

SEASIDE BASIN WATERMASTER
REQUEST FOR SERVICE

DATE: November 30, 2012

RFS NO. 2012-04

(To be filled in by WATERMASTER)

TO: Derrick Williams
HydroMetrics LLC
PROFESSIONAL

FROM: Robert Jaques
WATERMASTER

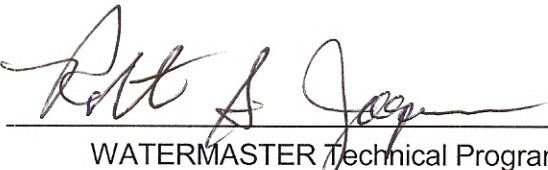
Services Needed and Purpose: Perform groundwater monitoring as described in Attachment 1.

Completion Date: All work of this RFS shall be completed not later than 60 days from the date of execution of this RFS No. 2012-04.

Method of Compensation: Time and Materials (As defined in Section V of Agreement.)

Total Price Authorized by this RFS: \$ 45,290.00 (Cost is authorized only when evidenced by signature below.) (See Attachment 1 for Estimated Costs).


Total Price may not be exceeded without prior written authorization by WATERMASTER in accordance with Section V. COMPENSATION.

Requested by: 
WATERMASTER Technical Program Manager

Date: 11/30/12

Authorized by: 
WATERMASTER Chief Executive Officer

Date: 12/7/12

Agreed to by: 
PROFESSIONAL

Date: Dec 3 2012

ATTACHMENT 1



519 17th Street, Suite 500
Oakland, CA 94612

Mr. Robert S. Jaques, Technical Program Manager
Seaside Basin Watermaster
83 Via Encanto
Monterey, CA 93940

November 20, 2012

Subject: Scope and Cost Estimate to Model Replenishment Repayment
Scenarios

Dear Mr. Jaques:

HydroMetrics Water Resources Inc. is pleased to submit this scope and cost estimate for preparing revised Protective Water Levels for selected wells in the Seaside Basin, and for modeling the effects from two different Seaside Basin replenishment scenarios. The purpose of the modeling work is to evaluate whether protective groundwater elevations are achieved over Cal-Am's proposed repayment period of 25 years, or how much of a decrease in pumping and/or supplemental water supply is needed to achieve protective elevations over the 25 year period.

Our scope includes providing professional consulting services to the Seaside Groundwater Basin Watermaster for preparing and running an extended baseline scenario to 2042, and developing and running two repayment scenarios.

The two repayment scenarios are:

1. **25 Year Repayment Scenario** – Cal-Am pumps an annual total of 774 AFY (1,474 AFY less 700 AFY) from the Basin for a period of 25 years beginning in 2017.
2. **25 Years to Achieve Protective Elevations Scenario** – pumping in all Standard Producer wells in the Seaside Basin will be iteratively reduced to

determine a pumping schedule that achieves protective elevations within 25 years through in-lieu recharge. If reducing these pumping levels to zero still does not achieve protective elevations, the additional amount of water needed to replenish and protect the Basin through spreading or injection will be determined.

The tasks required to model the above scenarios are described below.

Task 1. Revise Protective Groundwater Elevations

The protective groundwater levels developed in Chapter 2 of HydroMetrics' February 2009 *Basin Management Action Plan* (BMAP) will be revised based on additional knowledge about the hydrogeologic properties of the Basin which has been gained since the 2009 BMAP was prepared. This task will involve:

1. Revising the protective groundwater elevation analyses using aquifer parameters derived from the calibrated groundwater model, and a reasonable range of aquifer parameters around the calibrated values. This will provide more confident estimates of the 100% protective groundwater elevations that protect the full depth of the aquifers. Results from this task will include revised recommendations of the 100% depth protective groundwater elevation, as well as the range of uncertainty at each well.
2. Estimating the impact of protecting only 90% of the aquifer depth. We will estimate how far inland from each monitoring well the toe of the seawater intrusion may reach if we protect only 90% of the aquifer depth.

Task 2. Extend Model to 2042

The predictive Seaside Basin model currently extends out to 2031. For the proposed scenarios, model fluxes (recharge and pumping) need to be extended to 2042, to cover the 25 year period after 2017. This extended simulation will be the basis of the two scenarios. Only the amount of pumping will change between scenarios.

Task 3A. Develop and Run 25 Year Repayment Scenario

Cal-Am's annual production will be reduced to 774 AFY for the replenishment repayment period of 25 years. After the scenario has been developed, the model

will be run and outputs generated for tabular and graphical representation of groundwater elevations vs. protective groundwater elevations, and average coastal groundwater velocities which will be representative of the rate of approach of the offshore seawater intrusion front.

Task 3B. Iterate 25 Year Repayment Scenario to Achieve Protective Elevations

If protective groundwater elevations are not achieved within the 25 year repayment period in Task 3A, we will adjust production iteratively for the Standard Producers until protective elevations are reached by the end of the 25 year repayment period. Pumping from Standard Producer wells in the Seaside Basin will be reduced proportionally until protective groundwater elevations are reached. If this cannot be achieved even if the Standard Producer pumping rates are reduced to zero, the amount of supplemental water that will need to be replenished by spreading or injection into the Basin to achieve protective elevations will be determined. Tabular and graphical representation of groundwater elevations vs. protective groundwater elevations and average coastal groundwater velocities will be prepared to show the results of the scenario.

Task 4. Meetings

The budget includes time for three meetings. The first meeting will be by teleconference and will be used to finalize model assumptions. The second meeting will be used to present the final results to the TAC, with the third meeting used to present the results to the Board.


Task 5. Reporting

Model assumptions, descriptions of the extended simulation and two model scenarios, revised protective water levels (including a map showing the inland extent of seawater intrusion due to only protecting 90% of the aquifer), findings, conclusions, and recommendations will be summarized in a brief technical memorandum. A draft of the technical memorandum will be provided electronically to the Watermaster's Technical Program Manager in MS Word format for presentation and discussion with the Technical Advisory Committee (TAC) at the second meeting mentioned in Task 4. A final version of the Technical Memorandum, reflecting comments and issues raised by the Technical

Program Manager and the TAC will be provided electronically to the Technical Program Manager in MS Word format.

The estimated cost for the work discussed is \$45,290, as shown on the attached table.

Sincerely,

A handwritten signature in cursive script that reads "Derrick Williams".

Derrick Williams, President
HydroMetrics Water Resources Inc.

**Cost Estimate for Seaside Groundwater Basin Watermaster
Professional Services to Model Cal-Am Replenishment Repayment Scenarios**

Tasks	Rates	HydroMetrics WRI Labor					Labor Total	Other Direct Costs	TOTALS
		Derrick Williams President	Cameron Tana Vice-President	Georgina King Senior Hydrogeologist	Nick Byler Staff Hydrogeologist	Hours			
		\$190	\$180	\$160	\$110	(\$)			
Task 1. Revise Protective Groundwater Elevations									
1.1. Revise Protective Elevation Models with Final Calibrated Model Aquifer Parameters. Rerun 100% Protection Models and Analyze.	8	34	0	0	0	42	\$ 7,640	\$ -	7,640
1.2. Run 90% Protection, Analyze Results and Prepare Map Showing Inland Extent of Seawater Intrusion at 90% Protection	8	12	16	0	0	36	\$ 6,240	\$ -	6,240
<i>Subtotal Task 1</i>						78	\$ 13,880	\$ -	13,880
Task 2. Develop and Run Base Simulation to 2042									
Extend Base Simulation to 2042	12	0	8	6	6	26	\$ 4,220	\$ -	4,220
<i>Subtotal Task 2</i>						26	\$ 4,220	\$ -	4,220
Task 3A. Develop and Run 25 Year Repayment Scenario									
3A.1. Develop Pumping Data	2	0	2	4	4	8	\$ 1,140	\$ -	1,140
3A.2. Run Model, Produce Tabular and Graphical Output on Protective Elevations and Groundwater Velocity	8	0	4	8	8	20	\$ 3,040	\$ -	3,040
<i>Subtotal Task 3A</i>						28	\$ 4,180	\$ -	4,180
Task 3B. Iterate 25 Year Repayment Scenario to Achieve Protective Elevations									
3B.1. Iterate Modeling to Determine How Much Water is Needed to Achieve Protective Elevations within 25 Years	24	0	0	16	16	40	\$ 6,320	\$ -	6,320
3B.2. Produce Tabular and Graphical Output on Protective Elevations and Groundwater Velocity	4	0	4	8	8	16	\$ 2,280	\$ -	2,280
<i>Subtotal Task 3B</i>						56	\$ 8,600	\$ -	8,600
Task 4. Meetings									
Assume Three Meetings - One to Finalize Model Assumptions, One to Present Results to TAC and, One to Present Results to Board	20	0	8	2	2	30	\$ 5,300	\$ 300	5,600
<i>Subtotal Task 4</i>						30	\$ 5,300	\$ 300	5,600
Task 5. Reporting									
Prepare Technical Memorandum describing Revised Protective Groundwater Elevations, Scenarios, Findings, Conclusions and Recommendations	8	2	32	16	16	58	\$ 8,760	\$ 50	8,810
<i>Subtotal Task 5</i>						58	\$ 8,760	\$ 50	8,810
TOTAL						276	\$ 44,940	\$ 350	45,290

Notes
Other Direct Costs includes mileage, postage, office supplies