Attachment 5. Work Plan

Scope of the Proposed Work

The Sacramento Groundwater Authority (SGA) will perform an assessment and develop tools for the long-term management of a regionally-extensive occurrence of tetracholorethylene (PCE) contamination in groundwater in northern Sacramento County. Eleven wells within the California American Water Company (Cal-Am) Lincoln Oaks Service Area (LOSA) and Sacramento Suburban Water District (SSWD) have observed continued and increasing impacts associated with PCE (see the **PCE Study Area** figure below). The first detection of the presence of PCE occurred in the eastern portion of the LOSA dating back to 1989. Eight of the 26 wells in the LOSA have had PCE detections, with three of those exceeding the USEPA maximum contaminant level (MCL) of 5 micrograms per liter (ug/L).

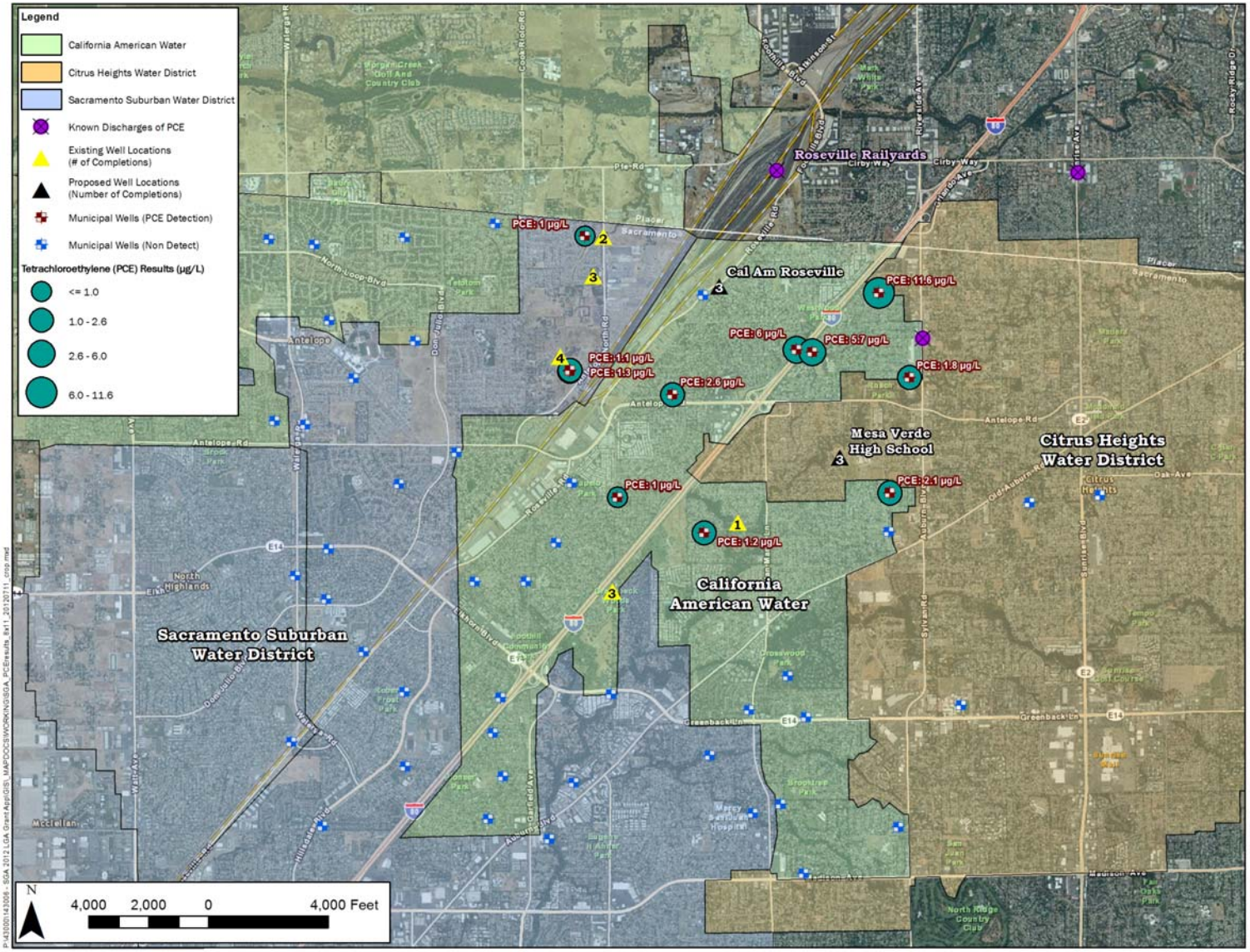
The scope of work includes:

- Completion of California Environmental Quality Act (CEQA) information and notifications, prepare drilling permits,
- Install and develop two triple completion groundwater monitoring wells,
- Conduct regional groundwater sampling for PCE, other Volatile Organic Compounds (VOCs) and general chemistry,
- Conduct predictive contaminant fate and transport modeling,
- Prepare reporting documentation including: Quarterly Reporting, Technical Memorandums, and a Final Report.

The study area, as shown in the **PCE Study Area** figure on the following page, is within SGA's management area and approximately bounded by Walerga Road on the west, Madison Avenue on the south, Sunrise Boulevard on the east, and the border with Placer County on the north. Although physical work will be restricted within SGA's management area in northern Sacramento County, it is likely that additional existing water quality data will be collected from Placer County as it is upgradient in the groundwater basin.

Purpose of the Proposed Work

The purpose of the proposed work is to provide SGA and its member agencies with: 1) information on the nature, extent, and potential mobility of high levels of PCE observed in a large number of wells in northern Sacramento County in the vicinity of Citrus Heights; and 2) tools to plan for basin operations that minimize potential impacts to water supply from this contamination.



PCE Study Area

Goals/Objectives of the Proposed Work

The primary goal of the study is to minimize the impact of the contaminant on the region's groundwater supply. In support of this goal four objectives of the study have been established:

1. Better define the presence of PCE around the perimeter of the LOSA.
2. Better define the nature of the presence of the PCE.
3. Better define potential source areas of the PCE.
4. Better define where the PCE could go given recent groundwater extraction patterns.

The proposed project is directly related to the primary goal of the 2008 SGA GWMP "to ensure a viable groundwater resource for beneficial uses including agricultural, industrial, and municipal supplies that support that support the Water Forum Agreement's co-equal objectives of providing a reliable and safe water supply and preserving the fishery, wildlife, recreational, and aesthetic values of the lower American River." This goal cannot be met without a sustainable groundwater basin. Additionally, the project is directly supportive of the SGA basin management objective to "maintain or improve groundwater quality in the SGA area to ensure sustainable use of the groundwater basin."

Data Dissemination

Information gained from the project will be disseminated in a variety of ways. First, updates on the project will provided at each quarterly meeting of the Regional Contamination Issues Committee (RCIC). As described in more detail in the Project Description section of this application, the RCIC already includes key stakeholders in the proposed project. Second, updates will be provided at regular meetings of the SGA Board of Directors, a publicly noticed meeting held six times per year. Finally, all information gathered from the proposed project will be provided to DWR in requested formats.

Work Plan Tasks

The following subsections describe in detail the methodologies and anticipated requirements to complete each component of the project. Each subsection presents a general cost and schedule, but detailed budget and schedule information for these components are included in Attachments 6 and 7 of this application.

Task 1. CEQA Documentation and Permitting

This task provides CEQA compliance, and acquires the appropriate permits for installation of monitoring wells. CEQA compliance and County permits are required by law.

Task 1.1 CEQA Exemption Documentation

The California Environmental Quality Act (CEQA) requires that the project work tasks be evaluated for their impacts to the environment. Based upon the investigations performed

prior to this with similar scope, the proposed project is anticipated to qualify for an Article 19 Categorical Exemption 15306 - Information Collection. As such, SGA will submit documentation to this effect for public review for the life of the project and file with the state clearinghouse and maintain the documentation. An Environmental Data Report (EDR) – NEPA Check®, Radius Map with GeoCheck®, Historic Aerial Photo review, and historic topographic map review will be collected and reviewed prior to submission of the categorical exemption documentation.

Deliverable:

- One set of CEQA exemption documents

Cost Assumptions

- CEQA exemption documents will require approximately 5 days of staff time to prepare and review and submit within 60 days of authorization.
- EDR Report fee of $2000 for a 1 mile radius search.
- Total estimated budget is $6,464.

Task 1.2 Well Drilling Permits

A well permit will be completed and submitted to the Sacramento County Department of Environmental Health for each of the drilling locations for approval prior to initiating drilling activities for the proposed monitoring wells. As required for the application a drilling work plan will be prepared to support the application and document the proposed well installation and development program.

The anticipated drilling locations are located on private property owned and operated by Cal-Am,and San Juan Unified School District. An alternate location is owned by SSWD. As such, right of ways and easements and access is considered implicit for this project tasks and well locations. Access documentation will be completed and maintain by the SGA for the life of the wells.

Deliverable:

- Sacramento County permit applications to install monitoring wells (including Work Plan)

Cost Assumptions

- Permits will require approximately 3 days of staff time to prepare and review

- Sacramento County Well Permit fees are estimated at $4,476 for necessary permits for 2 triple completion monitoring wells
- Permits will be completed within 60 days of authorization
- Total estimated budget is $6,084.

Task 2. Monitoring Well Installation

This task involves the installation of 2 triple-completion monitoring wells. If possible construction of three monitoring wells maybe possible if budget allows at time of performance. The location of the two highest priority wells will be within Cal-Am and CHWD service areas at the locations shown on the **PCE Study Area** figure. These locations have been selected to provide the information needed to address VOCs, primarily the industrial solvent PCE, detected in water supply wells within the regional groundwater system. The current Work Plan calls for installation of two monitoring wells. This allows for an alternate location should an issue arise, or potential for an additional monitoring well to be installed if the budget allows. An alternate location is also being made available within the SSWD service area at a location further downgradient (the location is not currently shown on the map). Letters from Cal-Am, CHWD, and SSWD are included at the back of this section of the application to confirm their cooperation in this study and access to the sites.

Monitoring well installation and analysis provides detailed geologic logs and information with identification of formation contacts for assessment of preferential flow pathways controlling the movement of VOCs, interactions between aquifer systems, and depth specific water quality data. These wells will also be added to the California Statewide Groundwater Elevation Monitoring (CASGEM) system to provide water level data for the region and will also provide critical data for the refinement to the regional groundwater models.

Task 2.1 Drill, Install, and Develop Monitoring Wells

Based on well logs completed in the area, it is anticipated that the multiple completion wells will be completed to a maximum approximate depth of 500 feet below ground surface (bgs). SGA will contract with a consultant that has extensive experience overseeing the drilling of wells to similar depths in the project area, construction of multi-completion monitoring wells, and ability to develop protocol for identifying geologic formation contacts from lithologic samples. The drilling method used will be selected based on the ability to provide continuous depth-discrete lithologic samples and to complete wells to depths up to 500 feet bgs with borehole diameters up to 12-inches. Drill cuttings and groundwater produced during development will be contained and disposed properly at an offsite location. Drilling of monitoring wells will be performed by a valid C-57 license contractor. Following procuring the permits and prior to drilling, the Underground Service Alert (USA) will be contacted for clearance of underground utilities. The selected locations are within developed areas of the County and, as such, a private utility locator will also be contracted for clearance of underground utilities.

During drilling of the pilot boring, the lithology will be recorded continuously on a geologic boring log from grab samples collected during drilling. Chip trays will be collected at 5-foot intervals or change in lithology to document lithologic samples and specific lithology changes. These chip trays will be provided to SGA at the end of the project and stored as reference. A photographic log of the samples will be prepared and presented on the final geologic boring log presented in the Monitoring Well Installation Technical Memorandum (TM). If requested, portions of the bulk samples will be provided to State and local agencies. Lithologic samples will be logged by a California Professional Geologist proficient in the methods described in ASTM D2488 and DT2487 and geologic formation contacts identified in the area. Selected lithologic samples will be submitted to geotechnical laboratory for mechanical analysis to support the final well design. After completion of the pilot boring, the hole will be conditioned and prepared for completion of a downhole geophysical log. Methods used for the downhole geophysical logging will include resistivity, spontaneous potential, spectral gamma, and caliper logs.

A California Certified Hydrogeologist will develop the final well design based upon lithology observed and geophysical logs. The design will include screen intervals, slot size, and gravel pack size and gradation. Prior to construction, the finalized well design will be provided to SGA for approval.

After the final well design has been approved, the pilot boring will be enlarged to 12 inches. Once the desired depth of the borehole has been obtained, well installation methods will be consistent with Chapter 6.28 of the Sacramento County Code and Section 13801 of the California Water Code. Well casing (blank and screen) is anticipated to consist of 2.5-inch diameter (outside diameter), schedule 80 PVC. Triple completion well screens and casing will be located in the borehole using centralizers. Gravel pack will be placed at each screen interval and the well surged to settle the gravel pack around the well screen and continue until the gravel pack stops settling (preliminary development). Additional gravel pack will then be added to the desired depth. A bentonite seal at least 2-feet thick will be placed immediately above the gravel pack. A volume calculation will be conducted to estimate the volume of a bentonite based grout needed to place between the lower screen and next upper screen. Fine mesh sand will then be placed to 1 foot below the next screen interval and the process for placement of gravel pack and bentonite seal repeated as discussed above for the remaining completions. The upper most annular space will then be grouted with a bentonite or cement grout to approximately 2-feet bgs. All annular materials will be placed using a tremie pipe per County of Sacramento specifications. A wellhead completion will then be placed over the well for security and protection.

No earlier than 24-hours after the grout placement, the well(s) will be developed using one or more of these methods: surging, air lifting, over pumping, and bailing. Generally, each well will be developed until it is free of suspended sediment and turbidity values are less than 10 NTU. During development, field parameters to include pH, temperature, specific conductivity, and oxidation-reduction potential will be monitored and recorded on field

records to document development. Following development and final well head construction, the wells will be surveyed by a California licensed surveyor.

Deliverable:

- Data collected during this task will be included in the Monitoring Well Installation TM described in Task 2.2

Cost Assumptions

- Drilling and logging of samples will require 3 days of staff time per well to provide oversight to drilling operations.
- All well cuttings and drilling fluids will be required to be removed from site and disposed of accordingly.
- Oversight will be performed for 10 hours per day of drilling.
- Each monitoring well will cost a maximum of approximately $67,745 to drill, install, and develop (Quote provided in Attachment 6.
- Sieve analysis will cost $80 per sample analyzed with 3 per borehole.
- Clearance of underground utilities will cost $600 for each drilling location.
- Well construction will require 1 day of continuous 24 hour per day oversight per well.
- Well development will require one 12 –hour day of staff oversight per well.
- Surveying of well elevations will cost $750 per multi-completion well.
- Well Installation planned to be completed within 60 days of CEQA documentation submittal and approval.
- Total estimated budget is $154,335. Cost includes drilling subcontractor total budget for drilling, installation, and development.

Task 2.2 Installation Technical Memorandum

After completion of the well installation and development program, the Well Installation TM will be prepared summarizing the methods used and results of the program. The TM will include boring logs, well completion diagrams, sieve analysis results, chip tray photo log, development notes and documentation, and surveyors report. The report will be finalized after receiving comments from SGA and will include an inspection and certification by a California Professional Engineer or Hydrogeologist that the project has been completed in accordance with submitted final plans and specifications in accordance with the contract.

Deliverable:

- One Field Investigation TM that describes both monitoring well installation activities. The TM will include boring logs, DWR required well logs, well construction as-built diagrams, and records of well development.

Cost Assumptions

- The Field Investigation TM will require six days of staff time to prepare and review.
- TM will be submitted within 30 days of completion of well installation, development, and surveying.
- Total estimated budget is $5,265.

Task 3. Groundwater Sampling

This task involves the collection of groundwater samples from four existing multi-completion monitoring wells, one existing single-completion monitoring well, and two proposed multi-completion monitoring wells. The locations of these wells are shown in **PCE Study Area** figure. These locations have been selected to provide an overall assessment of the lateral and vertical extent of VOCs, primarily the industrial solvent PCE. Wells within the region with reported detections of PCE formed the basis for selection of monitoring wells to be sampled. Information obtained from this task will include a detailed one-time snap shot of the extent of PCE impacts within the area, assessment of the depth and stratigraphic zone of PCE impacts, and an overall view of the fate and transport of the current impacts. Other parameters will be measured to assess interactions between aquifer zones and the source of groundwater.

Task 3.1 Monitoring Well Sampling

A total of 19 monitoring wells at seven locations will be sampled. Six of the locations will have multi-completion monitoring wells providing vertical discretization of groundwater chemistry. Two duplicate samples will be collected and one trip blank will be included and analyzed for quality assurance purposes for a total of 22 sets of analyses. These samples will be analyzed for the following constituents:

- PCE and other VOCs using EPA Method 8260B;
- Fuel oxygenates (MTBE, DIPE, ETBE, TAME, TBA) using EPA Method 8260B;
- 1,4-Dioxane using EPA Method 8270C;
- Cations including: sodium, calcium, potassium, iron, magnesium, manganese, and boron;
- Anions including: chloride, bicarbonate, sulfate, nitrate, nitrite, orthophosphate, and fluoride;
- General water quality including: alkalinity, hardness, and total dissolved solids; and
- Field parameters of pH, temperature, specific conductivity, and oxidation-reduction potential.

The analyte list was selected to provide insight to potential flow pathways that may be associated with specific industrial uses of PCE allowing for identification of the source area. The inclusion of 1,4-dioxane, for example, will aid in distinguishing the PCE source areas of industrial users (large fabrication and de-greasing operations) versus commercial users (dry cleaners). The use of the fuel oxygenates, specifically MTBE, will allow for potential elimination of source areas due to its conservative transport nature and multiple source areas within the region. The full list of VOCs will allow for determination of the PCE fate and evaluation of potential natural degradation that may be occurring in the system. The general water chemistry will allow additional opportunity to distinguish specific water types that may occur within discrete zones within the aquifer allowing for further refinement of potential flow pathways for PCE in the aquifer.

Groundwater samples will be collected using Hydrasleeves™. The sample is collected without purging and with very little down well disturbance, providing excellent control of turbidity and minimizes the time spent on filtration and purging. Samples can be collected at in-situ pressure with almost no aeration or degassing. This prevents alteration due to loss of volatiles or oxidation of sensitive parameters. Samples can be analyzed for all parameters from this sampling methodology and will limit the time required and waste generation.

Deliverables:

- Work Plan outlining procedures that will be used for sampling of wells.
- Results of activities under this task will be included in the TM described in Task 3.2.

Cost Assumptions

- Water quality sampling will require approximately 2 days of staff time to collect and submit for analysis.
- Groundwater Sampling will be conducted within 60 days of Monitoring Wells completion.
- Analytical costs are estimated at $314 per sample. Each well will be sampled once with 2 duplicate quality assurance samples and a single trip blank for a total of 22 analyses for an estimated cost of $6,908. Laboratory Quote provided in Attachment 6.
- Total estimated budget is $10,496.

Task 3.2 Monitoring Technical Memorandum

After completion of well sampling and water quality analysis, a Groundwater Monitoring Results TM will be prepared summarizing the methods used and results of the sampling and analysis program. The TM will include a general geochemical analysis with various water

quality plots and a description of the distribution of constituents observed. The report will be finalized after review by SGA staff and will be certified by a California Professional Engineer or Hydrogeologist that the project has been completed in accordance with the submitted work plan and accordance with the contract.

Deliverable:

- One Groundwater Monitoring Results TM that will document groundwater sampling procedures, and will include the results of monitoring activities.

Cost Assumptions

- The Groundwater Monitoring Results TM will require six days of staff time to prepare and review.
- Total estimated budget is $4,662.

Task 4. Contaminant Fate and Transport Modeling

Groundwater modeling will be conducted to estimate 1) the potential future flow paths of PCE contamination under various anticipated well field operation scenarios and groundwater demands for the next 20 years and 2) potential source areas for the PCE contamination given known potential source locations. The groundwater model will incorporate the newly collected data from the proposed monitoring wells to improve local hydrogeologic conceptualization and understanding within the study area and along the advancing perimeter of the plume.

The Sacramento Regional Groundwater Model (SRM) will be used as a basis for the following proposed modeling analyses. The SRM is a rigorously calibrated, United States Geologic Survey (USGS) MODFLOW 2000-based groundwater flow model that was recently developed in 2010 for the City of Roseville California. This regional scale groundwater model completely encompasses the localized study area and incorporates a sophisticated and up-to-date rendering of geologic and stratigraphic conditions as well as hydrologic features and fluxes in the greater Sacramento groundwater basin. The SRM produces three-dimensional flow fields that are immediately suitable for use with the industry standard particle tracking and solute transport codes, MODPATH and MT3DMS. The advanced geologic layering and associated hydraulic parameterization for the model layers also provide a suitable framework for adjusting the heterogeneity of aquifer units to the extent that it influences the future migration of the PCE plume.

The SRM is also fully integrated with industry standard GIS feature classes and data models, greatly facilitating the import of additional data sets as they become available and the refinement of model components as additional analyses are completed. The usage of this regional modeling tool also allows the refinement of the model grid to a resolution suitable to

reflect the influence of heterogeneity and hydraulic parameterization at the scale of the proposed study area and PCE contamination. This "telescopic mesh refinement" capability of the SRM modeling tool makes it an excellent framework upon which to develop future, predictive solute transport simulations that can be further updated, advanced and refined in the coming years.

Task 4.1 Data Collection and Incorporation

Relevant information from other regional modeling tools, publically available hydrogeologic databases, and hydrogeologic reports will be collected and incorporated into the updated conceptual and numerical model framework where appropriate.

Deliverable:

- Data collected during this task will be included in the TM described in Task 4.7

Cost Assumptions

- Data collection and incorporation will require approximately three days of staff time to prepare and review.
- Total estimated budget is $2,427.

Task 4.2 Model Refinement and Conceptualization

Model grid (row and column) spacing will be refined within the study area to a resolution sufficient to describe local hydrogeologic heterogeneity and hydrologic fluxes within the study area as well as limit averaging and numerical dispersion of PCE concentrations during transport simulations. The SRM currently has 1,000-foot grid spacing. It is anticipated that a model cell spacing of approximately 500 feet will be appropriate to simulate the transport of the PCE plume in the past and future time periods. Likewise, the addition of model layers to accommodate geologic complexities or vertical gradients will also be considered and implemented if necessary to improve the three-dimensional resolution of the transport model simulation. Hydrogeologic interpretations incorporated into the localized model layering will be compared to collected data for the study area. Revisions to model layering elevations and hydraulic parameterization will be made only where it is deemed that such changes will have an impact upon simulated migration of PCE or other constituents of concern in the study area.

Temporal discretization of the calibrated SRM as well as derivative predictive model scenarios will be reviewed and adjusted to allow for suitable simulation time scales to

properly address rate of change in relevant hydrologic conditions, such as: recharge, precipitation, and surface water flows.

Deliverable:

- Data collected during this task will be included in the TM described in Task 4.7

Cost Assumptions

- Model refinement and conceptualization will require approximately nine days of staff time to prepare and review.
- Total estimated budget is $10,094.

Task 4.3 Model Calibration Verification

Confirmation and verification of the quantitative calibration of the refined SRM tool will be conducted to verify that observed water levels, regional and local flow gradients are suitably reproduced by the updated historic flow model simulation. Water budget components will be reviewed to verify that they are within reasonable, estimated ranges. Given that the SRM is already suitably calibrated, any adjustments made to model refinements to maintain the regional calibration are anticipated to be minimal.

Deliverable:

- Confirmation of refined SRM calibration metrics will be included in the TM described in Task 4.7

Cost Assumptions

- Verification of model calibration will require approximately eight days of staff time to prepare and review.
- Total estimated budget is $7,370.

Task 4.4 Predictive Model Runs

Predictive groundwater flow model scenarios will be developed and presented to SGA and project stakeholders for review and approval. A minimum of three predictive model scenarios will be developed to reflect potential future groundwater pumping operations, spatial shifts in groundwater demand, and potential changes in groundwater recharge over the next 20 years.

Predictive simulation inputs will be developed and imported into the refined SRM to produce a series of future simulated flow fields. The temporal discretization for the model

simulations will be designed to allow for the appropriate estimation of future long term and seasonal groundwater trends and associated PCE migration potential.

Deliverable:

- Scenario details and input data development will be documented in the TM described in Task 4.7

Cost Assumptions

- Predictive model runs will require approximately five days of staff time to prepare and review.
- Total estimated budget is $4,767.

Task 4.5 Particle Tracking

A particle tracking analysis using MODPATH will be performed with the future simulated 20-year flow fields for the selected predictive model scenarios. Forward particle tracking will be performed to estimate future potential migration pathways and receptors for present day PCE concentrations.
Additionally, forward particle tracking will be performed with the refined SRM tool for the previous 20 years to assess the likelihood of identified PCE source locations serving as source areas for the present day PCE detections. For both the future and past particle tracking simulations, the estimated, conservative advective pathways for migration of PCE will be assessed, and locations of potentially coalescing PCE source zones will be identified.

Deliverable:

- Inputs and results for the future and past particle tracking simulations will be documented in the TM described in Task 4.7

Cost Assumptions

- Particle tracking will require approximately four days of staff time to prepare and review.
- Total estimated budget is $3,814.

Task 4.6 Fate and Transport Estimation

Fate and transport modeling of the contaminant concentrations will be performed using MT3DMS, using the simulated groundwater flow fields from the predictive flow model simulations as well as the calibrated, refined SRM simulation. Future migration of the PCE

plume will be estimated assuming solute advection, dispersion, diffusion, and retardation processes. Future potential groundwater receptors for the currently observed PCE plume will be identified and timing for the arrival of PCE mass will be estimated. Results from the fate and transport modeling will be compared to those from the particle tracking analysis to analyze the effects of solute retardation and dispersion relative to conservative transport of the contaminant, respectively. The comparison of these two results will provide information on the potential range of arrival time of PCE mass to potential receptor locations.

A fate and transport simulation will also be performed over the previous 20-year time period for any contaminant source zone locations identified as being potential PCE plume sources as a result of the particle tracking analysis. This simulation will provide greater insight into the effects of dispersion and coalescing plumes upon estimated present day PCE distributions.

Deliverable:

- Inputs and results for the future and past PCE fate and transport simulations will be documented in the TM described in Task 4.7

Cost Assumptions

- Fate and transport estimation will require five days of staff time to prepare and review.
- Total estimated budget is $4,767.

Task 4.7 Model Documentation

A TM will be developed that documents the model's content. The TM will document: the hydrogeologic conceptual model, the selected groundwater modeling tool, details of modifications to the numerical flow model, descriptions of predictive scenarios, results of model recalibration and predictive model flow, fate and transport simulations, results of particle tracking, results of predictive PCE plume transport simulations, potential groundwater receptor locations, and PCE plume arrival estimates. TM contents will be described in text and figurative formats.

Deliverables:

- One Model Documentation TM. The Model Documentation TM will record and describe the developed groundwater model and the results of model runs.

Cost Assumptions

- Model Documentation will require eight days of staff time to prepare and review, for a total estimated cost of $7,261.

Task 4.8 Modeling Meetings

Three meetings will be held to discuss modeling efforts with SGA staff and stakeholders. The first meeting will be a kickoff meeting to discuss and receive input on the upcoming effort. The second meeting will be held to discuss and demonstrate the updated modeling tool, and will be used to determine predictive scenarios to run with the modeling tool. The third meeting will be held to present the results of the modeling of predictive scenarios. These meetings will be held concurrently with the Regional Contamination Issues Committee meetings to ensure maximum participation of stakeholders.

Deliverables:

- Three meetings with SGA staff and interested stakeholders will be held.

Cost Assumptions

- Modeling meetings will require approximately seven days of staff time for meeting preparation and participation, for a total estimated cost of $7,290.

Task 5. Project Management

Project management will include activities such as project team coordination, budget and schedule tracking, quarterly reports, and other efforts as needed to complete the project scope of work on schedule and budget.

Task 5.1 Quarterly Reporting

The reporting for this project will include quarterly reporting to provide progress reports and final TMs for Monitoring Well Installation, water quality sampling, and groundwater modeling results. Each quarterly report will summarize the results of each task performed during the quarter. These reports will serve to inform the public, technical advisory committee, and DWR of the progress made during the study and provide accountability for the budget used throughout the life of the project.
The quarterly reports are intended to provide regular updates on the progress of the project and milestones met in accordance to budget utilization. These reports will be submitted to DWR for support for budget allocation. These reports will also serve to inform interested

parties and will be posted on the project website for the life of the project and will be made available for public review.

Deliverables:

- Eight quarterly reports

Cost Assumptions

- Each quarterly report will require one day of staff time to prepare and submit. These costs will be in-kind costs performed directly by SGA at an estimated cost of $7,040.

Task 5.2 Final Technical Memorandum

The Final Technical Memoranda will be prepared following completion of the field program tasks. It will include a summary of the findings of each of the project components and a general conclusions and recommendations for management strategies associated with the regional groundwater PCE impacts. The report will also provide each of the TMs as appendices and provide a general compendium of the investigation findings.

Deliverable:

- One Final Technical Memorandum.

Cost Assumptions

- The Final TM will require approximately eight days of staff time to prepare, review, and submit. Estimated cost is $8,231.

Task 5.3 Quality Control and Quality Assurance

This task provides Quality Assurance and Quality Control (QA/QC) activities. QA/QC activities will consist of reviews of TMs, reviews of well designs by senior hydrogeologists, review of water quality analytical data, and reviews of modeling efforts. QA/QC reviews will be documented in the quarterly reports.

Deliverable:

- Results of QA/QC efforts will be included in other project deliverables

Cost Assumptions

- QA/QC activities will require approximately seven days of staff time spread out over the life of the project, at an estimated total cost of $6,639.

CALIFORNIA
AMERICAN WATER

California American Water – Sacramento
4701 Beloit Drive
Sacramento, CA 95838
amwater.com

July 10, 2012

California Department of Water Resources
Division of Integrated Regional Water Management
Regional Planning Office
PO Box 942836
Sacramento, CA 94236-0001
Attn: Tom Lutterman

Subject: Monitoring Well Installation – California American Water Property

Dear Mr. Lutterman:

As General Manager of California American Water Company (Cal Am), I am writing to confirm our intent to allow for the construction of a monitoring well at Cal Am's Roseville Road Storage Tank Facility. The facility is an excellent location for groundwater monitoring and collection of additional data on the occurrence of PCE in northern Sacramento County.

Please feel free to contact me at 916-568-4259, if you have questions or require additional information.

Sincerely,

Andy Soulé
General Manager
California American Water
Northern Division

CITRUS HEIGHTS WATER DISTRICT

6230 Sylvan Road
P.O. Box 286
Citrus Heights
California
95611-0286

phone
916/ 725-6873
fax
916/ 725-0345
website
www.chwd.org

July 11, 2012

Mr. Tom Lutterman:
California Department of Water Resources
Division of Integrated Regional Water Management
Regional Planning Office
PO Box 942836
Sacramento, CA 94236-0001

Re: Monitoring Well

Dear Mr. Lutterman:

As General Manager of Citrus Heights Water District (CHWD), I am writing to confirm our intent to work with the Sacramento Groundwater Authority for the construction of a monitoring well within CHWD's service area. CHWD is very concerned about how the presence of PCE could impact our current or future operations.

CHWD has a Mutual Assistance Agreement with San Juan Unified School District (SJUSD) in which SJUSD "commits to…..assist and cooperate with CHWD in identifying and considering for sale, lease, or other agreements for use, real property under the management or control of SJUSD which could provide suitable locations for groundwater wells, storage tank sites or easements for facilities, without compromising the mission of SJUSD."

We have a meeting scheduled with SJUSD on July 23, 2012 to address water supply, infrastructure and other items of mutual interest that will include discussion of locating a monitoring well on the westerly perimeter of Mesa Verde High School. We believe that locating a monitoring well in the vicinity of the school would be most helpful in delineating the presence of PCE.

Please feel free to contact me at 916-725-6873, if you require any additional information.

Sincerely,

Robert A. Churchill

Robert A. Churchill
General Manager

General Manager

Robert S. Roscoe, P. E.

SACRAMENTO SUBURBAN WATER DISTRICT

CLEARLY REFRESHING SERVICE!

July 9, 2012

California Department of Water Resources
Division of Integrated Regional Water Management
Regional Planning Office
Attn: Tom Lutterman
PO Box 942836
Sacramento, CA 94236-0001

Re: Monitoring Well at Antelope Water Storage Tank Facility

Dear Mr. Lutterman:

As General Manager of Sacramento Suburban Water District (SSWD), I am writing to confirm our intent to allow for the construction of a monitoring well at SSWD's Antelope Water Storage Tank Facility. The facility is an excellent location for additional data on the occurrence of PCE in northern Sacramento County. SSWD also intends to allow access for collecting water quality samples at its monitoring wells for the proposed study.

Please feel free to contact me at 916.679.3994, if you require any additional information.

Sincerely,

Robert S. Roscoe, P.E.
General Manager