COUNTY OF SISKIYOU
CONTRACT FOR SERVICES
FOR BOARD OF SUPERVISORS SIGNATURE

This Contract made this 14th day of August, 2018 between:

COUNTY: Siskiyou County Flood Control and Water Conservation District
1312 Fairlane Road
Yreka, CA 96097

And

CONTRACTOR: Larry Walker Associates, Inc
1480 Drew Avenue, Suite 100
Davis, CA 95618
530-753-6400
530-753-7030 (fax)

ARTICLE 1. TERM OF CONTRACT

1.01 Contract Term: This Contract shall become effective on August 15, 2018 and shall terminate on June 30, 2019, unless terminated in accordance with the provisions of Article 7 of this Contract or as otherwise provided herein. No work shall commence under this contract until Contractor is issued a written authorization to proceed from Terry Barber, County Administrator, or her designee following the County's receipt of its Sustainable Groundwater Grant Program funds.

ARTICLE 2. INDEPENDENT CONTRACTOR STATUS

2.01 Independent Contractor: It is the express intention of the parties that Contractor is an independent contractor and not an employee, agent, joint venture or partner of County. Nothing in this Contract shall be interpreted or construed as creating or establishing the relationship of employer and employee between County and Contractor or any employee or agent of Contractor. Both parties acknowledge that Contractor is not an employee for state or federal tax purposes. Contractor shall retain the right to perform services for others during the term of this Contract.

ARTICLE 3. SERVICES

3.01 Specific Services: Contractor agrees to furnish the following services: Contractor shall provide the services described in Exhibit "A" attached hereto.

No additional services shall be performed by Contractor unless approved in advance in writing by the County stating the dollar value of the services, the method of payment, and any adjustment in contract time or other contract terms. All such services are to be coordinated with County and the results of the work shall be monitored by the **County Administrator, Terry Barber** or his or her designee.

3.02 Method of Performing Services: Contractor will determine the method, details, and means of performing the above-described services including measures to protect the safety of the traveling public and Contractor's employees. County shall not have the right to, and shall not, control the manner or determine the method of accomplishing Contractor's services.

3.03 Employment of Assistants: Contractor may, at the Contractor's own expense, employ such assistants as Contractor deems necessary to perform the services required of Contractor by this Contract. County may not control, direct, or supervise Contractor's assistants or employees in the performance of those services.

ARTICLE 4. COMPENSATION

4.01 Compensation: In consideration for the services to be performed by Contractor, County agrees to pay Contractor in proportion to services satisfactorily performed as specified in Exhibit A, two-hundred and fifty thousand dollars ($250,000). Payment shall not exceed amount appropriated by the Board of Directors for such services for the fiscal year.

4.02 Invoices: Contractor shall submit detailed invoices for all services being rendered including original receipts.

4.03 Date for Payment of Compensation: County shall pay within 30 days of receipt of invoices from the Contractor to the County, and approval and acceptance of the work by the County.

4.04 Expenses: Contractor shall be responsible for all costs and expenses incident to the performance of services for County, including but not limited to, all costs of materials, equipment, all fees, fines, licenses, bonds or taxes required of or imposed against Contractor and all other of Contractor's costs of doing business. County shall not be responsible for any expense incurred by Contractor in performing services for County.

ARTICLE 5. OBLIGATIONS OF CONTRACTOR

5.01 Contractor Qualifications: Contractor warrants that Contractor has the necessary licenses, experience and technical skills to provide services under this Contract.

5.02 Contract Management: Contractor shall report to the Terry Barber or his or her designee who will review the activities and performance of the Contractor and administer this Contract.

5.03 Tools and Instrumentalities: Contractor will supply all tools and instrumentalities required to perform the services under this Contract. Contractor is not required to purchase or rent any tools, equipment or services from County.

5.04 Workers' Compensation: Contractor shall maintain a workers' compensation plan covering all its employees as required by California Labor Code Section 3700, either through workers' compensation insurance issued by an insurance company or through a plan of self-insurance certified by the State Director of Industrial Relations. If Contractor elects to be self-insured, the certificate of insurance otherwise required by this Contract shall be replaced with a consent to self-insure issued by the State Director of Industrial Relations. Proof of such insurance shall be provided before any work is commenced under this contract. No payment shall be made unless such proof of insurance is provided.

5.05 Indemnification: Contractor shall indemnify and hold County harmless against any and all liability imposed or claimed, including attorney's fees and other legal expenses, arising directly or indirectly from any act or failure of Contractor or Contractor's assistants, employees or agents, including all claims to the extent relating to the injury or death of any person or damage to any property. Contractor agrees to maintain a policy of liability insurance in the minimum amount of ($1,000,000) One Million Dollars, to cover such claims or in an amount determined appropriate by the County Risk Manager. If the amount of insurance is reduced by the County Risk Manager such reduction must be in writing. Contractor shall furnish a certificate of insurance evidencing such insurance and naming the County as an additional insured for the above-cited liability coverage prior to commencing work. It is understood that the duty of Contractor to indemnify and hold harmless includes the duty to defend as set forth in Section 2778 of the California Civil Code. Acceptance by County of insurance certificates and endorsements required under this Contract does not relieve Contractor from liability or limit Contractor's liability under this indemnification and hold harmless clause. This indemnification and hold harmless clause shall apply to any damages or claims for damages whether or not such insurance policies shall have been determined to apply. By execution of this Contract, Contractor acknowledges and agrees to the provisions of this Section and that it is a material element of consideration.

5.06 General Liability and Automobile Insurance: During the term of this Contract, Contractor shall obtain and keep in full force and effect a commercial, general liability and automobile policy or policies of at least ($1,000,000) One Million Dollars, combined limit for bodily injury and property damage; the County, its officers, employees, volunteers and agents are to be named additional insured under the policies, and the policies shall stipulate that this insurance will operate as primary insurance for work performed by Contractor and its sub-contractors, and that no other insurance effected by County or other named insured will be called on to cover a loss covered thereunder. All insurance required herein shall be provided by a company authorized to do business in the State of California and possess at least a Best A:VII rating or as may otherwise be acceptable to County. The General Liability insurance shall be provided by an ISO Commercial

General Liability policy, with edition dates of 1985, 1988, or 1990 or other form satisfactory to County. The County will be named as an additional insured using ISO form CG 2010 1185 or the same form with an edition date no later than 1990, or in other form satisfactory to County.

5.07 Certificate of Insurance and Endorsements: Contractor shall obtain and file with the County prior to engaging in any operation or activity set forth in this Contract, certificates of insurance evidencing additional insured coverage as set forth in paragraphs 5.04 and 5.10 and which shall provide that no cancellation, reduction in coverage or expiration by the insurance company will be made during the term of this Contract, without thirty (30) days written notice to County prior to the effective date of such cancellation. **Naming the County as a "Certificate Holder" or other similar language is NOT sufficient satisfaction of the requirement.** Prior to commencement of performance of services by Contractor and prior to any obligations of County, contractor shall file certificates of insurance with County showing that Contractor has in effect the insurance required by this Contract. Contractor shall file a new or amended certificate on the certificate then on file. **If changes are made during the term of this Contract, no work shall be performed under this agreement, and no payment may be made until such certificate of insurance evidencing the coverage in paragraphs, 5.05, the general liability policy set forth in 5.06 and 5.10 are provided to County.**

5.08 Public Employees Retirement System (CalPERS): In the event that Contractor or any employee, agent, or subcontractor of Contractor providing services under this Contract is determined by a court of competent jurisdiction or the Public Employees Retirement System (CalPERS) to be eligible for enrollment in CalPERS as an employee of the County, Contractor shall indemnify, defend, and hold harmless County for the payment of any employee and/or employer contributions of CalPERS benefits on behalf of Contractor or its employees, agents, or subcontractors, as well as for the payment of any penalties and interest on such contributions, which would otherwise be the responsibility of County. Contractor understands and agrees that his personnel are not, and will not be, eligible for memberships in, or any benefits from, any County group plan for hospital, surgical or medical insurance, or for membership in any County retirement program, or for paid vacation, paid sick leave, or other leave, with or without pay, or for any other benefit which accrues to a County employee.

5.09 IRS/FTB Indemnity Assignment: Contractor shall defend, indemnify, and hold harmless the County, its officers, agents, and employees, from and against any adverse determination made by the Internal Revenue Service of the State Franchise Tax Board with respect to Contractor's "independent contractor" status that would establish a liability for failure to make social security and income tax withholding payments.

5.10 Professional Liability: If Contractor or any of its officers, agents, employees, volunteers, contactors or subcontractors are required to be professionally licensed or certified by any agency of the State of California in order to perform any of the work or services identified herein, Contractor shall procure and maintain in force throughout the duration of the Contract a professional liability insurance policy with a minimum coverage level of ($1,000,000) One Million Dollars, or as determined in writing by County's Risk Management Department.

5.11 State and Federal Taxes: As Contractor is not County's employee, Contractor is responsible for paying all required state and federal taxes. In particular:

a. County will not withhold FICA (Social Security) from Contractor's payments;
b. County will not make state or federal unemployment insurance contributions on behalf of Contractor.
c. County will not withhold state or federal income tax from payment to Contractor.
d. County will not make disability insurance contributions on behalf of Contractor.
e. County will not obtain workers' compensation insurance on behalf of Contractor.

5.12 Records: All reports and other materials collected or produced by the Contractor or any subcontractor of Contractor shall, after completion and acceptance of the Contract, become the property of County, and shall not be subject to any copyright claimed by the Contractor, subcontractor, or their agents or employees. Contractor may retain copies of all such materials exclusively for administration purposes. Any use of completed or uncompleted documents for other projects by Contractor, any subcontractor, or any of their agents or employees, without the prior written consent of County is prohibited. It is further understood and agreed that all plans, studies, specifications, data magnetically or otherwise recorded on computer or computer diskettes, records, files, reports, etc., in possession of the Contractor relating to the matters covered by this Contract shall be the property of the County, and Contractor hereby agrees to deliver the same to the County upon request. It is also understood and agreed that the documents and other materials including but not limited to those set forth hereinabove, prepared pursuant to this Contract are prepared specifically for the County and are not necessarily suitable for any future or other use.

5.13 Contractor's Books and Records: Contractor shall maintain any and all ledgers, books of account, invoices, vouchers, canceled checks, and other records or documents evidencing or relating to charges for services or expenditures and disbursements charged to the County for a minimum of five (5) years, or for any longer period required by law, from the date of final payment to the Contractor under this Contract. Any records or documents required to be maintained shall be made available for inspection, audit and/or copying at any time during regular business hours, upon oral or written request of the County.

5.14 Assignability of Contract: It is understood and agreed that this Contract contemplates personal performance by the Contractor and is based upon a determination of its unique personal competence and experience and upon its specialized personal knowledge. Assignments of any or all rights, duties or obligations of the Contractor under this Contract will be permitted only with the express written consent of the County.

5.15 Warranty of Contractor: Contractor warrants that it, and each of its personnel, where necessary, are properly certified and licensed under the laws and regulations of the State of California to provide the special services agreed to.

5.16 Withholding for Non-Resident Contractor: Pursuant to California Revenue and Taxation Code Section 18662, payments made to nonresident independent

contractors, including corporations and partnerships that do not have a permanent place of business in this state, are subject to 7 percent state income tax withholding.

Withholding is required if the total yearly payments made under this contract exceed $1,500.00.

Unless the Franchise Tax Board has authorized a reduced rate or waiver of withholding and County is provided evidence of such reduction/waiver, all nonresident contractors will be subject to the withholding. It is the responsibility of the Contractor to submit the Waiver Request (Form 588) to the Franchise Tax Board as soon as possible in order to allow time for the Franchise Tax Board to review the request.

5.17 Compliance with Child, Family and Spousal Support Reporting Obligations: Contractor's failure to comply with state and federal child, family and spousal support reporting requirements regarding contractor's employees or failure to implement lawfully served wage and earnings assignment orders or notices of assignment relating to child, family and spousal support obligations shall constitute a default under this Contract. Contractor's failure to cure such default within ninety (90) days of notice by County shall be grounds for termination of this Contract.

5.18 Conflict of Interest: Contractor covenants that it presently has no interest and shall not acquire an interest, direct or indirect, financial or otherwise, which would conflict in any manner or degree with the performance of the services hereunder. Contractor further covenants that, in the performance of this Contract, no subcontractor or person having such an interest shall be used or employed. Contractor certifies that no one who has or will have any financial interest under this contract is an officer or employee of County.

5.19 Compliance with Applicable Laws: Contractor shall comply with all applicable federal, state and local laws now or hereafter in force, and with any applicable regulations, in performing the work and providing the services specified in this Contract. This obligation includes, without limitations, the acquisition and maintenance of any permits, licenses, or other entitlements necessary to perform the duties imposed expressly or impliedly under this Contract.

5.20 Bankruptcy: Contractor shall immediately notify County in the event that Contractor ceases conducting business in the normal manner, becomes insolvent, makes a general assignment for the benefit of creditors, suffer or permits the appointment of a receiver for its business or assets, or avails itself of, or becomes subject to, any proceeding under the Federal Bankruptcy Act or any other statute of any state relating to insolvency or protection of the rights of creditors.

ARTICLE 6. OBLIGATIONS OF COUNTY

6.01 Cooperation of County: County agrees to comply with all reasonable requests of Contractor (to provide reasonable access to documents and information as

permitted by law) necessary to the performance of Contractor's duties under this Contract.

ARTICLE 7. TERMINATION

7.01 Termination on Occurrence of State Events: This Contract shall terminate automatically on the occurrence of any of the following events:

1. Bankruptcy or insolvency of Contractor
2. Death of Contractor

7.02 Termination by County for Default of Contractor: Should Contractor default in the performance of this Contract or materially breach any of its provisions, County, at County's option, may terminate this Contract by giving written notification to Contractor.

7.03 Termination for Convenience of County: County may terminate this Contract at any time by providing a notice in writing to Contractor that the Contract is terminated. Said Contract shall then be deemed terminated and no further work shall be performed by Contractor. If the Contract is so terminated, the Contractor shall be paid for that percentage of the phase of work actually completed, based on a pro rata portion of the compensation for said phase satisfactorily completed at the time of notice of termination is received.

7.04 Termination of Funding: County may terminate this Contract in any fiscal year in that it is determined there is not sufficient funding. California Constitution Article XVI Section 18.

ARTICLE 8. GENERAL PROVISIONS

8.01 Notices: Any notices to be given hereunder by either party to the other may be effected either by personal delivery in writing or by mail, registered or certified, postage prepaid or return receipt requested. Mailed notices shall be addressed to the parties at the addresses appearing in the introductory paragraph of this Contract, but each party may change the address by written notice in accordance with the paragraph. Notices delivered personally will be deemed communicated as of actual receipt; mailed notices will be deemed communicated as of two (2) days after mailing.

8.02 Entire Agreement of the Parties: This contract supersedes any and all contracts, either oral or written, between the Parties hereto with respect to the rendering of services by Contractor for County and contains all the covenants and contracts between the parties with respect to the enduring of such services in any manner whatsoever. Each Party to this Contract acknowledges that no representations, inducements, promises, or contract, orally or otherwise, have been made by any party, or anyone acting on behalf of any Party, which are not embodied herein, and that no other contract, statement, or promise not contained in this Contract shall be valid or binding. Any modification of this Contract will be effective only if it is in writing signed by the Party to be charged and approved by the County as provided herein or as otherwise required by law.

8.03 Partial Invalidity: If any provision in this Contract is held by a court of competent jurisdiction to be invalid, void, or unenforceable, the remaining provision will nevertheless continue in full force without being impaired or invalidated in any way.

8.04 Attorney's Fees: If any action at law or in equity, including an action for declaratory relief, is brought to enforce or interpret the provisions of this Contract, the prevailing Party will be entitled to reasonable attorney's fees, which may be set by the court in the same action or in a separate action brought for that purpose, in addition to any other relief to which that party may be entitled.

8.05 Conformance to Applicable Laws: Contractor shall comply with the standard of care regarding all applicable federal, state and county laws, rules and ordinances. Contractor shall not discriminate in the employment of persons who work under this contract because of race, the color, national origin, ancestry, disability, sex or religion of such person.

8.06 Waiver: In the event that either County or Contractor shall at any time or times waive any breach of this Contract by the other, such waiver shall not constitute a waiver of any other or succeeding breach of this Contract, whether of the same or any other covenant, condition or obligation.

8.07 Governing Law: This Contract and all matters relating to it shall be governed by the laws of the State of California and the County of Siskiyou and any action brought relating to this Contract shall be brought exclusively in a state court in the County of Siskiyou.

8.08 Reduction of Consideration: Contractor agrees that County shall have the right to deduct from any payments contracted for under this Contract any amount owed to County by Contractor as a result of any obligation arising prior or subsequent to the execution of this contract. For purposes of this paragraph, obligations arising prior to the execution of this contract may include, but are not limited to any property tax, secured or unsecured, which tax is in arrears. If County exercises the right to reduce the consideration specified in this Contract, County shall give Contractor notice of the amount of any off-set and the reason for the deduction.

8.09 Negotiated Contract: This Contract has been arrived at through negotiation between the parties. Neither party is to be deemed the party which prepared this Contract within the meaning of California Civil Code Section 1654. Each party hereby represents and warrants that in executing this Contract it does so with full knowledge of the rights and duties it may have with respect to the other. Each party also represents and warrants that it has received independent legal advice from its attorney with respect to the matters set forth in this Contract and the rights and duties arising out of this Contract, or that such party willingly foregoes any such consultation.

8.10 Time is of the Essence: Time is of the essence in the performance of this Contract.

8.11 Materiality: The parties consider each and every term, covenant, and provision of this Contract to be material and reasonable.

8.12 Authority and Capacity: Contractor and Contractor's signatory each warrant and represent that each has full authority and capacity to enter into this Contract.

8.13 Binding on Successors: All of the conditions, covenants and terms herein contained shall apply to, and bind, the heirs, successors, executors,

administrators and assigns of Contractor. Contractor and all of Contractor's heirs, successors, executors, administrators, and assigns shall be jointly and severally liable under the Contract.

8.14 Cumulation of Remedies: All of the various rights, options, elections, powers and remedies of the parties shall be construed as cumulative, and no one of them exclusive of any other or of any other legal or equitable remedy which a party might otherwise have in the event of a breach or default of any condition, covenant or term by the other party. The exercise of any single right, option, election, power or remedy shall not, in any way, impair any other right, option, election, power or remedy until all duties and obligations imposed shall have been fully performed.

8.15 No Reliance On Representations: Each party hereby represents and warrants that it is not relying, and has not relied upon any representation or statement made by the other party with respect to the facts involved or its rights or duties. Each party understands and agrees that the facts relevant, or believed to be relevant to this Contract, may hereunder turn out to be other than, or different from the facts now known to such party as true, or believed by such party to be true. The parties expressly assume the risk of the facts turning out to be different and agree that this Contract shall be effective in all respects and shall not be subject to rescission by reason of any such difference in facts.

IN WITNESS WHEREOF, County and Contractor have executed this agreement on the dates set forth below, each signatory represents that he/she has the authority to execute this agreement and to bind the Party on whose behalf his/her execution is made.

COUNTY OF SISKIYOU

Date: 8/14/18

RAY A. HAUPT, CHAIR
Board of Directors
Siskiyou County Flood Control and
Water Conservation District
State of California

ATTEST:
COLLEEN SETZER
Clerk, Board of Supervisors

By: _____
Deputy

CONTRACTOR: Larry Walker Associates

Date: _____

Karen Ashby, Vice President

Date: _____

Kathryn Walker, Assistant Treasurer

[Contractor Signatory Name and Designate official capacity in the business]

License No.:_____
(Licensed in accordance with an act providing for the registration of contractors)

Note to Contractor: For corporations, the contract must be signed by two officers. The first signature must be that of the chairman of the board, president or vice-president; the second signature must be that of the secretary, assistant secretary, chief financial officer or assistant treasurer. (Civ. Code, Sec. 1189 & 1190 and Corps. Code, Sec. 313.)

TAXPAYER I.D. 94-2610668

ACCOUNTING:

Fund	Organization	Account	Activity Code (if applicable)
1026	207050	723000	(SGMA Grant)

Encumbrance number (if applicable)

If not to exceed, include amount not to exceed: $250,000 for fiscal year 2018/2019

If needed for multi-year contracts, please include separate sheet with financial information for each fiscal year.

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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	$188.00
Senior Engineer/Scientist	$172.00
Associate Engineer/Scientist II	$159.00
Associate Engineer/Scientist I	$151.00
Staff Engineer/Scientist II	$141.00
Graduate Engineer/Scientist	$108.00
Engineering Intern II	$62.00
Engineering Intern I	$41.00
Student Intern	$21.0
Technical/project Assistant	$93.00
Secretary/Clerical II	$85.00
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.

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	$188.00
Senior Engineer/Scientist	$172.00
Associate Engineer/Scientist II	$159.00
Associate Engineer/Scientist I	$151.00
Staff Engineer/Scientist II	$141.00
Graduate Engineer/Scientist	$108.00
Engineering Intern II	$62.00
Engineering Intern I	$41.00
Student Intern	$21.0
Technical/project Assistant	$93.00
Secretary/Clerical II	$85.00
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.

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	$188.00
Senior Engineer/Scientist	$172.00
Associate Engineer/Scientist II	$159.00
Associate Engineer/Scientist I	$151.00
Staff Engineer/Scientist II	$141.00
Graduate Engineer/Scientist	$108.00
Engineering Intern II	$62.00
Engineering Intern I	$41.00
Student Intern	$21.0
Technical/project Assistant	$93.00
Secretary/Clerical II	$85.00
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
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SonTek RiverSurveyor M9 ADCP	$275.00/day
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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.