February 24, 2016

Mr. Daniel Cozad
Central Valley Salinity Coalition
dcozad@cvsalinity.org

**SUBJECT: CENTRAL VALLEY SALT AND NITRATE MANAGEMENT PLAN
REGION 5 UPDATED GROUNDWATER QUALITY ANALYSIS—
ADDITIONAL SCOPE AND BUDGET FOR AGGREGATED ANALYSES**

Dear Mr. Cozad:

In response to the request by the CV-SALTS Project Committee at the conclusion of the February 24, 2016 conference call to discuss the High Resolution work, Luhdorff & Scalmanini, Consulting Engineers (LSCE) has prepared this scope and budget on behalf of the LWA Team. Specifically, it was requested that a scope and budget be prepared for the additionally requested analyses described below.

In addition to the deliverables outlined in the high resolution analysis proposal (October 26, 2015), CV-SALTS has requested supplementary analyses involving *aggregate* water quality calculations for the Initial Analysis Zones (IAZs) that were used in Phase 1 Initial Conceptual Model (December 2013), and the 41 basin/subbasins of the Central Valley Floor outlined in the California Department of Water Resources Bulletin 118.

The currently scoped work is entirely focused on high resolution analyses at a 1-mile square scale. The outputs for the high resolution analysis will be the interpolated concentrations over the Central Valley Floor. This will include cell-by-cell (1 square mile cells) calculations for ambient concentrations of nitrate and TDS for the Upper and Lower zones. The interpolated results would then be aggregated as a part of this additionally proposed work.

The additionally requested work involves calculating aggregate numbers for the IAZs and groundwater basins/subbasins, including volume weighting the interpolated concentrations by the thickness of the zones at every location. The aggregation of the interpolated concentrations (using volume weighting) within an IAZ or basin results in single values for nitrate and TDS, for the Upper and Lower Zones. The zones would then be combined using volume weighting (using zone thicknesses) to compute the final Production Zone aggregated values. The Production Zone values cannot be calculated without first doing the analysis for the Upper and Lower Zones, and therefore all three are necessary for the additional work. As discussed during the Project Committee call on February 24, calculations of assimilative capacity will be made in accordance with the direction received by the team from the Executive/Policy Committee.

Since the additional work outlined above includes analyses that are out of the scope of the high resolution analysis proposal, LSCE has prepared a draft budget to complete this additional work. Two options are provided in an effort to keep costs to a minimum. The first option includes

providing the results only in tables of tabulated values, which includes Tasks 1, 2, 4, and 5. The second option (Tasks 1-5) includes providing the results in tabulated values and, in addition to the tables, the production of maps to visually present the results.

SCOPE OF WORK

The five tasks are described below.

Task 1 Ambient Quality, Assimilative Capacity, Trends: Aggregate Analysis

- Calculate volume weighted aggregate ambient groundwater quality and assimilative capacity for 22 IAZs for nitrate and TDS for upper, lower, and production zones.
- Calculate volume weighted aggregate ambient groundwater quality and assimilative capacity for 41 DWR Bulletin 118 groundwater basins/subbasins for nitrate and TDS for upper, lower, and production zones.
- Summary of well nitrate and TDS water quality trends for 22 IAZs for upper, lower, and production zones.
- Summary of well nitrate and TDS water quality trends for 41 DWR Bulletin 118 groundwater basins/subbasins for nitrate and TDS for upper, lower, and production zones.

Task 2 Tables of Results

- Create tables for calculated volume weighted aggregate ambient groundwater quality and assimilative capacity for 22 IAZs for nitrate and TDS for upper, lower, and production zones.
- Create tables for calculated volume weighted aggregate ambient groundwater quality and assimilative capacity for 41 DWR Bulletin 118 groundwater basins/subbasins for nitrate and TDS for upper, lower, and production zones.
- Create tables of well nitrate and TDS water quality trends for 22 IAZs for upper, lower, and production zones.
- Create tables of well nitrate and TDS water quality trends for 41 DWR Bulletin 118 groundwater basins/subbasins for nitrate and TDS for upper, lower, and production zones.

Task 3 Mapping Results

- Create maps for calculated volume weighted aggregate ambient groundwater quality and assimilative capacity for 22 IAZs for nitrate and TDS for upper, lower, and production zones.
- Create maps for calculated volume weighted aggregate ambient groundwater quality and assimilative capacity for 41 DWR Bulletin 118 groundwater basins/subbasins for nitrate and TDS for upper, lower, and production zones.
- Create maps of well nitrate and TDS water quality trends for 22 IAZs for upper, lower, and production zones.

- Create maps of well nitrate and TDS water quality trends for 41 DWR Bulletin 118 groundwater basins/subbasins for nitrate and TDS for upper, lower, and production zones.

Task 4 Presentation to PC on Conference Call

- Conference call presentation to PC
- Summary notes of call

Task 5 Update SNMP Sections

- Further analysis and results will require the update of several sections of the SNMP. This will be done in coordination with CDM Smith.

BUDGET

The estimated cost to conduct Tasks 1-5 is summarized in **Table 1** (attached), including a detailed breakdown of the estimated hours and costs for each task. The costs are based on the same hourly rates as the current Phase II Preliminary Draft SNMP work. The cost to conduct Tasks 1 through 5 is $16,325. The cost to conduct Tasks 1, 2, 4 and 5 (no mapping) is $12,935.

SCHEDULE

The work on the additional scope will begin upon approval of the proposed scope and budget and will follow immediately upon completion of the relevant high resolution work. The LWA Team will provide an updated schedule for the work in coordination with Richard Meyerhoff, SNMP Technical Program Manager.

Please call or email if you have any questions.

Sincerely,

Vicki Kretsinger Grabert

Vicki Kretsinger Grabert
President and Senior Principal Hydrologist

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CONSULTING ENGINEERS
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CV-SALTS
Fee Proposal Estimate for Additional Work Related to Central Valley SNMP Higher Resolution Groundwater Quality Data Analysis

Task		Job Title/ Classification CV-SALTS Phase II Rates	Luhdorff & Scalmanini Vicki Kretsinger *Principal Hydrologist* $195	Barb Dalgish *Senior Hydrogeologist* $165	Dylan Boyle *Staff Hydrogeologist* $125	Aaron King *Engineer* $125	Other Direct Costs	Sub-Total	Larry Walker Associates[1] Tom Grovhoug *Principal* $275	Karen Ashby *Principal* $255	Other Direct Costs	Sub-Total	Estimated Fee Proposal
Task 1 Ambient Quality, Assimilative Capacity, Trends: Aggregate Analysis		**Assumptions**						**$ 3,280**				**$ -**	**$ 3,280**
	Calculating aggregate values for ambient groundwater quality, assimilative capacity, and summary of trends for each of the 22 IAZs and 41 Bulletin 118 basins/subbasins		4		20			$ 3,280				$ -	$ 3,280
Task 2 Tables of Results		**Assumptions**						**$ 890**				**$ -**	**$ 890**
	Construct tables of aggregate results from Task 1 for each of the 22 IAZs and 41 basins/subbains		2		4			$ 890				$ -	$ 890
Task 3 Mapping Results		**Assumptions**						**$ 3,390**				**$ -**	**$ 3,390**
	Mapping aggregated results from Task 1 for each of the 22 IAZs and 41 basins/subbains		2		24			$ 3,390				$ -	$ 3,390
Task 4 Presentation to PC on Conference Calls		**Assumptions**						**$ 2,670**				**$ 1,020**	**$ 3,690**
	Presentation to PC, conference call time, summary notes		6		12			$ 2,670		4		$ 1,020	$ 3,690
Task 5 Update SNMP Sections		**Assumptions**						**$ 4,055**				**$ 1,020**	**$ 5,075**
	Coordination with CDM in regards to updating sections of the SNMP		8	3	16			$ 4,055		4		$ 1,020	$ 5,075
OPTION 1 TOTAL (TASKS 1 THROUGH 5)			**22**	**3**	**76**	**0**	**0**	**$ 14,285**	**0**	**8**	**0**	**$ 2,040**	**$ 16,325**
OPTION 2 TOTAL (TASKS 1, 2, 4, 5) (Without Mapping of Results)			**20**	**3**	**52**	**0**	**0**	**$ 10,895**	**0**	**8**	**0**	**$ 2,040**	**$ 12,935**