3 transducers and cables)	\$6,000
Installation of instruments	\$1,500
 Total cost of monitoring site	 \$ 166,000

Task 2) Monitoring

In FFY12, the USGS began a monitoring program at the monitoring sites completed during earlier phases of this study. The USGS installed equipment to monitor natural changes in the

unsaturated and saturated zones underlying the ACRP and vicinity. The instruments include pressure transducers to measure changes in water level and temperature probes installed at various depths within the wellbore of Sites 1 and 3 to measure changes in temperature as result of movement of natural and proposed artificial recharge. As part of the FFY12 funding, data from these instruments were downloaded quarterly and entered into the USGS database with appropriate quality assurance. These data are needed to document existing hydrologic conditions and recalibration of the groundwater-flow model. The USGS recommends continued monitoring at these sites in FFY13. Water-quality samples are needed to document current water-quality conditions, which will be used to compare and contrast with changes in water quality after the introduction of artificial-recharge water to the groundwater system. In addition, changes in water chemistry will be used to help track the movement of artificial water. The water-quality samples will be analyzed for major ions, nutrients, selected trace elements, and the stable isotopes of oxygen, hydrogen, and carbon-13, and radioactive isotopes tritium and carbon-14. All data collected will be entered into the USGS database with appropriate quality control, and will be available through the USGS NWIS online database. The quality control will include analyzing duplicate samples and/or field blanks.

The total cost for monitoring is \$31,000.

An itemized list of the monitoring costs is as follows:

Quarterly site visits to download data	\$8,000
Data processing an upload into USGS database	\$4,000
Water-quality sampling (including three wells at proposed site 4)	
Mobilization and sampling	\$8,000
Lab analysis	\$6,500
Data processing	\$2,000
Well development (site 3 needs development before sampling)	\$2,500
Total cost for site monitoring	\$31,000

Task 3) Update and recalibrate local-scale numerical groundwater-flow model

In April 2011, the USGS began development of a local-scale numerical groundwater-flow model using the results from the geophysical surveys, previously published reports, and data from monitoring sites to simulate groundwater flow and changes in flow caused by proposed artificial recharge at the ACRP. This model was developed to better understand the groundwater-flow system and address the mechanisms of artificial and natural recharge of the system. The USGS is proposing to update the model with field and laboratory data collected from monitoring Sites 1, 2, 3, and 4, as well as subsurface temperature profiles from the boreholes of Sites 1 and 3. Monitoring site 4 has been proposed to finalize the characterization of this complex hydrogeologic system and further the development of the comprehensive conceptual model of subsurface structure, aquifer properties, and groundwater flow. Long-term simulations will be

performed using various recharge-management scenarios to estimate the effect of artificial recharge on the groundwater system in the ACRP and Palmdale-Lancaster areas.

Final calibration of the groundwater-flow model depends on reliable estimates of aquifer properties, fault-hydraulic properties, and groundwater gradients between faults located down gradient of the proposed ACRP (fig. 1). In addition, the USGS will couple this model with the regional model “*Updated Regional Groundwater Flow and Subsidence Model for Antelope Valley, California*” currently being developed for the Antelope Valley groundwater basin by the USGS (Siade and others, in review). The data from the regional model will be used to define the boundary conditions of the local-scale model. Currently the local-scale model assumes the water-level in the regional basin will remain constant. If the regional water table changes it may affect the volume and distribution of applied recharge water entering the system near at the ACRP. The updated model will be modified to address regional water-level changes as simulated by the regional groundwater-flow model. This modification will improve the ability to make more reasonable predictive scenarios and assist in providing improved data for use in recharge management decisions both locally and regionally. This includes a better understanding about how the water-level changes will occur at nearby wells within the Antelope Valley groundwater basin near the cities of Palmdale and Lancaster. For example, figure 2 shows the contour of simulated water-level rise of 10 ft or greater resulting from an average recharge rate of 9,400 acre-ft/yr over a 20-year period. Coupling the regional model will also allow the City of Palmdale and other entities using the coupled models to determine how management scenarios tested on the regional model will effect recharge operations at the ACRP and how recharge operations at the ACRP will affect the flow and distribution of water in the regional model near Palmdale and Lancaster.

Total cost to update the local-scale model is \$125,000.

The total cost of the proposed cooperative water-resources program in FFY13 is \$322,000. Of this total, the City of Palmdale will contribute \$249,800 and, subject to the availability of Federal Matching Funds (FMF), the USGS will contribute \$72,200.

The USGS is required to have an agreement in place prior to any work being performed on a project. Work is scheduled to commence as soon as a signed agreement is received. If you have any questions concerning the program described above, please contact Allen H. Christensen, in our San Diego Office at (619) 225-6175. If you have any administrative questions, please contact Glenn Henz, in our San Diego Office, at (916) 278-6114.

Sincerely,

Eric Reichard

Director,
USGS California Water Science Center

Enclosures

cc: Tracy Nishikawa, USGS CAWSC