In July of 2017, the District was authorized as the Groundwater Sustainability Agency for the Shasta, Scott and Butte Valley Groundwater Basins by the California Department of Water Resources. The District has received a grant award, and associated cost-share waiver, from the California Department of Water Resources (DWR) for development of Groundwater Sustainability Plans for the the three basins, and portions of this grant award will be expended towards the activities outlined below. Larry Walker Associates (LWA), as Lead Consultant, is teamed with Davids Engineering, Inc., and the University of California, Davis (UC Davis) Department of Land, Air and Water Resources (LAWR) to deliver the tasks and subtasks outlined within this Exhibit. The LWA Team brings more than three decades of proven experience, extensive knowledge of statewide water quality regulations and policies, understanding of California agricultural practices and challenges, skill in developing data expertise in groundwater modeling, and ability to communicate complex data, analytical process, and modeling results to stakeholders ranging from farmers and environmental advocates to County agricultural commissioners and North Coast Water Board staff. Having previously worked together to deliver successful projects, LWA's established relationships and work processes will ensure that they deliver high-quality and responsive services. The LWA Team has experience in all relevant groundwater models and with many members of the Shasta, Scott, and Butte Valley Groundwater Basins.

Project 1: Scott Valley Groundwater Basin

1. Develop and Document Conceptual Model:

This task will provide the central technical information necessary for developing other elements of the Groundwater Sustainability Plan. Under this task, the contractor will develop the hydrogeologic conceptual model, the water budget, and the numerical integrated hydrologic model of the Scott Valley. The development of the information will be an interactive process with the GSA, advisory committee, stakeholders, and the public. The deliverables will provide the required conceptual model, numerical model, and water budget documentation for the GSP. The information will provide the basis for engagement, education, and outreach among stakeholders and a decision-support tool for the GSA in the development of sustainability criteria (minimum thresholds, triggers, measurable objectives), of monitoring networks, and for designing potential projects. This task will expand on the existing efforts by UC Davis and the groundwater advisory committee, including the groundwater study plan (Harter et al., 20081) and the subsequent development of the Scott Valley Integrated Hydrologic Model (SVIHM, Foglia et al., 20132, 20183, Tolley et al., in prep), which represent hydrologic conditions for 1991 – 2011.

Conceptual and Numerical Model

The contractor will work with GSA staff to collate and summarize current programs relevant to the GSP (including any new programs developed between proposal submittal and GSP submittal), including:

- Existing water resources monitoring and management programs;
- Land use plans and land use elements of the general plan within the basin;
- Land use plans and land use elements of the general plan outside the basin that potentially impact basin groundwater and groundwater-surface water interaction;
- Wellhead protection;
- Existing groundwater contamination sites, monitoring, and cleanup programs;

- Well abandonment and destruction programs;
- Groundwater replenishments;
- Conjunctive use;
- Diversions to storage;
- Water conservation and water recycling;
- Water conveyance;
- Efficient water management practices;
- Well construction policies;
- Groundwater management plan;
- Groundwater management practices;
- Relationship with state and federal agencies;
- Adjudications;
- North Coast Regional Water Board TMDL Program;
- North Coast IRWMP; and
- Monitoring programs of groundwater levels, groundwater quality, surface water flows, surface water quality, fish populations, groundwater-dependent ecosystems, and land subsidence.

Collate, review, summarize, and archive existing reports and data sources

As a foundation for the conceptual hydrogeologic model, water level, well construction, streamflow, water quality, climate, ecosystem monitoring data, and other relevant data will be retrieved and organized electronically. Scientific papers and technical reports that are relevant to the understanding of the groundwater basin will be assembled in an electronic library that is web-accessible, including:

- Geography, climate, and land use;
- Geology and hydrogeology;
- Description of beneficial uses and users of water;
- Streamflow, water rights, and instream flow requirements;
- Groundwater-dependent ecosystems, stream ecology related to baseflow; and
- Water quality.

Develop conceptual hydrogeologic model

The hydrogeologic conceptual model (HCM) will be developed based on a review of the conceptual model elements of the Scott Valley Groundwater Study Plan and the findings of the ongoing UC Davis numerical modeling efforts (Foglia et al., 2013, 2018). The conceptual model will include a description of the hydrology, land use, soils, geology and geologic structure, hydrogeology and aquifer system, water quality, and groundwater-dependent ecosystems in the Scott Valley groundwater basin. The conceptual model will identify the various water budget elements of the surface water system, the land use – soil system, and the groundwater system. The conceptual model will also explain the conceptual basis of relevant corresponding elements in the numerical integrated hydrologic model of the Scott Valley groundwater system. The conceptual model provides the basis for the development of the water budget and for the development of the numerical model. It provides the context and supporting information for identifying undesirable results and for developing sustainability criteria and monitoring systems. It will

be an essential tool for stakeholder education and engagement in the decision-making process. The work will be performed through a review of relevant data sources, reports and publications, leading to documentation in a report that includes maps and cross-sections. A draft report will be reviewed by the GSA and the advisory committee before it is finalized. Extend SVIHM modeling period through water year 2018 and produce model documentation.

UC Davis is currently developing a calibrated Scott Valley Integrated Hydrologic Model (SVIHM) that includes model components for the upper watershed, upstream and outside of the Scott Valley groundwater basin area, for the stream system overlying the Scott Valley groundwater basin, for the land use and soil system overlying the Scott Valley basin, and for the groundwater basin itself. SVIHM is a numerically based model system that encompasses most of the groundwater basin within the boundaries identified by DWR. We will be assembling the climate and streamflow data from 2011 through current from Scott Valley climate stations, including a CIMIS weather station in operation since 2015, to extend the model components of SVIHM through September 30, 2018. All model assumptions, model equations, and model input data will be documented in ways that will closely follow the hydrogeologic conceptual model description. Simulation results for the extended modeling period will be compared to measured data to determine whether re-calibration of the model is needed and, if that is the case, what data to be collected for re-calibration. A DWR compliant documentation of the entire modeling system will be written that includes description of the various model system components, of data sources and data preparation processes, and the model calibration process. We will document the results of the updated model with discussion of new findings. SVIHM results will include description and discussion of the following, aided by maps, graphics, and tables:

- Stream inflows to the Scott Valley from the Scott River and its tributaries;
- Land use and land use changes, including changes in cropping and irrigation systems;
- Irrigation timing and amount, by water source;
- Soil moisture changes;
- Groundwater recharge areas and amount of groundwater recharge
    - from the landscape
    - from streams
    - from major canals;
- Groundwater discharge areas and amount of groundwater discharge:
    - Groundwater pumping, including well location
    - Seepage to the landscape (groundwater discharge areas)
    - Groundwater discharge to streams (baseflow);
- Streamflows in tributaries and along the main-stem of the Scott River including the location and timing of dry stream sections; and
- Water level maps tracking the elevation of the water table in Scott Valley over the simulation period.

All input and output data will be made available digitally in addition to producing digital maps of model results in ArcGIS format and tables in MS Office compatible spreadsheet format.

Deliverables

- *Technical Memorandum: Basin setting, including hydrogeologic conceptual model*
- *Technical Memorandum: Existing program, numerical model development, including model description, input data description, model calibration, model results, and discussion of model results*
- *Digital data: web-based bibliography of resources (existing programs, literature, reports) with embedded links*
- *Digital data: maps and tables derived from the modeling results in ArcGIS shapefile and MS Office spreadsheet or database format, respectively Digital data: model simulation software, model input data.*

2. Historical Water Budget, 1991-2018

The historical water budget will be constructed using the hydrogeologic conceptual model as a framework, using the data used to develop the input to the numerical model, and applying the results from the numerical model (SVIHM) where needed. Water budgets will be derived from data for the same period as the modeling period, October 1990 through September 2018 (water years 1991 – 2018). One or multiple forecasted future water budget(s), accounting for climate scenarios, planned projects and management actions, will be developed after the Groundwater Management task is complete. The water budget will consider the following water budget components:

- Evapotranspiration;
- Agricultural water demand;
- Urban water demand;
- Managed wetlands water demand;
- Precipitation;
- Surface water deliveries;
- Groundwater extraction;
- Applied water reuse and recycled water;
- Runoff;
- Return flow;
- Surface water inflows and outflows;
- Conveyance evaporation;
- Conveyance seepage;
- Imported water;
- Exported surface water;
- Stream-lake interaction;
- Pond evaporation;
- Recharge from irrigation and precipitation;
- Subsurface inflows and outflows to/from basin;
- Stream-groundwater interaction;
- Lake-groundwater interaction;
- Managed recharge;
- Groundwater banking extraction; and
- Groundwater report.

For each of the above water budget components, we will provide a methods description including data sources and data analysis. Using these data, including precipitation and runoff, we will develop a water year type specification following recommendations in the work by Deas et al. (20064). Separate water budgets will then be developed for:

- Each month (season) of the modeling period;
- Each year of the modeling period;
- Average monthly (seasonal) water budget (January through December);
- Average annual water budget;

- Average dry year monthly (seasonal) water budget (January through December);
- Average dry year annual water budget;
- Average wet year monthly water budget (January through December);
- Average wet year annual water budget;
- Average normal year monthly (seasonal) water budget (January through December); and
- Average normal year annual water budget.

Deliverables

- *Technical Memorandum: documentation of water budget development, analysis and results including extraction sites, recharge and replenishment sites, water sources used for irrigation, and other information derived from the water budget, outline of results for various water year types, and bibliography.*
- *Digital data: maps and tables in GIS shapefile and MS Office spreadsheet or database format, respectively.*

3. Public Outreach During Model, Water Budget and GSP Development

As part of the Contractor's efforts, it is anticipated that that contractor members will attend a total of two to four meetings per year, at the direction of the GSA. This includes meetings of the Scott Valley Groundwater Advisory Committee, GSA Board meetings, and public outreach meetings. In outreach meetings, the contractor will provide educational background on its work and explain technical aspects of the GSP development through slide presentations that will also be made available electronically as PDF files. The contractor will engage in discussions to hear comments, opinions, and answer questions from the advisory committee or the public attending the advisory committee meeting. We consider outreach and public engagement an essential aspect of collaboratively building local knowledge and constructive support for effective decision-making in groundwater management.

As needed, the contractor will support the GSA in responding to educational and technical questions from GSA staff, advisory committee members, stakeholders, and the public, either via email, phone calls, or during meetings as needed.

Deliverables

- *Document to be included in GSP outlining the completed public outreach efforts*
- *Two to four outreach sessions annually with the GSA, advisory committee, and the public*
- *Individual meetings with stakeholders to explore technical issues, as needed (four days per year)*
- *PDF files of technical and educational presentations*
- *Document to be included in GSP outlining the completed outreach efforts by the Contractor*

4. Data Collection, Development, and Management

The goal of this task is to assemble and manage available environmental data needed for the identification of data gaps, for the development of the conceptual model, for the development of the numerical model and the water budget, for the development of monitoring networks and sustainability

metrics, and for scenario analyses. This will be completed in coordination and at the direction of the GSA and District staff who are also performing data collection efforts.

The Contractor will be using ArcGIS, Microsoft Excel, Microsoft Access, Microsoft Word, Microsoft PowerPoint, and Adobe Acrobat compatible software to store and deliver all data in a digital format that can easily be transferred into the GSA's data management system (DMS) and uploaded as needed through the Department of Water Resources' GSP Portal. The contractor will work closely with the GSA to ensure efficient and frequent data exchange. Our GIS shapefiles covering the groundwater basin will include:

- Land use (including crop type) for 2000 and 2010;
- Jurisdictional boundaries, including those of the adjudicated area;
- Topography;
- Surficial geology;
- Soils;
- Hydrogeologic zones;
- Well density, by section;
- Water level contours;
- Recharge areas;
- Existing and planned monitoring programs;
- Map of current groundwater quality;
- Potential groundwater nitrate loading;
- Potential non-ag pollution sources; and
- Potential groundwater-dependent ecosystems.

The MS Excel (or MS Access) DMS files will include:

- Historical groundwater quality data;
- Historical groundwater elevation measurements (including a separate database for transducer data, if we have any);
- Groundwater extraction data (if available);
- Well location and construction (screen interval) database;
- Surface water diversion and deliveries; and
- Climate data (e.g., ET and precipitation).

The contractor has completed significant data collection to develop water budgets and an integrated hydrologic model of the Scott Valley groundwater basin that represents the period from October 1990 through September 2011. We will expand our data collections efforts to include all data needed to building water budgets and expanding the integrated hydrologic model through the water year 2018. Necessary climatic, geographic, and hydrologic data will be collected from public sources compatible with requirements and recommendations by the Department of Water Resources. Data will include required future climate scenarios to be considered in water budget and modeling scenarios.

The contractor will prepare, document, and archive computer programming code to annually perform statistical analysis on updated daily precipitation, streamflow, ET/climate and water level time series. Results will be included in presentations to the GSA and used as needed for water budget analyses and modeling.

Deliverables

- *Documentation of data collection, data management, and processing protocols*
- *GIS shapefiles covering the groundwater basins*
- *MS Excel or MS Access database files*
- *Graphics in PDF file format, with a minimum of two geologic cross-sections*

Subtask – County Well Program Refinement

As needed, the contractor will provide technical advice to the GSA on the refinement of its well program based on the development of the hydrogeologic conceptual model, based on modeling results, and based on data made available through the previous subtask. This may include digitization of well records and well logs.

Deliverables

- *GIS database that outlines permitted and active groundwater wells, and abandoned and destroyed wells*
- *Document outlining the results of the well audit*

County CASGEM Program Transition

As needed, the contractor will provide technical advice to the GSA on the transition of its CASGEM program using information developed in Tasks 2 through 6.

Deliverables

- *Well monitoring data*

Identify Data Gaps

Data gaps may become apparent during any phase of this project, including the conceptual and numerical model development phase, the water budget development phase, development of sustainability criteria, the monitoring design network phase, and with other tasks and subtasks needed to develop the GSP. The project contractor will identify data gaps at each step and propose measures to address the observed data gaps and a necessary timeline within which data gaps will need to be addressed to appropriately support the GSP development.

Deliverables

- *Document outlining data gaps and data needs*

Project 2: Shasta Valley

1. Develop and Document Conceptual Model:

This task includes three significantly inter correlated parts: Hydrological Conceptual Model (HCM), Numerical Model, and Water Budget. The Contractor will conduct the work related to this task in response to the requirements outlined in the GSP Regulations, Subarticle 2, § 354.12, § 354.14, and § 354.14. As the first step, groundwater basin setting will be characterized by producing topographic maps, utilizing soil survey maps to outline soil characteristics, and defining the regional geologic and structural setting of the basin. This includes the description of immediate surrounding area, lateral basin boundaries, major geologic features that significantly affect groundwater flow, and the definable bottom of the basin. Basin setting lays the foundation for defining HCM and developing the numerical modeling and water budget. Upon conclusion of this task, a complete understanding of historical and current groundwater conditions within the basin will be formed that is necessary for successful development of the GSP as well as defining applicable and effective management actions and future scenarios.

Deliverables

- *Document outlining groundwater conditions within the Basin*

Conceptual and Numerical Model

GSP Regulations require a descriptive HCM of the basin that characterizes the physical components and interaction of the surface water and groundwater systems in the basin based on technical studies and qualified maps (GSP Regulations, Subarticle 2, § 354.14). The Contractor, specifically the UCD and Dr. Thomas Harter, have been involved in the similar work utilized for the Scott Valley Integrated Hydrologic Model. A similar but independent procedure will be followed to develop a complete understanding of the Shasta Valley Basin. All data obtained during data collection will be analyzed and referenced, and Contractor's extensive familiarity with the basin will be utilized to prepare an HCM that provides expected information with regards to identification and description of principal aquifers and aquitards, and their hydrogeological attributes including:

- Aquifer thickness, general lithology and depositional environment, formation names;
- Average well depths and production values;
- Physical properties of aquifers such as hydraulic conductivity, storativity, storage coefficients, and specific yield;
- General water quality of the aquifers and its distribution throughout the basin; and
- Identification of the primary use of each aquifer.

In addition, work under this subtask will include a sufficient and complete response to the requirements of the GSP Regulations, Subarticle 2, § 354.16 titled as "Groundwater Conditions". The documentation of groundwater conditions will form the basis for evaluating the sustainability of the basin and assessing

the presence or potential for undesirable results. We will review available historic maps on groundwater elevations and groundwater flow directions in the Basin and prepare a current water level elevation contour map (or maps, as necessary) using recent static water level available from wells owned by current pumpers, and from groundwater monitoring wells available through Geotracker and DWR SGMA Portal. In accordance with § 354.16, contour maps depicting seasonal high and seasonal low water levels for each principal aquifer within the basin will be created.

Groundwater level hydrographs coupled with well construction information will be used to identify water level trends in the basin, and help to determine the driving forces behind those trends (i.e. precipitation trends, concentrated areas of groundwater extraction, etc.). Those hydrographs will be compared to rainfall trends identified on accumulated departure of rainfall graphs. Hydrographs will be prepared for the GSP in accordance with the regulations of § 352.4 (e) and will include the requisite information listed therein. Subsequently, change in groundwater storage is estimated for every subarea (possible management area) of the basin for different time periods to support the goals of the GSP development and help with developing and calibrating the numerical model.

Surface water and groundwater interaction will be carefully examined and documented. Davids Engineering has a longstanding history of work in this area that will assist in prioritizing the sources of data available, data needs, and appropriate methods to investigate stream-aquifer interactions and groundwater-surface water exchanges in the Basin Water Budget. In particular, prioritization of efforts to improve understanding of surface water interaction will rely upon the 2013 Davids Engineering report prepared for the Shasta Valley Resource Conservation District entitled "Stream-Aquifer Data Collection Program to Support Preparation of a Groundwater Management Plan for the Shasta Valley." This report provides an overview of the hydrologic and hydrogeologic conceptualization of the Shasta Valley, and inventory of historical and existing hydrologic monitoring, review of basic regional data collection, framework for monitoring to support sustainable groundwater management, and plans for and prioritization of a wide range of specific monitoring activities. The Contractor will prepare an inclusive report after concluding the aforementioned processes to accordingly describe Basin setting and its respective HCM.

The information collected and produced for HCM will be used as the underlying foundation of the numerical model. The numerical mode is expected to provide scientifically justifiable results based on available monitored or hard data with regards to:

- Verification of the Basin hydrogeologic conceptual model, aquifer characteristics, and flow;
- Development and verification of the Basin water budget including agricultural demand;
- Evaluation of potential Basin flow conditions in the future;
- Assessment of groundwater/surface water interaction;
- Analysis of potential future groundwater production and aquifer recharge alternatives;
- Possibility and extent of land subsidence;

- Analysis of the potential effects of future climate variability and change on (i) recharge and other water budget components, (ii) groundwater flow conditions, and (iii) groundwater production and recharge alternatives; and
- Evaluation of different management scenarios.

The Contractor will prepare a report that outlines the model development process in this stage. As a future step, we plan to develop for the Shasta Basin an integrated hydrological model similar to the one developed for the Scott Basin. Because of the potentially significant contribution of the snowmelt from Mount Shasta, we will consider coupling the MODFLOW groundwater model to PRMS (a semi distributed Rainfall-Runoff model) through the GSFLOW tool developed by the USGS. Numerical model will undergo a rigorous calibration process to ensure its ability to accurately simulate major aquifers and aquitards according to the HCM and affirm its consistency with previously developed water budgets.

Deliverables

- *Report: Basin setting, including hydrogeologic conceptual model*
- *Development of model input and output data management systems (public domain)*

2. Historical Water Budget

A water budget will be quantified for historical and current conditions per Reg. § 354.18. This will involve use of past studies such as a similar approach to what has been done in Scott Valley Project by Dr. Foglia, recent monitoring data and investigations, developed numerical model under the previous subtask, and other relevant data about water balance components from Task 2. We will closely coordinate our water budget and numerical model to ensure that the conceptual water budget and the numerical modeling tool are consistent. Nonetheless, we also recognize that independent water budget analysis allows cross-checking of the model and analysis of specific issues that are not effectively addressed with a regional model.

All the available information with respect to the components of the water budget such as: evapotranspiration, water demand (agricultural, urban, managed wetlands, groundwater extraction, surface water deliveries, etc.), precipitation, runoff, surface and subsurface inflow and outflow, surface water (stream and river) and groundwater interaction, applied water reuse and recycled water, return flow, conveyance evaporation and seepage , imported and exported surface water, natural and managed recharge, etc. will be evaluated and documented. Existing water budgets will be used as a starting point for development of the water balance. Consistent methods will be applied to estimate the inflows and outflows for the historical water balance and these same methods will be applied to a forecasted future water balance under climate change. It is understood that DWR has provided and will continue to provide additional guidance and tools for evaluating climate change and forecasted changes to precipitation, air temperature, and seawater level. We will evaluate the applicability of DWR Guidance and Tools to the Basin conditions and conceptual projects. Assumptions on future conditions such as climate, water use and water availability will be documented, and the uncertainty of the future water balance will be addressed.

The numerical model will be leveraged to provide information on historical and current water budget components not directly extractable from available data such as subsurface inflows and outflows, and changes in flow rates over time. Throughout the use of the model, relative uncertainty in the aquifer parameters and modeling results will be documented. Analysis of the water budget will be automated using computer programs to ease the process of assessing alternatives and inspecting different scenarios. Similar process for typical dry, wet, and average water years will be used to produce and document detailed and independent water budget analyses. Seasonal budgets will also be provided for each of these water year types to describe interannual dynamics and variability of the water budget. Because of this in-depth water budget analysis, we will be able to prepare individual reports on surface water budget, soil-plantcrop- landscape budget, and groundwater budget for all three types of water years. Water budgets will be derived from data for the same period as the modeling period, most likely October 1990 through September 2018 as in the Scott Project (water years 1991-2018).

- Evapotranspiration;
- Agricultural water demand;
- Urban water demand;
- Managed wetlands demand;
- Precipitation;
- Surface water deliveries;
- Groundwater extraction;
- Applied water reuse and recycled water;
- Runoff;
- Return flow;
- Surface water inflows and outflows;
- Conveyance evaporation;
- Conveyance seepage;
- Imported water;
- Exported surface water;
- Stream-lake interaction;
- Pond evaporation;
- Recharge from irrigation and precipitation;
- Subsurface inflows and outflows to/from basin;
- Stream-groundwater interaction;
- Lake-groundwater interaction;
- Managed recharge;
- Groundwater banking extraction; and
- Groundwater report.

For each of the above water budget components, we will provide a methods description including data sources and data analysis. Using these data, including precipitation and runoff, we will develop a water year type specification following recommendations in the work by Deas et al. (2008). Separate water budgets will then be developed for:

- Each month (season) of the modeling period;
- Each year of the modeling period;
- Average monthly (seasonal) water budget (January through December);
- Average annual water budget;
- Average dry year monthly (seasonal) water budget (January through December);
- Average dry year annual water budget;
- Average wet year monthly water budget (January through December);
- Average wet year annual water budget;

- Average normal year monthly (seasonal) water budget (January through December); and
- Average normal year annual water budget.

Deliverables

- *Technical Memorandum: documentation of water budget development, analysis and results including extraction sites, recharge and replenishment sites, water sources used for irrigation, and other information derived from the water budget, outline of results for various water year types, and bibliography*
- *Digital data: maps and tables in GIS shapefile and MS Office spreadsheet or database format, respectively*

3. Coordination with the District

The Contractor will work with the District to establish and maintain a close relationship. We understand that we will have a designed point of contact within the District. In support of all tasks contemplated in Attachment A (including those other tasks outlined below), the Contractor may require information that is in

possession of the District, such as existing historical data. We recognize that data acquisition is inherently the responsibility of the Contractor, but that the District will be involved to facilitate coordination with other entities, local agencies, organizations, and individuals. As needed, we will receive advice from the District regarding the project scope of work, and the District maintains the authority to review and validate project deliverables.

Public Outreach During Model, Water Budget and GSP Development

As part of the Contractor's efforts, it is anticipated that that contractor members will attend a total of two to four meetings per year, at the direction of the GSA. This includes meetings of the Scott Valley Groundwater Advisory Committee, GSA Board meetings, and public outreach meetings. In outreach meetings, the contractor will provide educational background on its work and explain technical aspects of the GSP development through slide presentations that will also be made available electronically as PDF files. The contractor will engage in discussions to hear comments, opinions, and answer questions from the advisory committee or the public attending the advisory committee meeting. We consider outreach and public engagement an essential aspect of collaboratively building local knowledge and constructive support for effective decision-making in groundwater management.

As needed, the contractor will support the GSA in responding to educational and technical questions from GSA staff, advisory committee members, stakeholders, and the public, either via email, phone calls, or during meetings as needed.

Deliverables

- *Document to be included in GSP outlining the completed public outreach efforts*
- *Two to four outreach sessions annually with the GSA, advisory committee, and the public*
- *Individual meetings with stakeholders to explore technical issues, as needed (four days per year)*

- *PDF files of technical and educational presentations*
- *Document to be included in GSP outlining the completed outreach efforts by the Contractor*

4. Data Collection, Development, and Management

Task 2 will entail development of a data management program and by using and improving existing tools and data sets such as the County Well Program Refinement and County CASGEM Program. Data gaps identification will be carried out as an important step in this task. The GSP Regulations, § 352.6. Data Management System, state, "Each Agency shall develop and maintain a data management system that can store and report information relevant to the development or implementation of the Plan and monitoring of the basin." As per § 354.40, monitoring data shall be stored in the data management system. In summary, Task 5will accomplish the following subtasks:

- Data Collection and Data Management Program;
- County Well Program Refinement;
- County CASGEM Program Transition; and
- Identify Data Gaps.

Data Collection

For this initial project effort, the Contractor will collect available data and reports that are relevant to the development of a hydrogeologic conceptual model, a numerical groundwater flow model, and the GSP. Key sources of information for this effort will include:

- The Cities of Yreka, and Montague and the County of Siskiyou;
- Grenada Irrigation District, Montague Water Conservation District, and Shasta River Water Association;
- California Geological Survey, DWR, DOGGR, and NCRWQCB; and
- Federal agencies, for example USEPA, USGS, and NOAA.

The following is a preliminary list of the types of data needed for GSP preparation. Our contractor has already obtained many of the documents and databases listed below, which are necessary to complete the hydrogeologic conceptual model and prepare the GSP. These existing data sets will be augmented with new studies or updated data collected over time for the Basin. Data will be organized on a data sharing site to help centralize data collection; data sharing protocols will be developed. This data sharing site will become the shared data set for the components of the GSP development work, so that our contractor and the interested parties are working with and reviewing a common data set. If/where appropriate, relational databases may be developed for some of the data sets as part of an additional task.

Key data compiled for the GSP work will include:

- Accurate location information (land survey and global positioning system [GPS] data plotted in a GIS database) of currently known water-supply wells, groundwater monitoring wells, and surface water gaging stations, proximal rainfall stations, and significant spring sources.

- A topographic base map of the area, and a digital elevation model (DEM) of the Basin.
- GIS-based watershed boundaries, groundwater basin boundaries, and groundwater subbasin boundaries.
- Drilling permit data from Siskiyou County Environmental Health Division for both historic well drilling work and recently-drilled wells and monitoring wells in the SVB.
- State DWR well completion reports (driller's logs) and depths/screen intervals of known, historically drilled, private and municipal monitoring and supply water wells in the Basin, including geophysical data where available.
- Geologic and geophysical data for the numerous wildcat oil wells drilled over the years in the Basin to help identify the thickness of water-bearing sediments and the depth to the underlying nonwaterbearing bedrock at those drill sites. The bottom of the water-bearing sediments represents the base of fresh water in the Basin.
- Hydrogeologic characterization of key aquifer/aquicludes, as available from pumping test data and existing modeling efforts within the Basin; all available aquifer test data and calculations by others for the hydrogeologic properties of the aquifers (transmissivity, storativity and hydraulic conductivity). Geologic fault data collected over the years to display the locations and alignments of various faults in/near Basin.

- Available information on the hydraulic characteristics of faults, and their effects on groundwater Flow
- Soil surveys, including maps in GIS format (as available) and soil characteristics within the Basin.
- Climatic data, including precipitation and potential evapotranspiration (PET) data over time from climate and CIMIS (California Irrigation Management Information System) stations. This will include LA County DPW data stations (as available), plus isohyetal (USGS, County, PRISM) and ET maps (DWR).
- Historical and recent surface water runoff/discharge data as available, plus relevant information on stormwater management practices.
- Historical and current cropping and land use information and aerial photos to evaluate extent and density of urbanization, and to identify large landscape areas, large water areas (unlined, if any), channelized streams, and natural vegetation including riparian areas.
- Water demand information, particularly acreages and amounts of water use for landscaping (e.g., recycled water use, municipal data for large landscape customers), but including estimates of real losses (e.g. pipeline leaks) over time from the municipal water suppliers in the Basin.
- Additional water supply information, including imports to the Basin, recycled water, and groundwater pumping amounts over time for Basin and the adjoining hill/mountain areas, as well as waters used for municipal, industrial, remediation, dewatering, agricultural, landscaping, and domestic purposes.

- Wastewater disposal practices, including location, extent and density of areas depending on septic systems within the Basin.
- Groundwater elevation contour maps and change maps for different time periods.

Groundwater quality data from known wells and groundwater monitoring wells, local LUST data from the GeoTracker website, and key current data.

- Groundwater-dependent ecosystems, stream ecology related to baseflow.
- Water quality data from Shasta River and other surface waters.

Deliverables

- *GIS shapefiles covering the groundwater basins*
- *MS Excel or MS Access database files*
- *Graphics in PDF file format with a minimum of two geologic cross-sections*
- *Documentation of data collection, data management and processing tools*

County Well Program Refinement

Information on permitting and inspecting domestic, agricultural, and groundwater monitoring wells have been recorded through the "Water Wells" program run by the County Environmental Health Division since 1991. Prior to that date, data are kept by DWR. A dynamic GIS dataset including well permit, abandoning, and destruction information will be developed for the available groundwater wells drilled before and after 1991. For that matter, data from DWR and the County will be integrated using a standardized format. In addition, a "Well Audit" program will be performed to determine if the developed GIS data set has covered all of the existing active, abandoned, or destructed groundwater wells within the County. The GIS dataset will be built flexible enough to ensure future data addition would be happening seamlessly. As an important subtask of Data Collection, Development, and Management, the County's well program will be refined to ensure an efficient connection and communication pathway is created between the County Environmental Health Division and the Natural Resources Department. The Natural Resources Department will be notified of new permit issuance and abandoning/destruction of wells by developing an effective process. The process will be devised to address needs of the Natural Resources Department and to be compatible with the dynamic GIS data set.

Deliverables

- *GIS database that outlines permitted and active groundwater wells, and abandoned and destroyed wells*
- *Document outlining the results of the well audit*

Identify Data Gaps

The Contractor will review the compiled data and information and will identify data gaps in surface and

ground water data sets. Identification of duplicate data and qualitative assessment of the quality of each data source, with pertinent data from lower quality sources used when necessary to fill data gaps. Data gap identification results will be used to determine what type of additional data and at which location are needed. The results will be further used to propose potential new sampling locations and/or modifications needed to monitoring plans and protocols. In addition, recommendations for methods/studies to fill those data gaps will be suggested and prioritized. Data gaps and the needs for new studies will be documented and shared.

Deliverables

- *Document outlining data gaps and data needs*

Writing and Reporting of Documents

For each of the previous tasks, administrative draft and stakeholder draft GSP sections will have been developed. Under this task, the Contractor will compile all the draft GSP sections, address stakeholder comments on those draft sections and add the remaining items, such as the executive summary, to create a complete plan. The technical work to prepare the GSP will have been conducted during previous tasks. As a result, this task consists primarily of compiling the technical work and GSA and interested parties' inputs on the interim work products into a document that can be adopted by the GSA. We will carefully tailor our findings from the previous tasks and proposed sustainable management plan to fully comply with Article 5 of the Emergency Regulations. Under this task, the Contractor will prepare the remaining analyses necessary to complete the GSP and develop draft documents for review and comment by the interested parties and
public. Feedback will be incorporated into a final public review draft GSP. Written comments from the public and interested stakeholders will be sought, and oral public comments will be received during GSA workshops.

The Contractor will compile the public comments and will work with the GSA to decide how public comments will be addressed and a final report will be prepared. Conflicting comments and significant policy differences implied by conflicting comments will be resolved by decision of the GSA.
Public comments will be used to prepare the final GSP that will be considered for adoption by the GSA. The Executive Summary and reference documents will also be revised and finalized as needed based on public comments. A draft resolution to adopt the GSP will be prepared by the Contractor for consideration. The Contractor has extensive experience in developing regulatory documents that support stakeholder interests as outlined in this experience will allow us to prepare a GSP document that meets the needs of interested stakeholders and regulatory requirements necessary to adopt the GSP.

Deliverables

- *GSP drafting and completion*

Butte Valley

1. Water Budget Development (Including Groundwater Conditions and Conceptual Model) – Led by UC Davis

This task will provide the central technical information necessary for developing other planning elements of the Groundwater Sustainability Plan. Under this task, we develop the hydrogeologic conceptual model and the water budget for the Butte Valley groundwater basin. The development of the information will be an interactive process with the GSA, advisory committee, stakeholders, and the public. The deliverables will provide the required hydrogeologic conceptual model and water budget documentation for the GSP. The information will provide the basis for engagement, education, and outreach among stakeholders and a decision-support tool for the GSA in the development of sustainability criteria (minimum thresholds, triggers, measurable objectives), of monitoring networks, and for designing potential projects.

Groundwater Conditions (Including Conceptual Model)

The Contractor will work with GSA staff to collate and summarize current programs relevant to the GSP (including any new programs developed between proposal submittal and GSP submittal), including:

- Existing water resources monitoring and management programs;
- Land use plans and land use elements of the general plan within the basin;
- Land use plans and land use elements of the general plan outside the basin that potentially impact basin groundwater and groundwater-surface water interaction;
- Wellhead protection;
- Existing groundwater contamination sites, monitoring, and cleanup programs;
- Well abandonment and destruction programs;
- Groundwater replenishments;
- Conjunctive use;
- Diversions to storage;
- Water conservation and water recycling;
- Water conveyance;
- Efficient water management practices;
- Well construction policies;
- Groundwater management plan;
- Groundwater management practices;
- Relationship with state and federal agencies;
- Adjudications;
- North Coast Regional Water Board TMDL Program;
- North Coast IRWMP; and
- Monitoring programs of groundwater levels, groundwater quality, surface water flows, surface water quality, groundwater-surface water interaction, fish populations, groundwater-dependent ecosystems, and land subsidence.

Collate, review, summarize, and archive existing reports and data sources. As a foundation for the

conceptual hydrogeologic model, water level, well construction, streamflow, water quality, climate, ecosystem monitoring data, and other relevant data will be retrieved and organized electronically. Scientific papers and technical reports that are relevant to the understanding of the groundwater basin will be assembled in an electronic library that is web-accessible, including:

- Geography, climate, and land use;
- Geology and hydrogeology;
- Description of beneficial uses and users of water;
- Streamflow, water rights, and instream flow requirements;
- Groundwater-dependent ecosystems, stream ecology related to baseflow; and
- Water quality.

Develop hydrogeologic conceptual model.

The hydrogeologic conceptual model (HCM) will be developed based on a review of past hydrological and groundwater studies, especially the work of Wood (1960), well logs and other available hydrological, geologic, and geographic information. The conceptual model will include a description of the hydrology, land use, soils, geology and geologic structure, hydrogeology and aquifer system, water quality, and groundwater-dependent ecosystems in the Butte Valley groundwater basin. This work will include reviewing available well logs to create maps, cross-sections, and a three dimensional representation of the geologic setting of Butte Valley illustrating surface topography and the depth and extent of water-bearing surficial alluvial deposits. Aquifer properties and geologic features such as faults or offsets will be identified, and all borehole logs and results from aquifer tests used to inform the model will be assembled. The HCM will be sufficiently detailed to allow for clear identification of water system components for water budget calculations. We will also prepare tables and graphs to support the geologic cross-sections. The conceptual model will identify the various water budget elements of the surface water system, the land use – soil system, and the groundwater system. The conceptual model provides the basis for the development of the water budget. It provides the context and supporting information for identifying undesirable results and for developing sustainability criteria and monitoring systems. It will be an essential tool for stakeholder education and engagement in the decision making process.

The work will be performed through a review of relevant data sources, reports and publications, leading to documentation in a report that includes maps and cross-sections. A draft report will be reviewed by the GSA and the advisory committee before it is finalized. All data will be made available digitally in addition to producing digital maps of model results in ArcGIS format and tables in MS Office compatible spreadsheet format.

Deliverables

- *Technical Memorandum: Existing programs*
- *Technical Memorandum: Basin setting, including hydrogeologic conceptual model*
- *Digital data: web-based bibliography of resources (existing programs, literature, reports) with embedded links*

- *Digital data: maps and tables in ArcGIS shapefile and MS Office spreadsheet or database format, respectively*

Subtask – Water Budget

The water budget will be constructed using the hydrogeologic conceptual model as a framework, and using all the available data, including crop maps and climate data. Water budgets will be derived from data for the same period as the other basins, October 1990 through September 2018 (water years 1991 – 2018). The water budget will consider the following water budget components:

- Evapotranspiration;
- Agricultural water demand;
- Urban water demand;
- Managed wetlands water demand;
- Precipitation;
- Surface water deliveries;
- Groundwater extraction;
- Applied water reuse and recycled water;
- Runoff;
- Return flow;
- Surface water inflows and outflows;
- Conveyance evaporation;
- Conveyance seepage;
- Imported water;
- Exported surface water;
- Stream-lake interaction;
- Pond evaporation;
- Recharge from irrigation and precipitation;
- Subsurface inflows and outflows to/from basin;
- Stream-groundwater interaction;
- Lake-groundwater interaction;
- Managed recharge;
- Groundwater banking extraction; and
- Groundwater report.

For each of the above water budget components, we will provide a methods description including data sources and data analysis. Using these data, including precipitation and runoff, we will develop a water year type specification following recommendations in the work by Deas et al. (2006). Separate water budgets will then be developed for:

- Each month (season) of the modeling period;
- Each year of the modeling period;
- Average monthly (seasonal) water budget (January through December);
- Average annual water budget;
- Average dry year monthly (seasonal) water budget (January through December);
- Average dry year annual water budget;
- Average wet year monthly water budget (January through December);
- Average wet year annual water budget;
- Average normal year monthly (seasonal) water budget (January through December); and
- Average normal year annual water budget.

Deliverables

- *Technical Memorandum: documentation of water budget development, analysis and results including extraction sites, recharge and replenishment sites, water sources used for irrigation,*

and other information derived from the water budget, outline of results for various water year types, and bibliography

- *Digital data: maps and tables in ArcGIS shapefile and MS Office spreadsheet or database format; respectively*

2. Coordination with the District

The Contractor will work with the District to establish and maintain a close relationship. We understand that we will have a designed point of contact within the District. In support of all tasks contemplated in Attachment A (including those other tasks outlined below), the Contractor may require information that is in possession of the District, such as existing historical data. We recognize that data acquisition is inherently the responsibility of the Contractor, but that the District will be involved to facilitate coordination with other entities, local agencies, organizations, and individuals. As needed, we will receive advice from the District regarding the project scope of work, and the District maintains the authority to review and validate project deliverables.

Public Outreach During Model, Water Budget and GSP Development

As part of the Contractor's efforts, it is anticipated that that contractor members will attend a total of two to four meetings per year, at the direction of the GSA. This includes meetings of the Scott Valley Groundwater Advisory Committee, GSA Board meetings, and public outreach meetings. In outreach meetings, the contractor will provide educational background on its work and explain technical aspects of the GSP development through slide presentations that will also be made available electronically as PDF files. The contractor will engage in discussions to hear comments, opinions, and answer questions from the advisory committee or the public attending the advisory committee meeting. We consider outreach and public engagement an essential aspect of collaboratively building local knowledge and constructive support for effective decision-making in groundwater management.

As needed, the contractor will support the GSA in responding to educational and technical questions from GSA staff, advisory committee members, stakeholders, and the public, either via email, phone calls, or during meetings as needed.

Deliverables

- *Document to be included in GSP outlining the completed public outreach efforts*
- *Two to four outreach sessions annually with the GSA, advisory committee, and the public*
- *Individual meetings with stakeholders to explore technical issues, as needed (four days per year)*
- *PDF files of technical and educational presentations*
- *Document to be included in GSP outlining the completed outreach efforts by the Contractor*

Data Collection, Development, and Management

The goal of this task is to assemble and manage available environmental data needed for the identification of data gaps, for the development of the conceptual model, for the development of the water budget, for the development of monitoring networks and sustainability metrics, and for scenario analyses.

The Contractor will be using ArcGIS, Microsoft Excel, Microsoft Access, Microsoft Word, Microsoft PowerPoint, and Adobe Acrobat compatible software to store and deliver all data in a digital format that can easily be transferred into the GSA's data management system (DMS) and uploaded as needed through the Department of Water Resources' GSP Portal. The contractor will work closely with the GSA to ensure efficient and frequent data exchange. Our GIS shapefile covering the groundwater basin will include:

- Land use (including crop type) for 2000 and 2010;
- Jurisdictional boundaries, including those of the adjudicated area;
- Topography;
- Surficial geology;
- Soils;
- Hydrogeologic zones;
- Well density, by section;
- Water level contours;
- Recharge areas;
- Existing and planned monitoring programs;
- Groundwater quality;
- Potential groundwater nitrate loading;
- Potential non-ag pollution sources; and
- Potential groundwater-dependent ecosystems.

The MS Excel (or MS Access) DMS files will include:

- Well logs database;
- Stream gauge measurements;
- Surface water diversion and deliveries; and
- Climate data (e.g., ET and precipitation).

The contractor will need to perform a significant data collection to develop water budgets of the Butte Valley groundwater basin that represents the period from October 1990 through September 2018. Necessary climatic, geographic, and hydrologic data will be collected from public sources compatible with requirements and recommendations by the Department of Water Resources. Data will include required future climate scenarios to be considered in water budget and eventually future modeling scenarios.

The contractor will prepare, document, and archive computer programming code to annually perform statistical analysis on updated daily precipitation, streamflow, ET/climate and water level time series. Results will be included in presentations to the GSA and used as needed for water budget analyses and modeling.

Deliverables

- *Program that outlines data management protocols and material*
- *GIS shapefiles covering the groundwater basins*
- *MS Excel or MS Access database files*
- *Graphics in PDF file format, with a minimum of two geologic cross-sections*
- *Documentation of data collection and processing protocols*

County Well Program Refinement

The project contractor will provide technical advice to the GSA on the refinement of its well program based on the development of the hydrogeologic conceptual model, based on modeling results, and based on data made available through the previous subtask. This may include digitization of well records and well logs.

Deliverables

- *GIS database that outlines permitted and active groundwater wells, and abandoned and destroyed wells*
- *Document outlining the results of the well audit*

County CASGEM Program Transition

The project Contractor will provide technical advice to the GSA on the transition of its CASGEM program using
information developed in Tasks 2 through 6.

Deliverables

- *Document outlining CASGEM program under the Siskiyou County Department of Natural Resources*
- *Well monitoring data*

Identify Data Gaps

Data gaps may become apparent during any phase of this project, including the conceptual model development phase, the water budget development phase, the monitoring design network phase, and with other tasks and subtasks needed to develop the GSP. The project contractor will identify data gaps at each step and propose measures to address the observed data gaps and a necessary timeline within which data gaps will need to be addressed to appropriately support the GSP development.

Deliverables

- *Document outlining data gaps and data needs*

Writing and Reporting of Documents

Using the deliverables from Task 1 through Task 6, the project Contractor will work closely with the GSA to produce early, intermediate, and final drafts of the GSP.

Deliverables

- *GSP drafting and completion*
- *Writing and reporting of documents*

Project 1 –
Scott Valley

LARRY WALKER ASSOCIATES

Rate Schedule

PERSONNEL	Rate $/Hour
Administrative	$88
Contract Administrator	$155
Project Staff I-C	$113
Project Staff I-B	$144
Project Staff I-A	$170
Project Staff II-B	$180
Project Staff II-A	$200
Senior Staff	$232
Associate	$258
Vice President	$283-$294
Senior Executive	$309
President	$309

REIMBURSABLE COSTS

Travel:

Local Mileage	Current IRS rate
Transportation	Actual expense
Auto rental	Actual commercial rate
Fares	Actual expense
Room	Actual expense
Subsistence[1]	$48 per day

The rate for each meal as follows:[1]

Breakfast	$9
Lunch	$13
Dinner	$21
Incidentals	$5

Report Reproduction and Copying:
Actual expense

Black and white copy, in-house	$0.08
Color copy, in-house	$0.89
Binding, in-house	$1.95

Special Postage and Express Mail:
Actual expense

Other Direct Costs:
Actual expense

Daily Equipment Rental Rates:

Single parameter meters & equipment	$30
Digital Flow Meter	$60
Multi-parameter field meters & sondes	$100
Dye/tracer mapping or residence time	$200
Multi-parameter continuous	

remote sensing	$40

Subcontractors:
Actual expense plus 10% fee

Note: [1]Charged when overnight lodging is required

DAVIDS ENGINEERING, INC.

Labor Rates

Effective January 1, 2018

Labor Classification	Hourly Rate
Sr. Principal Engineer	$220.00
Principal Engineer	$207.00
Supervising Engineer/Scientist	$196.00
Senior Engineer/Scientist	$172.00
Associate Engineer/Scientist II	$159.00
Associate Engineer/Scientist I	$151.00
Staff Engineer/Scientist II	$147.00
Graduate Engineer/Scientist	$108.00
Engineering Intern II	$62.00
Engineering Intern I	$41.00
Student Intern	$21.00
Technical/project Assistant	$93.00
Secretary/Clerical II	$89.00
Secretary/Clerical I	$73.00

Note: Labor rates are subject to revision at the beginning of each calendar year.

Vehicle and Equipment Rates

Effective January 1, 2018

Item	Rate
Automobiles	Current federal rate
Field Vehicle (4x4)	$1.00/mile
SonTek RiverSurveyor M9 ADCP	$275.00/day
SonTek FlowTracker Handheld ADVM	$55.00/day
Fuji Electric Portflow-C Transit Time Meter	$100.00/day

Pressure Transducer	$50.00/month
SCADA Equipment and Materials	At cost
Color plotter	$6.50/sq. ft.

Note: Equipment rates are subject to revision at the beginning of each calendar year.

Subcontractor - California State University, Chico
1047 Almendia Ct., Chico, CA 95926
Steffen William Mehl - $150.00/hour

Project 2 – Shasta Valley

LARRY WALKER ASSOCIATES

Rate Schedule

PERSONNEL	Rate $/Hour
Administrative	$88
Contract Administrator	$155
Project Staff I-C	$113
Project Staff I-B	$144
Project Staff I-A	$170
Project Staff II-B	$180
Project Staff II-A	$200
Senior Staff	$232
Associate	$258
Vice President	$283-$294
Senior Executive	$309
President	$309

REIMBURSABLE COSTS	
Travel:	
Local Mileage	Current IRS rate
Transportation	Actual expense
Auto rental	Actual commercial rate
Fares	Actual expense
Room	Actual expense
Subsistence[1]	$48 per day
The rate for each meal as follows:[1]	
Breakfast	$9
Lunch	$13
Dinner	$21
Incidentals	$5
Report Reproduction and Copying:	
Actual expense	
Black and white copy, in-house	$0.08
Color copy, in-house	$0.89
Binding, in-house	$1.95
Special Postage and Express Mail:	
Actual expense	
Other Direct Costs:	
Actual expense	
Daily Equipment Rental Rates:	
Single parameter meters & equipment	$30
Digital Flow Meter	$60
Multi-parameter field meters & sondes	$100
Dye/tracer mapping or residence time	$200
Multi-parameter continuous remote sensing	$40

Subcontractors:
Actual expense plus 10% fee

Note: [1]Charged when overnight lodging is required

DAVIDS ENGINEERING, INC.

Labor Rates

Effective January 1, 2018

Labor Classification	Hourly Rate
Sr. Principal Engineer	$220.00
Principal Engineer	$207.00
Supervising Engineer/Scientist	$196.00
Senior Engineer/Scientist	$172.00
Associate Engineer/Scientist II	$159.00
Associate Engineer/Scientist I	$151.00
Staff Engineer/Scientist II	$147.00
Graduate Engineer/Scientist	$108.00
Engineering Intern II	$62.00
Engineering Intern I	$41.00
Student Intern	$21.00
Technical/project Assistant	$93.00
Secretary/Clerical II	$89.00
Secretary/Clerical I	$73.00

Note: Labor rates are subject to revision at the beginning of each calendar year.

Vehicle and Equipment Rates

Effective January 1, 2018

Item	Rate
Automobiles	Current federal rate
Field Vehicle (4x4)	$1.00/mile
SonTek RiverSurveyor M9 ADCP	$275.00/day
SonTek FlowTracker Handheld ADVM	$55.00/day
Fuji Electric Portflow-C Transit Time Meter	$100.00/day
Pressure Transducer	$50.00/month
SCADA Equipment and Materials	At cost
Color plotter	$6.50/sq. ft.

Note: Equipment rates are subject to revision at the beginning of each calendar year.

Subcontractor - California State University, Chico
1047 Almendia Ct., Chico, CA 95926
Steffen William Mehl - $150.00/hour

Project 3 –
Butte Valley

LARRY WALKER ASSOCIATES

Rate Schedule

PERSONNEL	Rate $/Hour
Administrative	$88
Contract Administrator	$155
Project Staff I-C	$113
Project Staff I-B	$144
Project Staff I-A	$170
Project Staff II-B	$180
Project Staff II-A	$200
Senior Staff	$232
Associate	$258
Vice President	$283-$294
Senior Executive	$309
President	$309

REIMBURSABLE COSTS

Travel:

Local Mileage	Current IRS rate
Transportation	Actual expense
Auto rental	Actual commercial rate
Fares	Actual expense
Room	Actual expense
Subsistence[1]	$48 per day

The rate for each meal as follows:[1]

Breakfast	$9
Lunch	$13
Dinner	$21
Incidentals	$5

Report Reproduction and Copying:
Actual expense

Black and white copy, in-house	$0.08
Color copy, in-house	$0.89
Binding, in-house	$1.95

Special Postage and Express Mail:
Actual expense

Other Direct Costs:
Actual expense

Daily Equipment Rental Rates:

Single parameter meters & equipment	$30
Digital Flow Meter	$60
Multi-parameter field meters & sondes	$100
Dye/tracer mapping or residence time	$200
Multi-parameter continuous remote sensing	$40

Subcontractors:

Actual expense plus 10% fee

Note: [1]Charged when overnight lodging is required

DAVIDS ENGINEERING, INC.

Labor Rates

Labor Classification	Hourly Rate
Sr. Principal Engineer	$220.00
Principal Engineer	$207.00
Supervising Engineer/Scientist	$196.00
Senior Engineer/Scientist	$172.00
Associate Engineer/Scientist II	$159.00
Associate Engineer/Scientist I	$151.00
Staff Engineer/Scientist II	$147.00
Graduate Engineer/Scientist	$108.00
Engineering Intern II	$62.00
Engineering Intern I	$41.00
Student Intern	$21.00
Technical/project Assistant	$93.00
Secretary/Clerical II	$89.00
Secretary/Clerical I	$73.00

Note: Labor rates are subject to revision at the beginning of each calendar year.

Vehicle and Equipment Rates

Effective January 1, 2018

Item	Rate
Automobiles	Current federal rate
Field Vehicle (4x4)	$1.00/mile
SonTek RiverSurveyor M9 ADCP	$275.00/day
SonTek FlowTracker Handheld ADVM	$55.00/day
Fuji Electric Portflow-C Transit Time Meter	$100.00/day
Pressure Transducer	$50.00/month
SCADA Equipment and Materials	At cost
Color plotter	$6.50/sq. ft.

Note: Equipment rates are subject to revision at the beginning of each calendar year.

Subcontractor - California State University, Chico
1047 Almendia Ct., Chico, CA 95926
Steffen William Mehl - $150.00/hour