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CV-SALTS Phase II Conceptual Model

Task 1 –FINAL Workplan

Prepared for

SAN JOAQUIN VALLEY DRAINAGE AUTHORITY

Submitted by

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Introduction

On September 13, 2013, the Central Valley Salinity Coalition (CVSC) sought assistance in providing Technical Services supporting the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) Initiative. In particular, the CV-SALTS stakeholders sought technical assistance to guide the Phase II Conceptual Model in support of the development of the Preliminary Draft Salt and Nitrate Management Plan¹ (SNMP) by mid-2014. The Larry Walker Associates (LWA) Team² responded to the Request for Proposals (RFP) on September 30, 2013, and was authorized to provide the Phase II Conceptual Model Technical Services on October 21, 2013.

Consistent with the overarching goals of CV-SALTS and the Recycled Water Policy for the State of California³, CV-SALTS is developing a comprehensive SNMP for the Central Valley Regional Water Quality Control Board's (Regional Board's) jurisdictional boundaries. The SNMP, which will be developed in a collaborative setting with stakeholders and regulatory and partner agencies, will identify the approach and establish the basis for the short- and long-term management of salt and nitrate in the Central Valley region. The knowledge base, technical analyses, and associated documentation developed as part of the SNMP will form the basis for corresponding Basin Plan Amendments (BPAs) to the Water Quality Control Plans (Basin Plans) for the Sacramento/San Joaquin Basin and Tulare Lake Basin. The CV-SALTS technical work will also provide information to support more detailed, sub-regional analyses that may be undertaken in the future by local stakeholder groups if they choose to develop local SNMPs⁴. As envisioned by CV-SALTS, the phases of SNMP development in the Central Valley include the following⁵:

- **Phase I – Initial Conceptual Model (ICM) [2012-2013]:** The goal of the ICM was to produce a 30,000 foot “*Concept Level*” analysis of water balance and to estimate salt and nitrate load balances for the Central Valley floor in 22 areas of analysis that, for purposes of the ICM, are referred to as Initial Analysis Zones (IAZs). The Phase I ICM formed the foundation for the subsequent phases of necessary work (Phases II and III).
- **Phase II – Conceptual Model: Development of the Preliminary Draft SNMP [2013-2015]:** Phase II will utilize the data collected and/or organized through the Phase I effort, as well as the methods and results developed as a part of the ICM, develop additional analysis and

¹ Development of a Central Valley SNMP serves the purpose of the *Recycled Water Policy* by establishing a comprehensive approach for managing salt and nitrates on a regional or watershed basis and for all sources, rather than through individual recycled water projects. Although there has been significant discussion regarding nitrates versus nutrients within the Central Valley, it was determined that the focus of the Plan would be on nitrates as the highest priority since there are concentrations of nitrates within groundwater that are impacting groundwater quality and domestic drinking water wells.

² The LWA Team consists of the following firms: Larry Walker Associates, Carollo Engineers, Kennedy/Jenks Consultants, Systech Water Resources, PlanTierra, Luhdorff and Scalmanini Consulting Engineers, Giorgos Kourakos, and Formation Environmental.

³ http://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2013/rs2013_0003_a.pdf

⁴ For the purposes of this Workplan, the term “SNMP” refers to the document that is being developed for the Regional Board's jurisdictional boundaries. The term “local SNMP” refers to a document that would be developed for a regional/local Management Zone.

⁵ The CV-SALTS 5-Year Work Plan and Strategy and Framework document, which was approved in March 9, 2012, identifies the strategy and outcomes desired, as well as the specific work that needs to be completed to develop the SNMP. <http://www.cvsalinity.org/index.php/docs/documents-presentations.html>

management tools and methodologies for a designated Management Zone archetype area⁶, respond to the Recycled Water Policy requirements, and develop the Preliminary Draft SNMP and guidance for the development of local SNMPS.

- Phase III – Regulatory Approval Process [2015-2018]: Phase III will focus on the additional required elements of the Final SNMP (such as the monitoring/surveillance plan), as well as the documents that are necessary for the regulatory approval process for the adoption of the SNMP (antidegradation analysis, economic and environmental analysis of implementation alternatives, BPA Staff Report, and BPA language).
- Development of Local SNMPS: It is anticipated that, upon completion of Phase III and the adoption of the comprehensive SNMP, local SNMPS will be developed and implemented by local/regional entities as needed. It is intended that the local SNMPS will be informed by prototype and/or archetype methods and guided by the implementation measures and structure recommended in the final, adopted SNMP and associated BPA.

The relationship of the various phases to the overall work that needs to be completed as a part of the development of the final SNMP is illustrated in **Figure 1**. Each phase of work completed as a part of the SNMP informs the work that will be completed in the next phase. The overall schedule for these technical tasks is ambitious given the complexity of the technical issues, the fluid nature of policy development, the diversity of the stakeholders, and the high level of stakeholder involvement. The LWA Team will provide the project management and technical leadership necessary to manage the complex schedule while producing high quality and relevant technical work (also see Task 2 discussion). To meet the aggressive overall schedule, some technical tasks will necessarily be completed concurrently, and there will need to be timely review of technical work products that require review and/or approval from the Project Committee (PC), Technical Advisory Committee (TAC), and/or Executive Committee (EC). Any delays during Phase II will likely have a corresponding impact on the schedule for the future phases of work.

Pursuant to Task 1 of the Scope of Work, the LWA Team has developed this document, a detailed Phase II Conceptual Model Workplan (including a detailed schedule and budget)(Workplan), that describes the technical approach, milestones, and deliverables that will be used to complete Tasks 2-5, culminating in the development of a Preliminary Draft SNMP. It should be recognized that, as the individual Tasks are completed, the LWA Team may further develop the methodology based on circumstances that were unforeseen during the development of the Workplan. Any such modifications will be brought to the attention of the Technical Project Manager (TPM) and documented within the deliverables.

The Workplan also includes the following:

- A *Project Management Plan (PMP)* that identifies the activities and procedures for coordinating with CV-SALTS management and other technical committees and activities related to this project. The PMP identifies how the LWA Team will coordinate with and obtain the reviews and/or necessary decisions from the CV-SALTS Program Manager, TPM, PC, TAC, and/or EC in a timely manner so that the project can meet the aggressive schedule.

⁶ The term “Management Zone” refers to the geographical area (Alta Irrigation District) that is being characterized for the development of an example local SNMP. The term “archetype” refers to the fact that this is an example and will be used to develop guidance for the development of other, local SNMPS. At times, the term “Management Zone” and “archetype area” may be used interchangeably, however they both refer to the Alta Irrigation District boundaries.

- A *Data Management* section that identifies the types of data and sources required for this project and the procedures that will be followed for obtaining data, conducting a Quality Assurance/Quality Control (QA/QC) evaluation, and managing the data, as well as how data gaps will be addressed.

Any changes to the scope of work outlined within this Workplan will require EC approval and corresponding adjustments to the project budget and/or schedule. The tasks described within this Workplan⁷ will be initiated after it has been approved and a notice to proceed has been received from the CV-SALTS TPM. The specific tasks are outlined below and discussed in additional detail in the body of the document.

- Task 2 – Management and Coordination Activities
This task describes the process that will be utilized for this project in order to allow the LWA Team and CV-SALTS management and committees to coordinate the activities, maintain a clear focus on the assignments, clearly communicate progress on the development of necessary technical information, and apply the knowledge gained effectively.
- Task 3 – Groundwater Data Refinements and Updates to Support Salt, Nitrate, and Water Balance Estimates for the Archetype Area, SNMP, and Future Work
This task describes the refinements and updates that will be made to the existing database that will be useful during Phase II and future work throughout the Region 5 jurisdiction. The refinements identified will improve the certainty and accuracy of results.
- Task 4 – Management Zone Archetype Analysis
This task will develop a Management Zone archetype analysis for a pre-designated area (Alta Irrigation District) to test the application of selected policies, data analysis methods, and salt and nitrate management approaches that are currently being considered by CV-SALTS.

This task will also develop a methodology for the Management Zone area to determine ambient groundwater quality, best water quality attained since 1968, the existing assimilative capacity, and the assimilative capacity under future salt and nitrate management scenarios. The methodology will be applied for the archetype area and evaluated for application at other scales such as the smaller scale (e.g., publicly owned treatment works (POTW)), mid-range scale (other Management Zones), and/or a larger scale. The findings from this task will be used to inform the implementation elements of the SNMP and BPA.
- Task 5 – Prepare Preliminary Draft SNMP
The purpose of this task is to compile existing information; in particular, information developed to date through CV-SALTS, and prepare a Preliminary Draft SNMP for the entirety of the Central Valley Regional Water Quality Control Board jurisdiction. The Preliminary Draft SNMP will support the overall mission of CV-SALTS and is intended to meet the requirements of the Recycled Water Policy.

⁷ The development of this document fulfills the scope of work for Task 1, *Workplan Development*.

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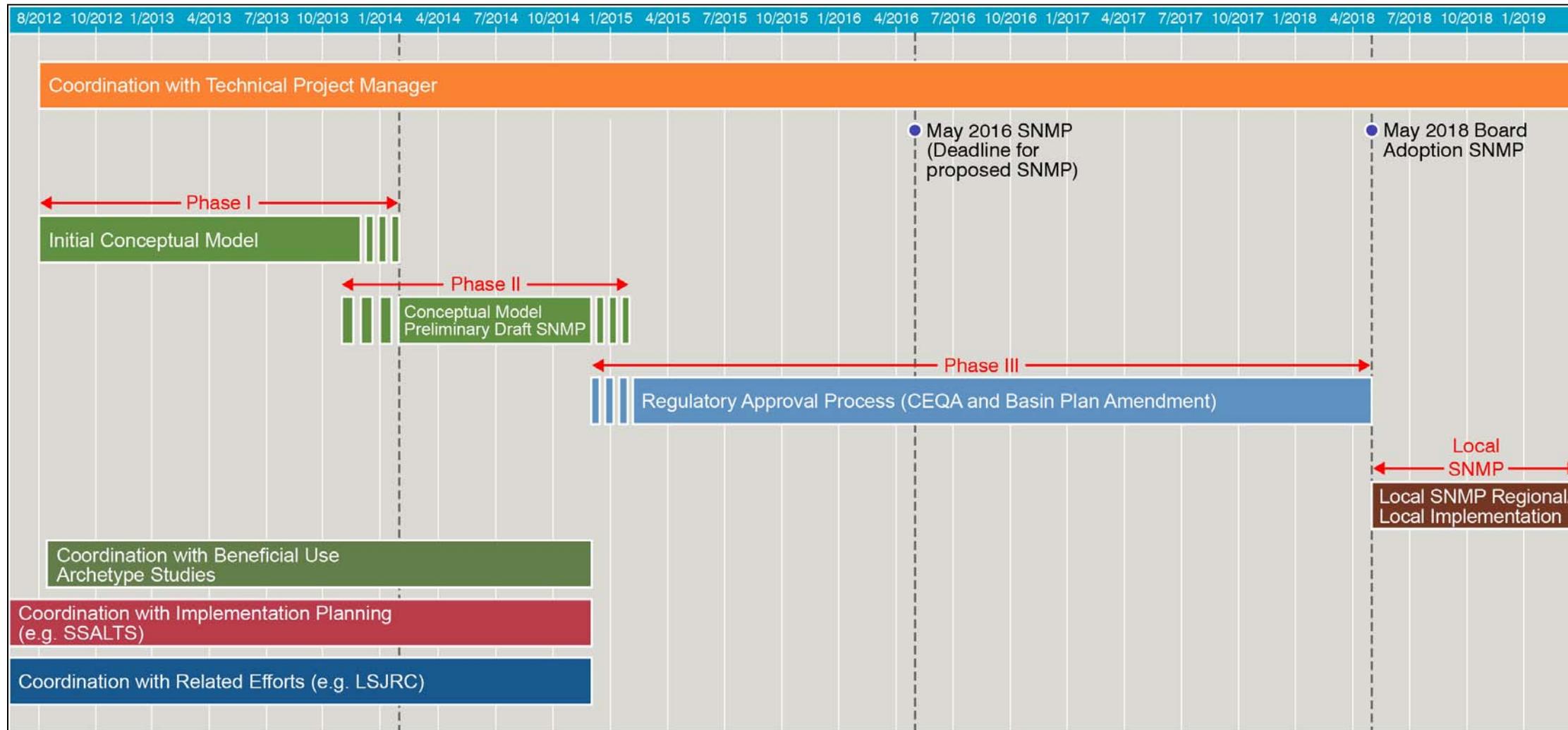


Figure 1. Schedule to Complete the SNMP

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Workplan Approach

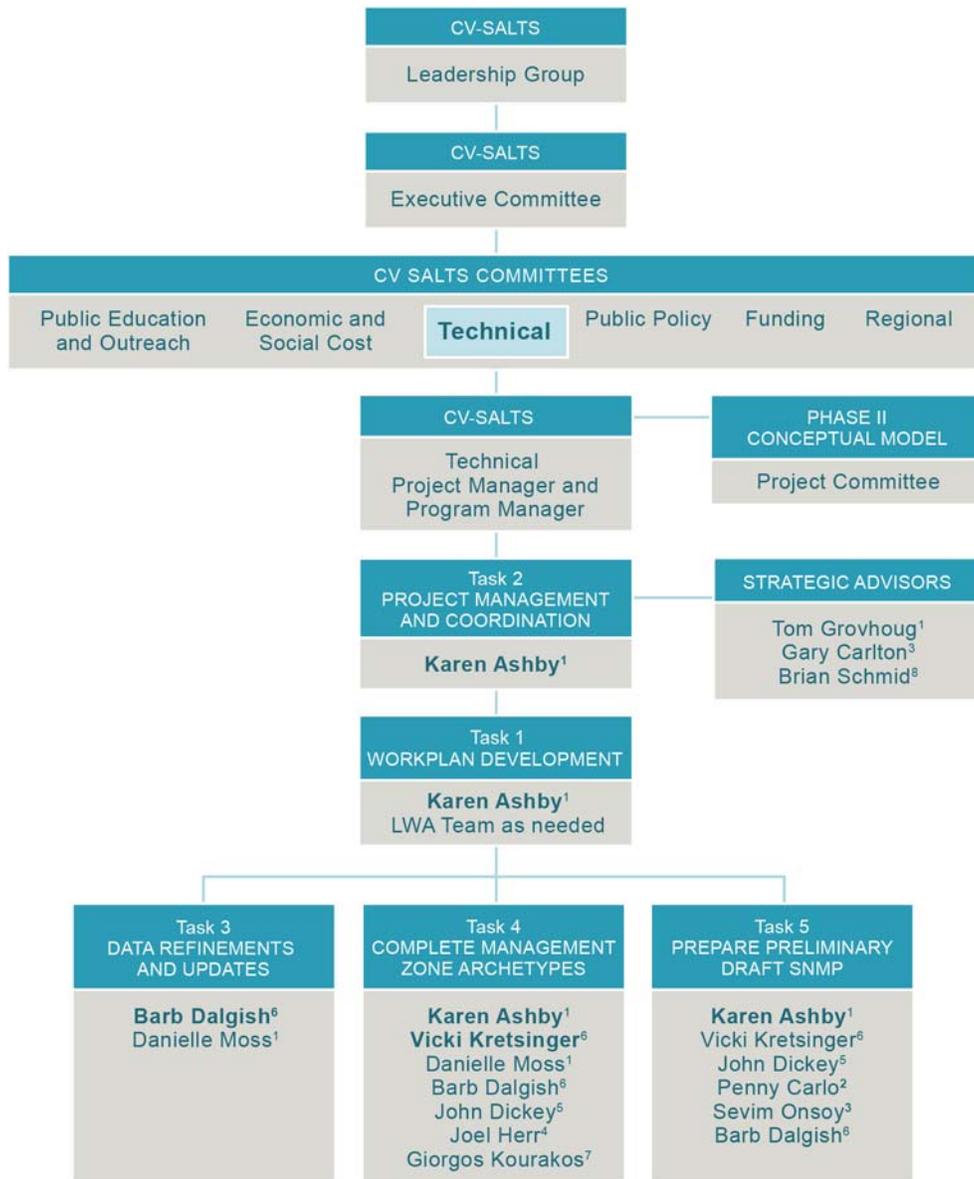
The sections below provide a detailed description of the scope of services that will be completed as a part of the Phase II Conceptual Model Workplan. The scope of work follows the overarching approach described herein and is based on a number of stated assumptions regarding the level of effort required. Throughout the term of the project, the Team's approach will be guided by the following principles:

- Focus on the overall objective of developing an implementable and comprehensive SNMP and associated BPA in a timely manner.
- Use a sound scientific and public policy approach. Aim for quantitative over conceptual responses and solutions whenever possible. Identify approximations and uncertainties clearly so they can be evaluated and plans can be made (as justified) to address them in the course of near-term work or future phases.
- Effectively and regularly communicate with CV-SALTS managers, committees, and stakeholders regarding technical work products (approaches, status, results).
- Further the TAC's role as a forum for technical discussions, planner and reviewer of technical studies, and developer of solutions that balance environmental improvement with effective use of economic resources.
- Effectively manage the LWA Team by assigning appropriate individuals to each task so that work is focused, timely, and efficient.

Project Management Plan

Although the LWA Team is comprised of several firms that have joined together to respond to this RFP, our Team is comprised of individuals that have been strategically selected from each firm so that we can efficiently and cost-effectively assist CV-SALTS. Each individual was selected based on their expertise and experience and has experience working for CV-SALTS. The organization of the LWA Team is shown in **Figure 2**. The organizational chart identifies the management structure, as well as the Task Leads and other key Team members who will be involved in the project.

The management and coordination activities that will be utilized as a part of the PMP by the LWA Team are described below. These activities will be employed to maintain a clear focus on the assignments, to clearly communicate progress on the development of necessary technical information, to receive early feedback from CV-SALTS, and to apply the knowledge gained most effectively. Given the compressed schedule and budget for this work, it will be important to streamline the project management approach and deliverable approval process, track progress closely, communicate frequently, and support the sharing of information and advice needed to complete the project.



LWA TEAM MEMBERS

- 1 - Larry Walker Associates
- 2 - Carollo Engineers
- 3 - Kennedy/Jenks
- 4 - Systech Water Resources
- 5 - PlanTierra
- 6 - Luhdorff and Scalmanini
- 7 - Independent Consultant
- 8 - Formation Environmental

Figure 2. LWA Team Organization

The project coordination between the LWA Team and CV-SALTS is illustrated in **Figure 3**. The key roles and responsibilities include the following:

- The CV-SALTS Program Manager will be Pam Buford with support from Jeanne Chilcott.
- The CV-SALTS day-to-day contacts will be Daniel Cozad, CVSC Executive Director (ED) and Richard Meyerhoff, the CV-SALTS TPM.
- On behalf of CV-SALTS and CVSC, Joe McGahan of the San Joaquin Valley Drainage Authority (SJVDA), will oversee the contracting and contract administration services. As Project Manager (PM), Ms. Ashby will work closely with Mr. McGahan to ensure that all of the invoicing and related monthly reports are completed and submitted on time.
- As the PM, Karen Ashby will provide overall project management and oversight and will be the day-to-day contact on behalf of the LWA Team.
 - The Strategic Advisors will provide review and advisory support at key decision points during the project.
 - The Task Leads will provide oversight for their related tasks and coordinate closely with Ms. Ashby and the Strategic Advisors.
- The CV-SALTS PC will provide technical and policy direction to the LWA Team. The PC will also provide early feedback and direction for all tasks, as well as approval for the deliverables.
- The TPM will function as the day-to-day contact for the PC, TAC, and EC, and will compile all comments received on deliverables and reconcile conflicting comments. The TPM will provide one consolidated set of comments to the LWA Team for all deliverables undergoing review⁸.
- The CV-SALTS TAC and EC will receive regular updates and feedback from the CV-SALTS TPM regarding the status of the work products and upcoming deliverables.

The TPM will be the principal liaison to the CV-SALTS TAC and EC on behalf of the Phase II Conceptual Model work effort⁹. LWA Team members, Karen Ashby, Tom Grovhoug, Vicki Kretsinger, and/or John Dickey may be able to attend the TAC and/or EC meetings as needed to provide support to the TPM; however, attendance at these meetings on an ongoing basis is not included within the current scope and budget (some meetings are included within the scope and budget).

In addition to the specific sub-tasks listed below, during the duration of the project, the following project management and coordination approaches will be used as a part of each task and sub-task to ensure that the work is completed efficiently and cost-effectively:

- Ms. Ashby will maintain the master schedule (**Attachment B**) and budget and update and submit them at least monthly as a part of the invoicing process. The budget report will identify the total budget, the expenditures to date, the amount remaining, and the estimated percent completion by task.

⁸ Given the schedule and budget for the completion of the work, each deliverable includes one draft document, one final document (with the comments received on the draft incorporated into the final), and the completion of the Response to Comments matrix.

⁹ Given the need to focus the budget on the technical work, the LWA Team needs support in communicating with the multiple CV-SALTS Committees. If it is desired to have the LWA Team members attend more meetings than are currently scoped, additional budget will be required.

- Ms. Ashby will work closely with the Task Leads and the CV-SALTS TPM and/or CVSC ED to ensure that the work meets the overall project needs and is completed on schedule and within budget.
- For quality control and consistency purposes, the schedule for each deliverable includes the following review process:
 - Task Leads review work product before providing to PM and/or Strategic Advisors
 - PM and/or Strategic Advisors review work product before providing to CV-SALTS TPM and/or CVSC ED¹⁰
 - CV-SALTS TPM and/or CVSC ED review work product before providing to CV-SALTS PC, TAC, and/or EC
 - All final deliverables will be provided to the CV-SALTS TPM and Program Manager
- To facilitate communication, LWA Team members will communicate as needed with key CV-SALTS individuals to promote their understanding of the project or to answer key questions that may be raised.
 - To the extent possible, and as needed, the telephonic communication with CV-SALTS individuals and/or committees will include Ms. Ashby.
 - For those telephonic communications that do not involve Ms. Ashby, telephone logs will be prepared and provided within 24 hours of the call(s).
 - All email communication from the LWA Team members will be copied to Ms. Ashby.

DATA MANAGEMENT

The work products developed as a part of this Workplan will be evaluated by the LWA Team PM, the LWA Team Strategic Advisors, and the CV-SALTS TPM to ensure that they will support the development of an administrative record for the BPA. A critical review of the work products and guidance by Strategic Advisors on the Team will also provide the necessary assurances that the criteria for a BPA administrative record have been met. As a part of the work effort, the project documents, files, and data will be maintained in an appropriate form and location. The data management will mainly include the following:

- Project Documents – The final project deliverables will be saved electronically as PDFs and Word documents
- Reference Documents – Any documents referenced within the final project deliverables will be saved electronically as PDFs and/or Word documents depending upon the source document received.
- Data – Any data used or referenced as a part of the final project deliverables will be saved electronically in Excel and/or Microsoft Access and/or another format depending upon the source of the data. The data files will include raw and calculated data, as well as data analysis output files. These files will be provided after the work is completed and approved by the EC.

¹⁰ For work products of high importance, with specialized or novel technical information, and for high-profile tasks, suitable experts from the LWA Team may also be designated by the PM as reviewers.

At the conclusion of the project, the documents and data listed above will be transferred to either CV-SALTS and/or maintained by the LWA Team until the information is requested.

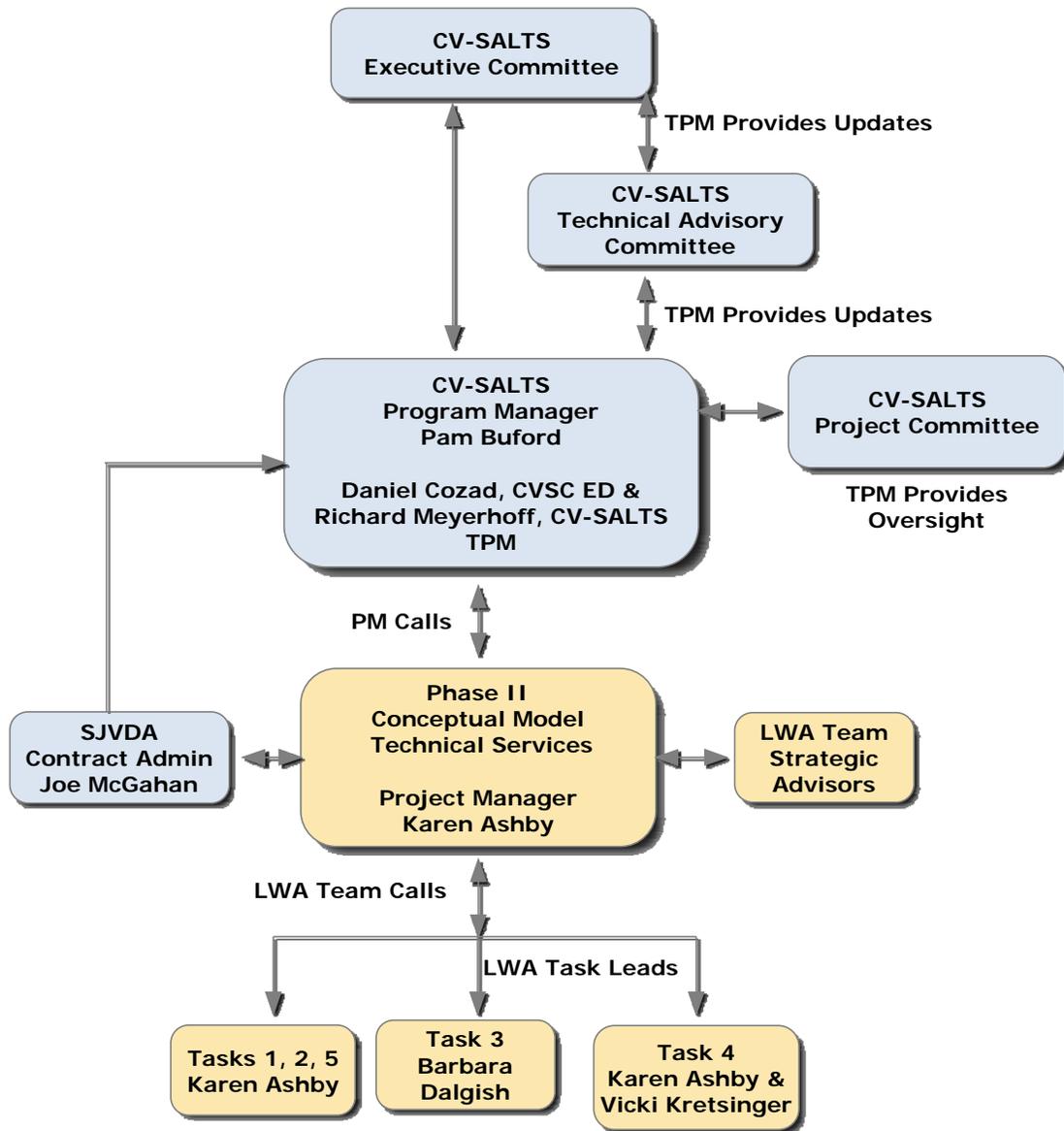


Figure 3. CV-SALTS Phase II Conceptual Model Organizational and Communication Structure

Task 2 - Management and Coordination Activities

Applying the management process described within this task will allow the LWA Team and CV-SALTS management and committees to coordinate the activities, maintain a clear focus on the assignments, clearly communicate progress on the necessary technical information, and apply the knowledge gained effectively. Given the compressed schedule and identified budget, it will be important to track progress closely, support the sharing of information, and obtain the advice needed in order to complete the studies in an efficient and cost-effective manner. The specific sub-tasks include:

Sub-Task 2.1 Coordination Meetings

As illustrated in **Figure 3**, there are several types of coordination meetings that need to take place to ensure that the deliverables meet the goals and objectives of the scope of work as well as the aggressive schedule¹¹. The coordination meetings include:

- **LWA Team Calls** – Throughout the duration of the project (12 months) the LWA Team members¹² will participate in bi-monthly conference calls (24 calls total) to ensure that work is on schedule and budget. These meetings will typically be 1 hour in length and will be focused on the work that is currently being completed as well as the upcoming tasks for which the Team needs to plan. Any issues that are being encountered with the project will be discussed during these calls.
- **Kickoff Meeting** – Once the Workplan is approved¹³ and the LWA Team is authorized to initiate work, the Team recommends holding a kickoff meeting via a conference call with the PC. The primary purpose of the conference call is to review the outline and discuss the overall approach for the development of the SNMP. This meeting is critical since it will set the foundation and expectations for the SNMP.

Deliverables: Twenty four (24) Team calls

One two (2) hour kickoff meeting (via conference call) including agenda, meeting materials, and meeting summary

Sub-Task 2.2 Coordination Meetings with CV-SALTS Management

Regular conference calls/meetings will be held to keep the project on schedule and to ensure that there are clear lines of communication to discuss project progress. The PM will be responsible for coordinating the Team's technical activities and regularly communicating with the CV-SALTS management to discuss

¹¹ Although the RFP only included a task for coordination meetings with CV-SALTS Management, the LWA Team also included the necessary Team coordination for the project as well as a recommended kickoff meeting and Draft SNMP workshop.

¹² The LWA Team members participating on the call will fluctuate from week to week depending on the specific tasks that are in progress. However, the Team members will typically include the PM, one or more Strategic Advisors, one or more Task Leads, and any technical support staff as needed.

¹³ The LWA Team recommends that the kickoff meeting be held within two (2) weeks after Workplan approval.

technical work status and/or reviews, discussion items in upcoming TAC and/or EC meetings, and near-term plans. It is anticipated that the coordination activities and meetings may include the following¹⁴:

- PM Calls – The LWA Team PM is responsible for coordinating the technical activities and regularly communicating with the CVSC ED and CV-SALTS TPM to discuss technical work status, major discussion items in upcoming TAC meetings, actual or projected issues or difficulties, and/or near-term plans. Throughout the duration of the project, the LWA Team PM and Strategic Advisor (Tom Grovhoug) will participate in a bi-monthly conference call with the CV-SALTS TPM and/or the CVSC ED to ensure that work is on schedule and budget (24 calls total)¹⁵. These calls will typically be 1 hour in length and will be focused on the work that is currently being completed, as well as upcoming tasks as needed. Any issues that are being encountered with the project will be discussed during these calls.
- Coordination with the Project Committee (PC) – Given the amount of work that needs to be completed and the aggressive schedule for the development of the Preliminary Draft SNMP, the LWA Team will need to continue to closely coordinate with the PC. Throughout the duration of the project and in coordination with the various deliverables, the LWA Team will prepare for and participate in up to three (3) conference calls with the PC to discuss and receive early feedback on the approach for the tasks and interim, pre-draft deliverables, as well as the draft and final memos, reports, and/or other documents developed as a part of this project¹⁶. These conference calls will typically be about 2 hours in length. The CV-SALTS TPM will be responsible for consolidating and providing direction on the comments received from the PC so that the LWA Team receives one set of reconciled comments.
- Coordination with the Technical Advisory Committee (TAC) – Throughout the duration of the project and in coordination with the various deliverables, the LWA Team will prepare for and participate in up to three (3) conference calls with the TAC to discuss and receive feedback on the draft and/or final memos, reports, and/or other documents developed as a part of this project¹⁵. These conference calls will typically be about 2 hours in length. The CV-SALTS TPM will be responsible for consolidating and providing direction on the comments received from the TAC so that the LWA Team receives one set of reconciled comments.
- Coordination with the Executive Committee (EC) – Throughout the duration of the project and in coordination with the various deliverables, the LWA Team will prepare for and participate in up to three (3) EC meetings to discuss and receive feedback on the draft and/or final memos, reports, and/or other documents developed as a part of this project¹⁷. These meetings will typically be about 4 hours in length. The CV-SALTS TPM will be responsible for consolidating and

¹⁴ If it is desired to have the LWA Team members attend more meetings than are currently scoped, additional budget will be required. If additional meeting attendance is requested, the LWA Team will proactively notify the TPM prior to the meeting.

¹⁵ Other LWA Team Strategic Advisors and/or key Team members will participate in these calls on an as-needed basis.

¹⁶ The three (3) meetings with the PC and TAC include the following and are in addition to the kickoff meeting noted in Sub-Task 2.1: 1) Sub-Task 4.5, 2) Sub-Task 4.9, and 3) Sub-Task 5.2

¹⁷ The three (3) meetings with the EC include the following: 1) Sub-Task 4.9, 2) Sub-Task 5.1, and 3) Sub-Task 5.2

providing direction on the comments received from the EC so that the LWA Team receives one set of reconciled comments.

*Deliverables: Twenty four (24) PM calls
Three (3) coordination calls with the PC
Three (3) coordination calls with the TAC
Three (3) coordination meetings with the EC*

Sub-Task 2.3 Coordinate with and/or Provide Support/Information to other CV-SALTS Related Technical Projects

The LWA Team will, on an as needed basis, coordinate with and/or provide technical and/or regulatory support and information for other CV-SALTS technical projects or analyses. It is anticipated that the coordination may occur with the following projects/work efforts:

- GIS Technical Services;
- Strategic Salt Accumulation Land and Transportation Study (SSALTS);
- Lower San Joaquin River salinity objectives activities; and
- Other beneficial use studies and/or archetype/prototype projects.

It will be critical to coordinate with these related projects since the SNMP will be informed by and, in some cases, incorporate the results of these projects. The LWA Team members' involvement in many of the CV-SALTS projects provides a unique opportunity to provide insight and support. This Task includes an estimated 16 hours of support¹⁸.

*Deliverables: Participation in coordination meetings
Provision of information as needed*

Sub-Task 2.4 Maintain Relevant Project Documents, Files, and Data

The work products, files, and data will be maintained in an accessible format and location and evaluated by the Team experts on BPAs for completeness. A critical review of the work products and guidance by Strategic Advisors on this Team will provide the necessary assurances that the criteria for a BPA have been met¹⁹. This task includes an estimated 16 hours of support²⁰.

Deliverables: Project files and data

Sub-Task 2.5 Provide Monthly Progress Reports

On a monthly basis, the LWA Team (via the PM) will provide a written progress report to the SJVDA (attached to the invoice) to document the project progress on a task-by-task basis. The monthly reports will document:

¹⁸ If it is desired to a higher level of effort, additional budget will be required. The status of this task and hours expended will be communicated to the CV-SALTS TPM during the bi-monthly PM calls.

¹⁹ This includes a complete listing of all references, copies of the referenced documents cited within the documents developed, and electronic files with all of the data used, calculations made, and documentation of the content files.

²⁰ If it is desired to a higher level of effort, additional budget will be required. The status of this task and hours expended will be communicated to the CV-SALTS TPM during the bi-monthly PM calls.

- The work completed during the current month;
- The work planned for the next month; and
- Any project concerns that need to be communicated (such as those that may affect the project scope of work, deliverable schedule, or project budget).

In addition to the written monthly progress report, the Team will provide an updated master schedule and monthly budget report (on a task-by-task basis) submitted with the invoice to provide the Program Manager and/or Contract Manager with the context for the project necessary to understand what has been completed to date, what still needs to be completed, and how this relates to the remaining budget and schedule. The invoices and monthly reports will be provided no later than the 15th of each month²¹. This information will also be shared, as needed, during regularly scheduled PM conference calls.

Deliverables: Monthly invoices (12)
Written progress reports
Budget Report in PDF
Updated Master Schedule in PDF

²¹ The LWA Team members will provide the corresponding information to the LWA Team PM by the 5th of each month for compilation into the monthly progress report.

Task 3 – Groundwater Data Refinements & Updates to Support Salt, Nitrate, and Water Balance Estimates for: Archetype Area, SNMP, & Future Work

The Phase I ICM Report included a number of recommendations for further refinements and/or updates to the existing database that could be useful or required during Phase II, as well as the development and/or implementation of Local SNMPs. The recommendations related to refinements that could be made to improve the certainty and accuracy of results. After discussions with CV-SALTS, it was determined that the data refinements will focus on the Geotracker GAMA issues as described below.

Sub-Task 3.1 Revise ICM Database – Geotracker GAMA Issues

During the work for Phase I, specific problems were detected with the Geotracker Groundwater Ambient Monitoring and Assessment Program (GAMA) dataset as acquired from the online download tool. The nature of the problem appeared to be that some tests were reported with incorrect units. Various test records indicated that the results provided were in units of mg/L as nitrogen; however, the units were in mg/L as nitrate (a difference of a factor of approximately 4.4). The State Board was contacted upon identification of the misreported records and the problems with the misreported records were identified and corrected in the online database after completion of the ICM Phase I work.

In light of this data issue, the groundwater quality database developed for Phase I will be updated to incorporate the corrected data from Geotracker GAMA. Additionally, other data sources [California Department of Public Health (CDPH), Department of Water Resources (DWR), and United States Geological Survey (USGS)] will be updated to include data that have become available since the initial acquisition of groundwater quality data in 2012. As with the database previously developed for Phase I, duplicate records between the databases will be identified as much as the data allow, as well as the potential identification of anomalous results and/or outliers (e.g., values that are off by several decimal points will be removed, and electrical conductivity and total dissolved solids (TDS) values will be compared when questionable data are identified). This QA/QC will be performed on the groundwater quality data in order to have the most complete and usable dataset for Phase II Task 4 and on-going analyses for the entirety of Region 5.

Some of the publicly available data will be easier to compile compared to others. The Geotracker GAMA, USGS, DPH, and DWR datasets will be the easiest and therefore, the least costly to compile. The Regional Board Dairy datasets are much more difficult to acquire and incorporate into the CV-SALTS groundwater quality database, as these data are received through a special request to the Board, resulting in individual spreadsheets of data in various formats (different offices provide data from dairies in different Region 5 areas and there is no standardized spreadsheet or database containing all pertinent groundwater quality data). The time associated with the data request, acquisition, and incorporation into the database is significant for the dairy data compared to the other sources, but on top of that cost, the QA/QC involved in identifying dairy and well locations and accurate concentrations is also a significant effort. Therefore, this dataset will not be updated at this time. Readily available dairy datasets within the Management Zone area (Alta Irrigation District) will be acquired for analysis as a part of Sub-Task 4.3.

Deliverables: Revised/updated database and GIS coverages

Brief technical memorandum documenting the database update

Task 4 – Management Zone Archetype Analysis

This task will include the work required to develop a Management Zone²² archetype for:

- a) The establishment of a salt and nitrate management area consistent with the expected framework for developing a local SNMP; and
- b) The testing of the application of selected policies, data analysis methods, and salt and nitrate management approaches that are currently being considered by CV-SALTS.

The findings will be used to inform the implementation elements of the SNMP and, potentially, the corresponding BPA. The LWA Team will work closely with the Stakeholder lead to complete the tasks as outlined below.

This Workplan assumes that the Alta Irrigation District in the Kings Subbasin will be the Management Zone for this archetype. However, it should be noted that the actual area that will be analyzed (the “modeled” area) will include an area extending beyond the Alta Irrigation District boundaries that is determined to be suitable for the use of the groundwater modeling applications described below. Although this task will serve to lay the groundwork for a local SNMP within the Kings Subbasin; it is not final or binding for the stakeholders. This archetype analysis will lend itself to vetting technical and policy assumptions to provide a template and guidance for the Region 5 Central Valley SNMP, as well as future local SNMPS within the Central Valley.

Sub-Task 4.1 Develop Boundaries of the Management Zone Archetype and Identify Stakeholders

Pursuant to direction from CV-SALTS and in consultation with David Orth with the Kings River Conservation District (KRCDD), it has been determined that the boundary for the Management Zone archetype will be the boundary of the Alta Irrigation District (located within the eastern and southeastern portion of the Subbasin). The area was selected without additional technical analysis of the larger Kings Subbasin²³ (i.e., above and beyond the technical analyses conducted as a part of the ICM work effort), using an existing jurisdictional boundary that is representative of a type of area that could operate under a local SNMP.

In addition to the analyses conducted as a part of the Management Zone archetype, different approaches for the delineation of Management Zones and the pros, cons, and limitations of each will be presented in the Task 4 deliverable and Preliminary Draft SNMP. Different approaches for delineating Management Zone boundaries on a technical basis will be provided and will serve as guidance for Management Zone boundary determinations in future local SNMP efforts. For example, the Alta Irrigation District archetype area may prove to become one of many Management Zones within a broader Kings Basin Management Zone Integrated Regional Water Management Plan (IRWMP) area.

²² A Management Zone is a user-defined geographic area with horizontal and vertical dimensions where salt and nitrate management is carried out in a collaborative and sustainable manner consistent with the goals of the SNMP.

²³ The LWA Team recognizes that there are two approaches for the delineation of the Management Zones. The zone can either be pre-selected without additional technical analysis or the zone can be selected after additional technical analyses are conducted. The Sub-Task 4.9 report will compare the advantages and disadvantages of both approaches.

The LWA Team will, through direct communication and involvement with David Orth, KCRD (the Stakeholder Lead for the Kings Subbasin)²⁴, verify the areal and vertical boundaries of the Management Zone. In addition, the LWA Team will work with the Stakeholder lead in identifying potential stakeholders to participate in the Management Zone archetype discussions.

*Deliverables: Coordination with the Stakeholder Lead in preparation for Sub-Task 4.2
This information will be summarized as a part of the Management Zone Report (Sub-Task 4.9)*

Sub-Task 4.2 Conduct a Task Kickoff Meeting

Once the stakeholders for the Management Zone area have been identified (Sub-Task 4.1), the LWA Team will participate in a Kickoff Meeting with the stakeholders. The purpose of the meeting is to introduce the Management Zone archetype concept and purpose as well as to review the task goals, and discuss data/information requests. The data requests would include, but are not limited to, private well data that the counties, KRCDD, or Self-Help Enterprises (SHE) have (including GIS layers, well completion information, pumping rates, etc.), and applied water quality. The requests will also include several pertinent datasets made available for the model update that KRCDD is currently performing for their Kings Basin Integrated Water Flow Model (IWFM) (v.4) effort²⁵.

A communication approach will also be introduced and established with the stakeholders. Frequent communication and check-ins with the Stakeholder Lead (and through the Stakeholder Lead, the stakeholders) will keep the tasks on track and will assist the LWA Team in verifying that task-related deliverables are accurate and representative of the Management Zone area.

*Deliverables: Participation in the kickoff meeting with LWA Team, stakeholder lead, and stakeholders
Meeting materials as needed
This information will be summarized as a part of the Management Zone Report (Sub-Task 4.9)*

²⁴ The Stakeholder Lead will a) organize and be the primary point of contact for the Team and stakeholders participating in the Management Zone Archetype; b) affirm the final boundaries for the area to be included in the Management Zone Archetype; c) lead discussions with the stakeholders with regards to salt and nitrate management decisions; d) obtain stakeholder input on task deliverables; and e) represent the interests of stakeholders to the CV-SALTS EC.

²⁵ Every effort will be made to work with the Stakeholder Lead to obtain the data requested. If additional data is not provided, the Management Zone analyses will rely on existing data.

Sub-Task 4.3. Complete Management Zone Characterization²⁶

The following datasets will be obtained from Task 3, the Phase I ICM study, and stakeholders (pursuant to Sub-Tasks 3.1 and 4.2) in order to characterize the Management Zone area. The intent of this Sub-Task is to perform the characterization of groundwater, surface water, land cover, and other data for the Management Zone boundary. This will be completed to the maximum extent possible using the data that are currently available. The Team will only request data from stakeholders as described below:

4.3.1. Surface Water Data

Surface water features will be characterized within and around the Alta Irrigation District boundaries, including²⁷:

- Surface water and groundwater interactions (to the extent described in existing studies),
- Locations of surface water,
- Flow characteristics,
- Sources of imported water,
- Locations of known diversions,
- Surface water quality used for irrigation (applied surface water quality) (to the extent that this is readily available), and
- Permitted discharges (facilities with active Waste Discharge Requirements (WDR) of all sizes) including POTWs

4.3.2. Groundwater Data

In order to characterize the movement of salt, nitrate, and water within the Management Zone, a larger, more encompassing area will need to be assigned for modeling purposes (the “modeled” area). This larger area will provide the model boundary, and will be determined based on available data from the characterization of the area within and around Alta Irrigation District, including hydrologic features and water quality test locations.

Groundwater features will be characterized within and around the Alta Irrigation District boundaries, including:

- Locations and pumping amounts of known municipal, irrigation, and domestic water supply wells,
- Well construction data for CDPH and other monitored wells to improve the vertical discretization and utility of groundwater quality data, and
- Groundwater quality data
 - Used for irrigation (applied groundwater quality),
 - Updated data from Task 3,
 - Updated dairy datasets from the Regional Board

Groundwater quality data will be linked to well construction information, as available, using DWR well completion reports, requests to stakeholders, and CDPH data. It is uncertain as to the level of cooperation or willingness to provide confidential information such as exact well locations, well depths,

²⁶ The intent of this task is to rely on existing data to the maximum extent possible.

²⁷ Per discussions with KRCD, there are no agricultural drains, therefore, these will not be included within the surface water data characterization.

screen depths, and other well-specific data, but the attempt to link groundwater quality with a particular depth of the subsurface will aid in the definition of ambient groundwater quality (and assimilative capacity). KRCD may have access to CDPH well-specific data. An attempt will be made to link other wells with groundwater quality data and unknown construction information to their DWR well completion reports, within reason.

As KRCD develops their IWFM groundwater model of the Kings Subbasin, certain data refinements will be requested in conjunction with existing Central Valley Hydrologic Model (CVHM) data to refine the local knowledge within and around Alta Irrigation District boundaries for purposes of the archetype analysis. It is anticipated that some collaboration during the KRCD model update will be mutually beneficial to KRCD and CV-SALTS during this effort. Data refinements may include:

- Simulated land use and crop data with associated simulated water demand;
- Water supply and demand data, including well locations (lat/longs), well construction (screen depths, well depths, etc.), and amounts pumped over time; stream configurations (rivers, creeks, and simulated canals) and surface water delivery locations and amounts over time;
- Aquifer parameter data: horizontal and vertical hydraulic conductivity discretized and defined for all model nodes/elements and layers (model layer 1, confining layer, model layer 2, and model layer 3); storage coefficient values; specific yield or porosity values; model layer elevations (top and bottom elevations of each layer); streambed elevation and conductance;
- Simulated boundary conditions data: assigned general head boundary properties and associated flow amounts through boundaries at each node over the model time period;
- [Artificial] Recharge facilities: locations, construction, timing, water quality concentrations, and amounts of water recharged over model time period; and
- Simulated volumetric budget components: groundwater pumping over each subregion or listed by node assigned to municipal or agricultural demands; streambed leakage (gaining or losing stream conditions); overland runoff; evapotranspiration; deep percolation (groundwater recharge); flow through general head boundaries; artificial recharge; stream flows; surface water inflow to model area; import deliveries and diversions.

Groundwater quality data from entities that have not migrated data to publicly available online locations (may include SHE), City of Fresno, Fresno County, Kings County, Tulare County, irrigation districts or water districts in the area) will be included, if readily available.

4.3.3. Land Cover and Other Data

Data developed under the CV-SALTS Geographic Information Systems (GIS) Technical Services Contract (Sub-Tasks 5.1 and 5.2) will be incorporated, including irrigation methods mapping, spatially distributed applied water quality estimates, and soils parameters²⁸. These are new since the Phase I ICM was completed. Other data to be collected or compiled as a basis for developing mass loading estimates in Sub-Task 4.6 will include: land cover²⁹, irrigation practices, applied water amounts and quality, and fertilizer rates.

²⁸ This report and others can be located on the CV-SALTS website <http://www.cvsalinity.org/index.php/docs/archive.html>

²⁹ Land cover data will originate from the most recent DWR publication, and/or any updated information from Kings River Conservation District or Alta Irrigation District.

4.3.4. Characterization of the Data

The quality of new datasets gathered under this Sub-Task will be assessed. The level of QA/QC performed will depend on the quality of the data received from stakeholders. If, even after data-related follow-up from the LWA Team with the stakeholders is completed, data received are deemed insufficient and/or there are significant data gaps, recommendations will be documented identifying how CV-SALTS may address these data gaps in the future.

Deliverables: A summary of the data characterization and identified data gaps will be incorporated in the Management Zone Report (Sub-Task 4.9).

Sub-Task 4.4 Develop Methodology to Characterize Historic/Ambient Groundwater Quality, Assimilative Capacity, and Long-Term Trends for the Archetype Area

The methodologies to determine ambient groundwater quality, best water quality attained since 1968, and existing assimilative capacity at a higher resolution will be developed for the Management Zone. Examples of existing methodologies from previous projects in the Central Valley and other regions of the state will be summarized and considered, including the approaches used for the Santa Ana Region³⁰.

The development and application of methodology in the archetype area to be modeled will entail a characterization of historical and existing ambient groundwater quality and existing assimilative capacity on a 1 square mile grid or finer as appropriate. Long-term trends in groundwater quality will be evaluated. A statistical trend analysis will be employed to evaluate potential trends in the historical record of groundwater quality data on various scales. For example, the trend analysis may be employed to determine potential trends for 1) the Alta Irrigation District as a whole; 2) potential sub-Management Zone boundaries; 3) different areas receiving surface water deliveries or areas relying on groundwater; and/or 4) areas within finer resolution zones as defined with input from the Stakeholder Lead. This analysis will help to identify areas of emerging concern, areas where improvements in recent groundwater quality might be observed, and confirm areas where continued degradation exists.

This Sub-Task will consider the following factors, to the extent possible using available information:

- Different data sources to assure water quality values are representative of the key aspects of a particular area (e.g., not only relying on public supply well data, but also including water quality data representing other facets of groundwater use and availability);
- The required amount of data both spatially (areal and vertical) and temporally to make decisions regarding ambient water quality, best water quality attained since 1968, and existing assimilative capacity;
- The quality of data needed (and what to do when non-ideal data are available);
- The necessity, ability or validity of linking groundwater quality to well construction information;
- The handling of outliers and anomalies (QA/QC);
- Spatial and temporal variability, especially when determining the time period of analysis;

³⁰ Resolution No. R8-2004-0001 and R8-2012-0002 and corresponding documents for the Santa Ana Region Salt Management Plan.

- Aspects pertaining to aquifer heterogeneity and linking portions of the aquifer to particular water volumes with associated TDS and nitrate concentrations to estimate historical and ambient mass amounts and volume-based concentrations;
- How the characteristics of the data lend themselves to determining the assimilative capacity, based on the estimates of ambient historic or existing water quality; and
- Methods consistent with interpretation of the state’s Antidegradation Policy (SWRCB Resolution 68-16), supporting local SNMP development, and consistent with the SWRCB Recycled Water Policy.

Data requirements for the various tasks and potential problems that may arise from data limitations as they become evident will inform the methodologies employed in this approach. Detail on the methodologies developed for the archetype area, the calculation methods utilized, and example calculations to support data handling and management decisions will be documented in the Management Zone Report.

This Sub-Task will also evaluate the potential application of the methodologies developed for the Management Zone archetype to other areas of the Central Valley and make recommendations for potential alternative methodologies at other scales (i.e., the various types of areas that may become future Management Zones as described in the ICM Task 4 Report) such as:

1. A small scale (POTW);
2. A mid-range scale (the Modesto subarea from the ICM Report, groundwater subbasin, etc.); or
3. A large scale (a hydrologic unit; and/or multiple subbasins).

The methodology for assigning ambient groundwater quality, best groundwater quality attained since 1968, and assimilative capacity for areas outside of the Central Valley Floor, will be evaluated in the context of the methodology developed and applied in the Alta Irrigation District boundary. This evaluation will serve as methodology guidance and will be documented in the Task 5 deliverable.

Deliverables: The archetype area methodology and results will be summarized as a part of the Management Zone Report (Sub-Task 4.9). The summary will provide detail on the methodologies developed, the calculation methods utilized, example calculations and step-by-step decision trees to support data handling and management decisions.

A discussion of the application of the methodologies at different scales will be documented in the Task 5 deliverable.

Sub-Task 4.5 Present Interim Findings for the Management Zone Archetype

The LWA Team is recommending holding a conference call presentation with the PC and the Stakeholder Lead to present the interim findings from Sub-Tasks 4.1 through 4.4 as well as a presentation to the EC. It is assumed that the Stakeholder Lead will be updated periodically throughout the progress of Task 4. Hence, the proposed presentation in Sub-Task 4.5 will provide a more formal presentation of the work that has occurred to this point for the Management Zone area stakeholders and PC.

Deliverables: Detailed presentation to the PC and Stakeholder Lead via conference call showcasing the characterization and interim findings from Sub-Tasks 4.2 through 4.4.

Sub-Task 4.6 Update Archetype Area Model

Based on the results from the data gathering effort in Task 4.3, the CVHM model inputs would be updated to reflect refined hydrologic data within the archetype area boundaries. To the extent

available, updated well pumping information (including well screen information, location, and amounts), diversion information (location, amounts), and other potential data will be input into the existing CVHM model. The LWA Team will convert the transient 42.5 year CVHM model time period into a steady state model in the archetype area, representing the last 20 years of the model's input (i.e., from 1983 to 2003), as this 20-year period was the focus of the ICM work, and the bulk of the existing data and research will be contained within that period. The advantage of converting CVHM to steady state will be the ability to move water, salt, and nitrate around for a longer period of time (the simulation will not be limited to a historical period of April 1961 to September 2003, but it will have the flexibility to simulate conditions beyond 42.5 years). This will enable an analysis of mass loading to be more meaningful, since, as learned from the ICM analysis in the Kings Subbasin, salt and nitrate take more than 20 years to reach depths where most public supply wells are pumping. By necessity, and as described above, the actual model area boundaries will be larger than the footprint of the Alta Irrigation District boundary³¹, but analysis of the movement of water, salt, and nitrate will be limited to within the District's boundary. In order to interpret the effects of various management changes, it is beneficial to utilize this type of steady state modeling that would be unconstrained by time. It is anticipated that, with the updated inputs from the data received from stakeholders, there may be a need to recalibrate this smaller local CVHM-derived model for the archetype area. This will be a local calibration and is not expected to be a lengthy calibration, as the CVHM tool has already undergone its own Valley-wide calibration.

Mass loading scenarios from the ICM work will also need to be revisited based on data updates from Task 4.3. Previous estimates (for example, Task 7 of the ICM) were developed in structured analyses. This facilitates changing of assumptions and input data as new or refined inputs become available. Since there is no Watershed Analysis Risk Management Framework (WARMF) coverage in this area, the mass loadings of salt and nitrate will rely on the adjustment of loading rates (by land cover class) from a nearby IAZ that had WARMF coverage in the ICM.

Deliverables: This information will be summarized as a part of the Sub-Task 4.9 deliverables

Sub-Task 4.7 Develop Salt and Nitrate Management Goals

Based on the results of Sub-Task 4.6 and key state and federal regulations, the LWA Team will work closely with the Stakeholder Lead and stakeholders to develop Salt and Nitrate Management Goals for the Management Zone archetype. The types of goals that may be considered include:

- Provide a safe drinking water supply;
- Support Recycled Water Policy stormwater recharge and reuse goals;
- Implement enhanced source control programs;
- Maintain or improve existing water quality; or
- Limit future degradation of groundwater through implementation of salt and nitrate management alternatives.

A targeted approach for developing the management goals will be to focus on areas of highest concern, such as existing hotspots and areas of emerging concern. Although the goals are non-binding, they will assist the stakeholders and LWA Team in providing a means to test the salt and/or nitrate management options or policies that could be established for the Management Zone.

³¹ Considerations relating to model grid and layering refinement will be assessed.

Deliverables: This information will be summarized as a part of the Management Zone Report (Sub-Task 4.9)

Sub-Task 4.8 Develop Short and Long-Term Strategies for Salt and Nitrate Management

Utilizing results from the above Sub-Tasks, as well as the interim and/or final work products from other CV-SALTS related work efforts (Sub-Task 2.2), the LWA Team will, in conjunction with the Stakeholder Lead, identify short and long-term strategies for managing salt and nitrate in the Management Zone that will assist in meeting the goals outlined in Sub-Task 4.7. In order to develop the strategies, a modeling analysis will be conducted with agreed-upon assumptions regarding modifications to anthropogenically controllable variables, such as mass loadings, pumping regimes, diversion amounts, and irrigation practices. Scenario options will be developed in coordination with the Stakeholder Lead and key stakeholders. From these discussions, three scenarios will be analyzed in order to evaluate the effectiveness of the salt and nitrate management strategies. Salt and nitrate management scenarios that may be considered include the following:

- Modify the proportions of source water (surface water to groundwater) and determine what affect that has on mass loadings and resultant groundwater quality over time;
- Modify how nutrients are managed for a majority/particular land use and determine what affect that has on mass loadings and resultant groundwater quality over time; and/or
- Modify the recharge environment and determine resulting mass loadings and groundwater quality trends: perhaps by simulating artificial recharge in areas where groundwater banking is desired; implementing water conservation measures which results in less applied water and less recharge; etc.

To the extent that it is supported by CVHM, the strategy development and analysis will include a) reasonable assurance analysis to demonstrate whether implementation of the strategies achieve the salt/nitrate management goals for the Management Zone; b) identification of key projects that could be implemented and the benefit of each; c) policy issues that need to be addressed through the Central Valley SNMP and Basin Plan amendment to provide the necessary regulatory support to implement the strategy; and d) whether the strategy will meet the expected groundwater and surface water requirements.

The results from the modeling will be used to determine if short- and/or long-term goals can be reasonably achieved with the proposed strategy. Results from the evaluation will help lay the framework for approaching salt and nitrate management strategies in other regions of the Central Valley.

Deliverables: This information will be summarized as a part of the Sub-Task 4.9 deliverables

Sub-Task 4.9 Prepare a Management Zone Report

The LWA Team will develop a report to document the findings from Task 4. The report will contain a summary of the following:

- The data used for characterization of the archetype area;
- The characterization and analysis, including the process and steps used;
- The developed methodologies and application of methodologies for current ambient groundwater quality, best groundwater quality attained since 1968, and assimilative capacity;
- The baseline modeling results;
- The approach for the development of management goals and management strategies for sustainable salt/nitrate management;
- The simulation results from Sub-Task 4.8 exemplifying future project salt and nitrate concentrations from possible implementation approaches for the Management Zone; and
- The maps, time series plots, and tables illustrating the results of the detailed analysis of salt and nitrate.

This report will be prepared in such a way that it will provide a template and/or guidance describing the process and steps for local SNMP development. The report will make recommendations and discuss the requirements necessary for completing data and modeling analyses, and include lessons learned that can be applied more generally in the development of other local SNMPs across the Central Valley. This report will complement the guidance developed for an Appendix in the Preliminary Draft SNMP (Task 5 deliverable).

Deliverables: *Draft Report*
 Final Report incorporating comments
 Completed Comment Response matrix

Task 5 – Prepare Preliminary Draft SNMP

The purpose of this task is to compile existing information developed to date through CV-SALTS, and prepare a Preliminary Draft SNMP for the entirety of the Central Valley Regional Water Quality Control Board jurisdiction based on the compiled information. The Preliminary Draft SNMP will support the overall mission of CV-SALTS and meet the requirements of the Recycled Water Policy. The CV-SALTS Mission is to develop an overarching SNMP for the Central Valley to address salinity and nitrate concerns at a high level in a comprehensive, consistent, and sustainable manner. The goals include:

- Sustain the Valley’s lifestyle;
- Support regional economic growth;
- Retain a world-class agricultural economy;
- Maintain a reliable, high-quality water supply; and
- Protect and enhance the environment.

The principles that will guide the development of the Preliminary Draft SNMP include the following:

- The SNMP will be developed for the entirety of the Region 5 jurisdiction and will provide the default regulatory and management approach for evaluating and managing salts and nitrates;
- Local SNMPS may be developed in the future, both others, as needed in order to provide additional refinement for the data and/or associated analyses and/or to take other local considerations into account;
- The SNMP will be developed based on work that has been completed to date through CV-SALTS (existing information, which includes Phase II Tasks 2-4)³²;
- The SNMP will be written so that it is user friendly and provides a balanced level of information and guidance; however, detailed technical information will be referenced. The document will also identify how the Phase I and Phase II work are being used to support the development of the SNMP and how it may also be used to support the development of future local SNMPS; and
- As identified in **Figure 1**, the SNMP developed during Phase II is a Preliminary Draft document that will be completed and supplemented with additional information as a part of the CV-SALTS Phase III effort.

The steps for the development of the SNMP include:

- Development of an annotated table of contents (TOC) (see **Attachment A**).
 - The annotated TOC, which was developed as a part of this Workplan, proposes a structure for the SNMP and identifies the key appendices that would provide guidance for the development of local SNMPS. The TOC identifies the following:
 - Major sections and sub-sections;
 - Purpose of each major section;
 - How each section will fulfill the requirements of the Recycled Water Policy;
 - The primary sources of information that will be used to develop each section; and
 - Potential data gaps.

³² No new original research or studies will be conducted as a part of this task.

- Sub-Task 5.1 – Update the TOC as needed and discuss changes with the EC.
- Sub-Tasks 5.2 and 5.3 – Prepare the Draft and Final Preliminary Draft SNMP (this will allow the data and analyses completed to date to drive the approach for the development of the SNMP).

Among the items shown in **Attachment A**, the Preliminary Draft SNMP will include the following:

- A summary by groundwater basin/subbasin of the IAZ scale ambient groundwater quality characterization (based on the ICM findings), and existing assimilative capacity (based on the ICM findings). Groundwater quality characterization for most groundwater basins/subbasins will be at the coarse IAZ scale, except for the higher resolution examples developed for the Management Zone area and the two Phase I focus areas (Modesto region and Kings Subbasin).
- A cursory characterization of the Region 5 jurisdiction outside the Central Valley Floor will be provided. Information pertaining to surface water and groundwater quality conditions will be based on the data collected and analyses conducted for the Phase I ICM Report and the groundwater data update from Phase II, Task 3.
- A description of the methodologies developed to assess ambient groundwater quality and assimilative capacity. Additionally, considerations relating to future assimilative capacity will be described based on the Management Zone area. The methodologies for ambient groundwater quality, assimilative capacity, and future assimilative capacity will be included in an Appendix in the Preliminary Draft SNMP.
- Considerations for the development of a Management Zone will include examples of existing methodologies from previous projects in the Central Valley and the state, including the approaches used for the Santa Ana Region. The importance of various factors for the determination of Management Zones will be hypothetically described based on the existing information and results developed from the archetype area (Task 4). Factors to be considered during delineation of Management Zones will be included in an Appendix in the Preliminary Draft SNMP.
- An appendix in the Preliminary Draft SNMP will include guidance for the development of a regional/local SNMP.

Due to the aggregated level of information and coarse scale of analysis for Central Valley groundwater basins/subbasins, and other necessary information for an SNMP, the Preliminary Draft SNMP will not provide all the necessary information needed for a local SNMP.

It is anticipated that the body of the DRAFT Preliminary SNMP will be about 100-125 pages and that it will reference, rather than incorporate, other supporting documents³³. Given the budget and time constraints for this task, it is critical that the content and level of detail for the SNMP be discussed and agreed upon with the PC and/or EC prior to initiating this task.

³³ For example, basin and subbasin descriptions will be sourced only as referenced – there will be no new analyses, nor will there be an exhaustive effort to find basin/subbasin information outside of readily available references (the ICM IAZ work from Phase I, DWR’s Bulletin 118, and other USGS studies).

Sub-Task 5.1 Review and Update the TOC as Needed

Based on the annotated TOC for the SNMP (**Attachment A**) and other CV-SALTS technical and policy work, the Team will identify any recommended changes to the structure and content of the SNMP. The recommended changes will be provided for EC review and approval³⁴.

*Deliverables: Recommended changes for the TOC for EC review and approval
Revised annotated TOC as needed*

Sub-Task 5.2 Prepare a DRAFT Preliminary Draft SNMP

Based on the results of Sub-Task 5.1 and the outcomes of Tasks 2-4, the LWA Team will develop a first version of the Preliminary Draft SNMP. The document will utilize the technical work completed for CV-SALTS (for both Phases I and II) and SSALTS to inform development of the Draft Preliminary Draft SNMP, and will include examples and guidance for the development of regional or local SNMPS.

Given the timeframe in which the Preliminary Draft SNMP needs to be completed and the importance of the document, once the Draft Preliminary Draft SNMP is underway, the LWA Team will present and discuss the SNMP document at a joint EC/PC meeting. This will allow the PC members, as well as other CV-SALTS TAC and EC members, the ability to walk through the document and ask key questions in an open discussion format. This information obtained through the meeting and written comment period will be used to develop the full Draft Preliminary Draft SNMP³⁵.

*Deliverables: Preliminary Draft SNMP for review by the EC (PC and/or TAC as needed)
Participation in a meeting to present the DRAFT SNMP
Summary of key comments from the meeting*

Sub-Task 5.3 Prepare a FINAL Preliminary Draft SNMP and Response to Comments

Based on the results of Sub-Task 5.2, the LWA Team will develop a Final Preliminary Draft SNMP for review and approval by the EC. Coordination with the PC and/or TAC will be conducted as needed.

*Deliverables: Final Preliminary Draft SNMP incorporating comments
Completed Comment/Response matrix*

³⁴ Given the budget and time constraints, it is critical that the content and level of detail for the SNMP be discussed and agreed upon with the PC and/or EC before the initiation of work on this task.

³⁵ If it is determined by CV-SALTS that this meeting is not necessary, the corresponding budget will be used to develop the Draft SNMP.

Project Schedule

The project schedule presented herein (see **Attachment B**) pertains to the activities and deliverables as described in this Workplan. This schedule has been developed based upon the specified deliverables and to identify how the project tasks will be coordinated with the various CV-SALTS Committees. As such, the schedule identifies the deliverables dates and necessary review times with the various Committees in order to finalize the documents.

The time frame for the project requires compression of a great deal of analysis and consultation into a short duration. Such a schedule naturally constrains the time available for the LWA Team to develop, revise, and finalize analyses and work products, as well as time available for crucial consultation and review with CV-SALTS Committees and stakeholders. Adherence to the proposed schedule will require that work product development and review timelines be met. Should certain schedule steps require additional time (which may occur for a variety of reasons); the LWA Team would take all reasonable measures to accommodate the changes while minimizing disruption to other schedule elements. However, delayed completion of schedule elements can cause delays in completion of other related work. The LWA Team will, in all instances, promptly identify the best possible manner to rectify the schedule and communicate a revised schedule to the TPM and/or CV-SALTS leadership.

Use of a scheduling tool such as Microsoft Project will help to facilitate clear communication between the LWA Team and the TPM and CV-SALTS Leadership so that progress and scheduling constraints can be identified, as well as upcoming deliverables and review times. Parameters used to frame this schedule included the following:

- The Contractor Agreement will be executed and the Notice to Proceed will be issued by March 10, 2014;
- The Phase II Conceptual Model Technical Services will be completed between March 2014-April 2015;
- It is assumed that the CV-SALTS EC and TAC will each meet monthly; and
- It is assumed that all reviews and approvals of work products will be completed within the timeframes identified within the schedule.

In general, the schedule will be reviewed and revised as needed during the completion of the tasks described in the Workplan and in consultation with CV-SALTS.

Cost Estimate

The detailed cost estimate is provided in **Attachment C**. The cost estimate includes the following for each Task/Sub-Task:

- The total estimated hours, labor costs, direct costs, and total costs for each major task; and
- Assumptions/ key factors that drive the cost of the task.

It should be noted that, in order to keep costs down and assist CV-SALTS with the completion of this work, the prime consultant (LWA) did not include the standard 10% markup on the subconsultant's costs for the project. **Table 1** provides a summary of the costs for each Task/Subtask.

Table 1. Budget Summary by Task

Task	Task Description	Estimated Cost
Task 1	Workplan Development	\$25,000
Task 1 Sub-Total		\$25,000
Task 2	Management and Coordination Activities	
2.1	Coordination Meetings	
	LWA Team Calls	\$22,380
	Kickoff Meeting	\$7,030
2.2	Coordination Meetings with CV-SALTS Management	
	PM Calls	\$16,340
	Coordination with the Project Committee	\$15,100
	Coordination with the Technical Advisory Committee	\$14,740
	Coordination with the Executive Committee	\$22,570
2.3	Coordinate with and/or Provide Support to Other CV-SALTS Related Technical Projects	\$3,060
2.4	Maintain Relevant Project Documents, Files, and Data	\$2,200
2.5	Provide Monthly Progress Reports	\$11,920
Task 2 Sub-Total		\$115,340
Task 3	Groundwater Data Refinements and Updates to support Salt, Nitrate, and Water Balance Estimates for the Archetype Area, SNMP, and Future Work	
3.1	Revise ICM Database – Geotracker GAMA Issues	\$9,160
Task 3 Sub-Total		\$9,160

Task	Task Description	Estimated Cost
Task 4	Management Zone Archetype Analysis ³⁶	
4.1	Develop Boundaries of the Management Zone and Identify Stakeholders	\$4,710
4.2	Conduct a Task Kickoff Meeting	\$9,650
4.3	Complete Management Zone Characterization	\$37,328
4.4	Develop Methodology to Characterize Historic/Ambient Groundwater Quality, Assimilative Capacity, and Long-Term Trends for the Management Zone Area	\$44,740
4.5	Present Interim Findings	\$9,150
4.6	Update Management Zone Area Model	\$52,840
4.7	Develop Salt and Nitrate Management Goals	\$5,660
4.8	Develop Short and Long-Term Strategies for Salt and Nitrate Management	\$63,700
4.9	Prepare a Management Zone Report	
	Prepare a Draft Management Zone Report	\$52,160
	Prepare a Final Management Zone Report	\$16,590
Task 4 Sub-Total		\$296,528
Task 5	Prepare Preliminary Draft SNMP	
5.1	Review and Update the TOC as Needed	\$3,075
5.2	Prepare a DRAFT Preliminary Draft SNMP	\$91,004
	Draft SNMP Workshop	\$10,390
5.3	Prepare a FINAL Preliminary Draft SNMP and Response to Comments	\$24,420
Task 5 Sub-Total		\$128,889
Total		\$574,971³⁷

³⁶ The LWA Team was notified by KCRD contractors that an additional \$3,700 may be necessary in order to obtain data from the KCRD area.

³⁷ For contracting purposes, this total will be rounded to \$575,000.

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Attachment A – Annotated Outline for Preliminary Draft SNMP

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Table A-1. Annotated Outline for the Preliminary Draft SNMP³⁸

	Section ²	Purpose	Recycled Water Policy Requirements ²	Primary Sources of Information	Potential Data Gaps
	Executive Summary				
Introduction and Background	1. Introduction and Background	This section will identify the purpose and need for the SNMP, the objectives and the organization of the document, and the relationship between the Central Valley-wide SNMP and the Regional/Local SNMPS that may be developed.	This section will include a general discussion of the Recycled Water Policy and the specific SNMP requirements contained in section 6 of the Policy.	The primary sources of information for this section may include: <ul style="list-style-type: none"> • Methodologies developed in the ICM Report and refined in Phase II Task 4 • The regulatory documents listed in section 1.c. • CEQA Scoping meeting documents for the SNMP • Other SNMPS that have been developed in California, including, but not limited to the Santa Ana Region Salt Management Plan 	None identified at this time.
	a. Purpose				
	b. Plan Objectives and Organization				
	c. Regulatory Framework <ul style="list-style-type: none"> i. Recycled Water Policy ii. Regional Water Quality Control Plan iii. Resolution 68-16 				
	d. SNMP Development and Implementation <ul style="list-style-type: none"> i. Process for the SNMP Development and Approach for Implementation (Appendix A) ii. Process for Regional/Local SNMP Development (Appendix B) and Approach for Implementation 				
	e. SNMP Review and Revision				
Central Valley and Basin Characterization	2. Characterization of the Central Valley¹ (Appendix C)	This section will provide an overview of the physical setting of Region 5, including hydrogeologic and hydrologic characteristics of the hydrologic regions and summary information on a basin/subbasin basis, as available. The information in this section is not intended to duplicate other published documents or to provide detailed site-specific information.	This section will support the Recycled Water Policy requirements by providing foundational information on a basin-wide basis relating to the management of salt and nitrate at regional and subregional scales for long-term sustainable use of water in California.	This will not be an exhaustive effort, and will refer to previously published works. The primary sources of information would largely cite to: <ul style="list-style-type: none"> • ICM Report • CV-SALTS GIS reports and database • DWR's Bulletin 118 (if available) • DWR's Water Plan Update (2013) • USGS CVHM Report 	Basins without existing characterization (Bulletin 118) will need to be investigated during the development of a local SNMP.
	a. Overview				
	b. Physical Description <ul style="list-style-type: none"> i. Climate ii. Land Cover and Land Uses iii. Water Sources and Demands 				
	Surface Water, Delivered Water, Imported Water, Recycled Water				
	c. Watershed Boundaries				
	d. Basin and Sub-basin Boundaries				
	e. Geology				
	f. Hydrogeology/Hydrology				
	g. Aquifers (Water Level Trends, Flow Directions, Changes in Storage, Groundwater Production)				

³⁸ This annotated table of contents illustrates the type of information that may be included within the SNMP. However, given the budget and time constraints, it is critical that the content and level of detail for the SNMP be discussed and agreed upon with the PC and/or EC prior to the development of the SNMP sections. The body of the SNMP will be approximately 100-125 pages.

		h. Recharge Areas				
	3.	Characterization of the Groundwater Basin(s)	<p>This section will provide a general characterization of the groundwater basins within the Region 5 boundary. This section will also inform the Monitoring Program to be developed as part of the Phase III CV-SALTS Workplan.</p> <p>The groundwater portion of this characterization will utilize the delineation of the upper portion of the aquifer that represents a 20-year travel time as well as the lower aquifer where most groundwater production may occur (ICM results).</p>	<p>This section will include a discussion for the following requirement:</p> <ul style="list-style-type: none"> 6.b.(3)(d) – Salt and nutrient source identification, basin/sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients. 	<p>The primary sources of information for this section may include:</p> <ul style="list-style-type: none"> ICM Report Methodologies developed in the ICM report and refined in Phase II Task 4 <p>This will not include any additional outreach except as related to Task 4.</p>	<p>The groundwater quality database is limited in information related to well construction information, which constrains the ability to associate most of the groundwater quality values with a particular portion of the aquifer. The exception to this is in the Alta Irrigation District area of Kings Subbasin, where some linkage between well construction and water quality measurements will be performed in Phase II Task 4.</p> <p>To date, there is no integrated, refined, higher resolution characterization of salt and nitrate conditions in groundwater in Region 5. The results from the Phase I IAZ analysis will be provided, but have been proven to be too coarse for management purposes.</p>
		a. Groundwater Quality				
		b. Surface Water Quality				
		c. Delivered Water Quality				
		d. Imported Water Quality				
	e. Recycled Water Quality					
Basin Evaluation	4.	Basin Evaluation – Water Balance	<p>This section will broadly describe water budget components at the Central Valley and regional hydrologic unit scales, along with summaries of water budget components at the IAZ scale. The basis for computing assimilative capacity at regional/subregional scales will be described.</p>	<p>This section will include a discussion for the following requirement:</p> <ul style="list-style-type: none"> 6.b.(3)(d) – Salt and nutrient source identification, basin/sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients. 	<p>The primary sources of information for this section may include:</p> <ul style="list-style-type: none"> ICM Report 	<p>Outside of the Central Valley Floor, these balance calculations have not been performed, and will need to be performed for the local SNMP.</p>
		a. Conceptual Model				
		b. Basin Inflow/Outflow				
		c. Water Movement within the Basin				
		d. Infiltration, Evaporation, Evapotranspiration				
		e. Recharge Mechanisms				
		f. Baseline Condition				
	5.	Basin Evaluation – Salt and Nitrate Balance	<p>This section will describe the integrated relationship between surface and groundwater resources in Region 5.</p>	<p>This section will include a discussion for the following requirement:</p>	<p>The primary sources of information for this section may include:</p>	<p>No loading estimates exist for outside of the Central Valley Floor.</p>
	a. Conceptual Model					

Management and Implementation		b. Salt and Nitrate Source Identification and Loading Estimates	groundwater resources in Region 5. It will provide a broad description of salt and nitrate sources and loading estimates. This section will describe estimated and projected assimilative capacities (at high resolution) on the IAZ scale and also provide guidance for future local SNMPs applications.	<ul style="list-style-type: none"> 6.b.(3)(d) – Salt and nutrient source identification, basin/sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients. 	<ul style="list-style-type: none"> ICM Report Methodologies developed in the ICM Report and refined in Phase II Task 4 	Valley Floor. Projected Assimilative Capacity will only be available for the Management Zone area as a result of Phase II Task 4.
		c. Import/Export				
		d. Assimilative Capacity (Existing and Projected)				
		e. Fate and Transport				
		f. Baseline Condition				
		6. Basin Evaluation - Projected Water Quality	This section will summarize groundwater quality trends and projected groundwater quality, especially for the central Valley Floor. In basins and subbasins outside the Valley Floor, groundwater quality trends will be described as data allow; but this will not include estimates of projected groundwater quality.	This section will include a discussion for the following requirement: <ul style="list-style-type: none"> 6.b.(3)(d) – Salt and nutrient source identification, basin/sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients. 	The primary sources of information for this section may include: <ul style="list-style-type: none"> ICM Report Methodologies developed in Phase II Task 4 	No future projected water quality outside of the Central Valley Floor.
		a. Groundwater and Surface Water Quality Trends				
		b. Projected Groundwater and Surface Water Quality				
		7. Salt and Nitrate Management Goals	This section will present the goals and objectives for using recycled water and stormwater within the Region 5 jurisdiction. This section will also recognize the need to define additional goals, as needed, on a regional/local basis.	This section will include a discussion for the following requirement: <ul style="list-style-type: none"> 6.b.(3)(c) – Water recycling and stormwater recharge/use goals and objectives. 	The primary sources of information for this section may include: <ul style="list-style-type: none"> CEQA Scoping meeting documents for the SNMP Stormwater Permits 	None identified at this time.
		c. Water Recycling				
	d. Stormwater Recharge and Use					
	8. Salt and Management Strategies and Implementation Measures	This section will present potential salt and nitrate management strategies aligned with the goals and objectives for long-term sustainable use of water in California. This section will also identify the range of implementation measures that may be used by each of the following sectors: <ul style="list-style-type: none"> Agricultural Dairy Industrial Municipal Wastewater Management Municipal Stormwater Management This section will also recognize the need to define the specific implementation	This section will include a discussion for the following requirement: <ul style="list-style-type: none"> 6.b.(3)(e) – Implementation measures to manage salt and nutrient loading in the basin on a sustainable basis. 	The primary sources of information for this section may include: <ul style="list-style-type: none"> Methodologies developed in Phase II Task 4 SSALTS Documents Information from the work being completed for the Lower San Joaquin River Committee 	None identified at this time.	
	a. Ongoing Management Programs					
	b. Implementation Measures					
	c. Integration with Other Programs					
	d. Implementation Schedule					

			measures on a regional/local basis.			
	9. Basin Monitoring Program		This section will be developed as a part of the Phase III CV-SALTS Workplan.	This section will include a discussion for the following requirement:	N/A	N/A
	a. Goals and Objectives					
	b. Monitoring Program Approach (Appendix E)					
		c. Reporting				
	10. References					
		Antidegradation Analysis (This will be developed as a part of Phase III for the BPA)	Meet requirements of State and federal antidegradation policies as required for Basin Plan Amendment and Recycled Water Policy	This section will include a discussion for the following requirement:		None identified at this time.
		a. Regulatory Requirements		<ul style="list-style-type: none"> 6.b.(3)(f) – An antidegradation analysis demonstrating that the projects included within the plan will, collectively, satisfy the requirements of Resolution No. 68-16. 		
		b. Methodology				
		c. Results				
		d. Conclusions				
Appendices	A.	Stakeholder Process for Development of the Central Valley Preliminary Draft SNMP	Describe CV-SALTS stakeholder process and active participants	N/A	The primary sources of information for this section may include:	None identified at this time.
					<ul style="list-style-type: none"> ICM report CEQA Scoping Documents CV-SALTS Outreach Materials Information developed in Phase II Task 2 Deliverables 	
	B.	Guidance for the Development of a Regional/Local SNMP	Provide direction and guidance for local entities seeking to develop a local SNMP	N/A	The primary sources of information for this section may include:	None identified at this time.
					<ul style="list-style-type: none"> Phase II Task 4 Deliverable 	
	C.	Methodology for Determining Existing Water Quality, Best Water Quality Attained Since 1968, and Assimilative Capacity	Provide the methodology for determining existing water quality, best attainable water quality attained since 1968, and assimilative capacity on various scales.	N/A	The primary sources of information for this section may include:	Examples will be limited to existing information and results for the ICM focus areas (Modesto region and Kings Subbasin) and the Management Zone area application for Phase II Task 4.
					<ul style="list-style-type: none"> Information developed in ICM Report and refined in Phase II Task 4 Deliverables 	

	D.	Methodology for Delineating Management Zones	Provide discussion of factors to be considered when delineating a Management Zone boundary, which may also serve as the area of interest for purposes of a local SNMP. The delineated Management Zone may also serve as one of many Management Zones under the umbrella of a larger regional SNMP.		The primary sources of information for this section may include; <ul style="list-style-type: none"> • ICM Task 4 Report • Archetype area analysis with Alta Irrigation District • Management Zone application and related considerations for other Management Zone scales from Phase II Task 4 	The Management Zone is Alta Irrigation District. The delineation of Management Zones will be based on hypothetical examples and considerations.
	E.	Guidance for the Development of a Basin Monitoring Program (To Be Developed as a part of Phase III)	N/A	N/A	N/A	None identified at this time.

¹ – This characterization will include the entire Central Valley Regional Water Quality Control Board jurisdiction

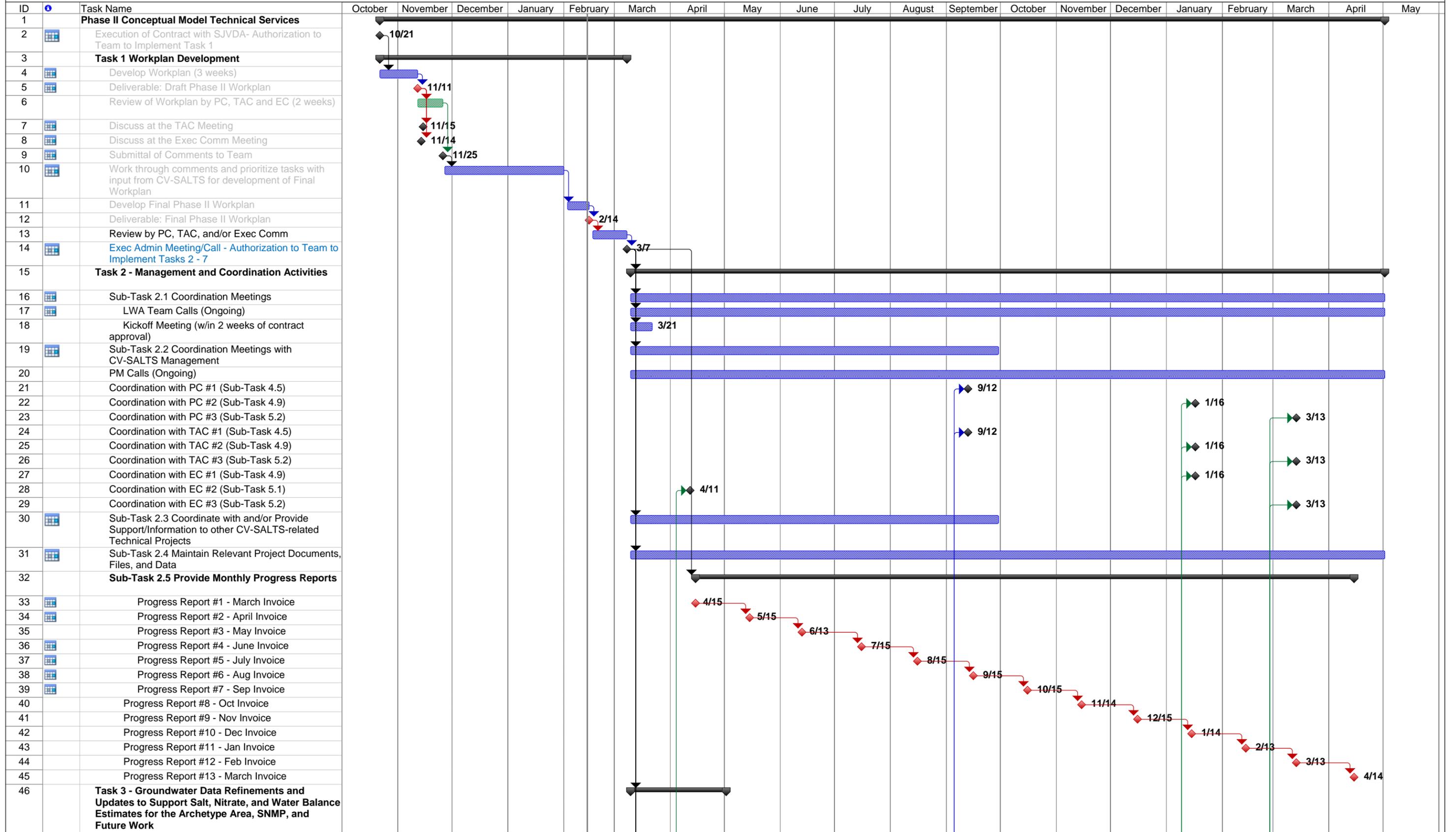
² – The items in red are required pursuant to the Recycled Water Policy

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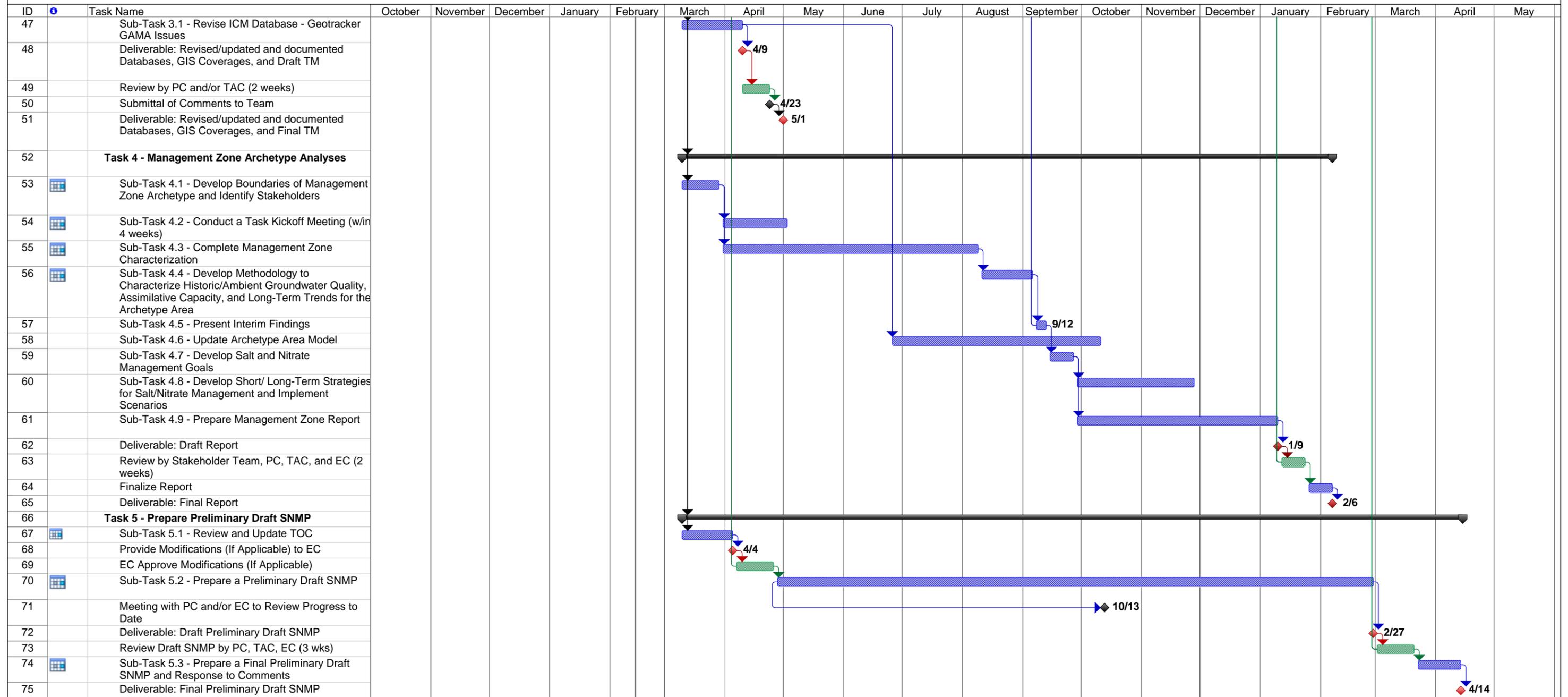
Attachment B - Detailed Schedule

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CV-SALTS
Phase II Conceptual Model Technical Services -General Project Schedule



CV-SALTS
Phase II Conceptual Model Technical Services -General Project Schedule



Attachment C - Detailed Budget

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CV-SALTS
Fee Proposal Estimate for Phase II Conceptual Model Services

Task	Job Title/Classification	Larry Walker Associates					PlanTierra			Luhdorff & Scalmanini				Kennedy/Jenks			Carollo Engineers			Systech Water Resources				Formation Environmental			Giorgos Kourakos			Estimated Fee Proposal					
		Tom Grovhoug	Karen Ashby	Danielle Moss	Michelle Boeckx	Other Direct Costs	John Dickey	Other Direct Costs	Sub-Total	Vicki Kretsinger	Barb Dalglish	Dylan Boyle	Other Direct Costs	Sub-Total	Gary Carlton	Sevim Onsoy	Other Direct Costs	Sub-Total	Lydia Holmes	Penny Carlo	Other Direct Costs	Sub-Total	Joel Herr	TBD	Other Direct Costs	Sub-Total	Brian Schmid	Chong/Chad Lupp	Other Direct Costs		Sub-Total	Giorgos Kourakos	Other Direct Costs	Sub-Total	
		Principal \$275	Principal \$255	Project Staff \$150	Project Staff \$140		Principal Scientist \$215	Other Direct Costs		Principal Hydrologist \$195	Project Hydrogeologist \$165	Staff Hydrogeologist \$125	Other Direct Costs		Engineer-Scientist Specialist 9 \$245	Engineer-Scientist Specialist 5 \$185	Other Direct Costs		Senior Professional \$269	Lead Project Professional \$248	Other Direct Costs		Principal \$180	Project Engineer \$140	Other Direct Costs		Senior Scientist 1 \$167	Associate Scientist 1 \$115	Other Direct Costs			Principal \$120	Other Direct Costs		
Task 1. Workplan Development¹		Assumptions					\$ 11,500	\$ 2,000	\$ 9,000	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500	\$ 25,000
	Develop Workplan - Draft, with detailed budget & schedule		17	12	2		\$ 6,415	6	\$ 1,290	8	32		\$ 6,840	2		\$ 490		2		\$ 496	3			\$ 540	3		\$ 543	4		\$ 480	\$ 17,094				
	Develop Workplan - Final with Comment Response matrix		12	12	2		\$ 5,070	4	\$ 753	3	10		\$ 2,138			\$ -				\$ -			\$ -			\$ -			\$ -	\$ 7,960					
Task 2. Management and Coordination Activities		Assumptions					\$ 71,540	\$ 12,930	\$ 30,870	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 115,340
2.1	Coordination Meetings						\$ -		\$ -				\$ -			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -			
	LWA Team Calls		24	24	3		\$ 13,140	12	\$ 2,580	24	12		\$ 6,660			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 22,380		
	Kickoff Meeting		6	8	1	\$ 90	\$ 3,920	4	\$ 890	6	6	\$ 60	\$ 2,220			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7,030		
2.2	Coordination Meetings with CV-SALTS Management						\$ -		\$ -				\$ -			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
	PM Calls		24	36	4		\$ 16,340		\$ -				\$ -			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 16,340		
	Coordination with the Project Committee (PC)		6	18	12	2	\$ 8,320	6	\$ 1,290	18	12		\$ 5,490			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 15,100		
	Coordination with the Technical Advisory Committee (TAC)			18	12	2	\$ 6,670	12	\$ 2,580	18	12		\$ 5,490			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 14,740		
	Coordination with the Executive Committee (EC)		12	20	12	3	\$ 10,870	20	\$ 4,300	20	20	\$ 200	\$ 7,400			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 22,570		
2.3	Coordinate with and/or Provide Support/Information to other CV-SALTS Related Technical Projects		4	4			\$ 1,620		\$ -	4	4		\$ 1,440			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,060		
2.4	Maintain relevant project documents, files and data				8		\$ 1,200		\$ -			8	\$ 1,000			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,200		
2.5	Provide monthly progress reports		36		2		\$ 9,460	6	\$ 1,290	6			\$ 1,170			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 11,920		
Task 3. Groundwater Data Refinements and Updates to Support Salt, Nitrate, and Water Balance Estimates for the Archetype Area, SNMP, and Future Work		Assumptions					\$ 810	\$ -	\$ 8,350	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,160	
3.1	Revise ICM Database - Geotracker GAMA Issues		2	2			\$ 810		\$ -	4	8	50	\$ 8,350			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,160		
Task 4. Management Zone Archetype Analysis²		Assumptions					\$ 82,760	\$ 47,730	\$ 139,140	\$ 1,110	\$ 1,488	\$ 2,160	\$ 15,660	\$ 6,480	\$ 296,528																				
4.1	Develop Boundaries of the Management Zone Archetype and Identify Stakeholders		4	6	1		\$ 2,770		\$ -	4	4	4	\$ 1,940			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,710		
4.2	Conduct a Task Kickoff Meeting		8	8	4	1	\$ 4,980	6	\$ 1,290	8	8	4	\$ 3,380			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,650		
4.3	Complete Management Zone Characterization						\$ -		\$ -				\$ -			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
4.3.1	Surface Water Data			40	2		\$ 6,280		\$ -				\$ -			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 6,280		
4.3.2	Groundwater Data						\$ -		\$ -	4	30	64	\$ 13,730			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,730		
4.3.3	Land Cover and Other Data						\$ -	20	\$ 4,300				\$ -			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 17,318		
4.3.4	Characterization of the Data (Included in Sub-Task 4.9)						\$ -		\$ -				\$ -	6	\$ 1,110	6	\$ 1,488	8	\$ 1,440	40	20	\$ 8,980			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -			
4.4	Develop Methodology to Characterize Historic/Ambient Groundwater Quality, Assimilative Capacity, and Long-Term Trends for the Archetype Area		20	20	8	3	\$ 12,220		\$ -	16	80	120	\$ 31,320			\$ -			\$ -			\$ -			\$ -	10	\$ 1,200	\$ 44,740							
4.5	Present Interim Findings for Management Zone Archetype		4	8	6	1	\$ 4,180	6	\$ 1,290	4	10	10	\$ 3,680			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,150		
4.6	Update Archetype Area Model		4	4	4	1	\$ 2,860	80	\$ 17,200	4	160	16	\$ 29,180			\$ -			\$ -	4	\$ 720	24	\$ 2,880	\$ 52,840											
4.7	Develop Salt and Nitrate Management Goals		2	8	16	2	\$ 5,270		\$ -	2			\$ 390			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ 5,660			
4.8	Develop Short and Long-Term Strategies for Salt and Nitrate Management		12	24	40	4	\$ 15,980	80	\$ 17,200	2	120	10	\$ 21,440			\$ -			\$ -			\$ -	40	\$ 6,680	20	\$ 2,400	\$ 63,700								
4.9	Prepare an Management Zone Report						\$ -		\$ -				\$ -			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
	Prepare a Draft Management Zone Report		16	24	60	6	\$ 20,360	20	\$ 4,300	16	72	100	\$ 27,500			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 52,160		
	Prepare a Final Management Zone Report		4	16	16	2	\$ 7,860	10	\$ 2,150	4	20	20	\$ 6,580			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 16,590		
Task 5. Prepare Preliminary Draft SNMP		Assumptions					\$ 62,125	\$ 6,480	\$ 56,120	\$ 1,470	\$ 1,614	\$ 1,080	\$ 128,889																						
5.1	Review and Update the TOC as Needed		4	4	1		\$ 2,295		\$ -	4			\$ 780			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,075		
5.2	Prepare a DRAFT Preliminary Draft SNMP		24	48	120	14	\$ 38,800	16	\$ 3,440	80	100	100	\$ 44,600	6	\$ 1,470	6	\$ 1,614	6	\$ 1,080			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 91,004		
	Draft SNMP Meeting		6	10	10	2	\$ 6,070	6	\$ 1,320	10	6	\$ 60	\$ 3,000			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 10,390		
5.3	Prepare a FINAL Preliminary Draft SNMP and Response to Comments		12	20	40	4	\$ 14,960	8	\$ 1,720	4	24	24	\$ 7,740			\$ -			\$ -			\$ -			\$ -			\$ -	\$ -	\$ -	\$ -	\$ -	\$ 24,420		
Total		192	395	438	65	\$ 430	\$ 228,720	322	\$ 60	\$ 69,183	273	750	530	\$ 320	\$ 243,458	8	6	\$ -	\$ 3,070	6	8	\$ -	\$ 3,598	21	0	\$ -	\$ 3,780	83	20	\$ -	\$ 16,203	58	\$ -	\$ 6,960	\$ 574,971

¹ The budget was adjusted so that it matches the amount approved by CV-SALTS. As a result, the values were rounded up to the nearest \$100.
² The LWA Team was notified by KCRD contractors that an additional \$3,700 may be necessary in order to obtain data from the KCRD area.

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