

PROPOSAL

# Water Year 2021 Annual Report for the Paso Robles Subbasin Groundwater Sustainability Plan

Presented to the City of Paso Robles

SEPTEMBER 2021

*Submitted by:*

GSI Water Solutions, Inc.  
5855 Capistrano Avenue, Suite C  
Atascadero, CA 93422  
805.460.4622





# Section 1

## Cover Letter

September 30, 2021

Christopher Alakel  
Interim Public Works Director  
City of Paso Robles – City Hall  
1000 Spring Street  
Paso Robles, CA 93446

### Re: Invitation to Submit Proposal for the Water Year 2021 Annual Report for the Paso Robles Subbasin Groundwater Sustainability Plan

Dear Mr. Alakel:

GSI Water Solutions, Inc. (GSI), is pleased to present our proposal to help the City of Paso Robles (City) and its Groundwater Sustainability Agency (GSA) partners develop the Water Year 2021 Annual Report for the Paso Robles Subbasin (Basin) Groundwater Sustainability Plan (GSP). GSI brings considerable institutional knowledge from our involvement in the development and implementation of the GSP in an advisory role and the preparation of the first two annual reports on behalf of the GSAs. Our team offers:

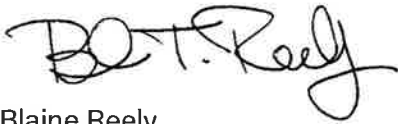
- **A streamlined, cost-efficient project delivery.** We will be able to hit the ground running with a cost-effective process for developing the 2021 Annual Report. Over the past 2 years, we have developed templates for data analysis and reporting that are designed to be easily updated for future annual reports. This will enable us to conduct data analysis for this year's report at a reduced cost.
- **A wealth of experience in groundwater management projects in the Basin.** Our groundwater experts have been working in the Basin for decades. Because of this and our ongoing advisory involvement in GSP implementation, our team is highly knowledgeable of the specifics of the Paso Robles Basin GSP and the needs and issues of each GSA. This will enable our team to work effectively and efficiently with stakeholders, helping to keep the project on track to meet tight deadlines.
- **The ability to foster collaboration and consensus.** We have earned a reputation for drawing independent, evidence-based conclusions to help all parties come together in a collaborative, cooperative manner. This has helped us build trust and credibility with members of the GSAs. Our unbiased approach allows us to work effectively with stakeholders, facilitate timely reviews and decision-making, and help stakeholders find common ground to build consensus.
- **Direct expertise with the Sustainable Groundwater Management Act (SGMA).** We are leading a number of GSP development efforts and serve as technical advisors to several more. We served in an advisory role in the development of the Paso Robles Basin GSP, and we understand the needs and issues of each GSA. We also bring proven experience in developing annual reports that meet the expectations of the California Department of Water Resources (DWR or the Department).

GSI is a specialized hydrogeologic consulting firm founded in 2000 with a focus on the sustainable management of groundwater resources. The firm is an S corporation that is 100 percent employee-owned through an Employee Stock Ownership Plan. We take pride in our fiscal responsibility; our company's financial stability is managed under the careful eye of our financial controller, who is a firm principal with years of accounting experience. Our firm has experienced steady growth over the past 21 years, and we are investing in our people and technology to support continued managed growth and serve our clients' needs. The firm was founded by three hydrogeologists (including project team member Jeff Barry); today, GSI has 75 employees, with offices in Atascadero and Santa Barbara, California, and Portland, Bend, and Corvallis, Oregon.

The GSAs are required by SGMA to prepare an annual report that measures the effectiveness of the GSP and demonstrates to DWR that the Basin is on track to sustainably manage its groundwater resource. Developing an annual report that will be approved by DWR entails compiling data, summarizing the results of monitoring efforts, documenting changes in groundwater supplies, tabulating basin-wide groundwater use, and tracking the effectiveness of GSP implementation efforts. Because GSI has completed this report for the past 2 years, we have established an efficient and streamlined process for updating templates and revising analyses with new data.

We appreciate the confidence that the GSAs have placed in GSI to request this proposal for the preparation and development of the 2021 Annual Report. This proposal is valid for ninety (90) days. We look forward to the opportunity to support this project for the Basin. Please do not hesitate to contact me with questions.

Sincerely,  
GSI Water Solutions, Inc.



Blaine Reely  
Principal Water Resources Engineer  
805.895.4627  
breely@gsiws.com  
5855 Capistrano Avenue, Suite C  
Atascadero, CA 93422



Nate Page  
Managing Hydrogeologist  
805.460.4624  
npage@gsiws.com  
5855 Capistrano Avenue, Suite C  
Atascadero, CA 93422

# Section 2

## Qualifications, Approach, and Scope of Work

### Experience Providing SGMA-Related Services

GSI is a specialized groundwater and water resources consulting firm that helps clients develop and manage groundwater supplies to ensure long-term sustainability and reliability. Our groundwater experts have a wealth of experience from decades of working on groundwater management projects in the Basin. We were heavily involved in GSP development in the Basin and are currently involved with ongoing GSP implementation efforts. GSI is also engaged in development of several GSPs for other basins in southern California.

GSI authored the first two annual reports for the Basin. We are well-acquainted with the Basin’s GSP, and we understand what is needed to develop an annual report that meets DWR requirements and measures the success of plan implementation over time. Our hydrogeologists and water resources consultants are experts in groundwater management and supply planning, specifically as it relates to SGMA compliance.

We have worked or are working on several GSPs and SGMA-related projects, including GSP development for the Atascadero Basin GSA, San Luis Obispo Valley Basin GSAs, Arroyo Grande Valley Subbasin GSAs, Carpinteria Valley Basin GSA, San Antonio Basin GSA, Santa Ynez River Valley Basin Eastern Management Area GSA, Santa Clarita Valley GSA, Kaweah Subbasin GSAs, and Cuyama Basin GSA.

This work includes conducting hydrogeologic investigations, developing water budgets that can achieve sustainability, identifying potential undesirable results, effectively communicating with basin stakeholders on technical matters and helping to identify commonalities that set the stage for a collaborative process, and identifying and implementing practical solutions to achieve sustainability goals. Our SGMA experience includes the following projects:

	Hydrogeologic assessments	Groundwater management planning	Groundwater modeling and water budgets	Data management systems	Groundwater/surface water interaction	Stakeholder engagement	GSA support/GSP preparation
<b>Expertise and Input to the Paso Robles Basin GSP</b> , Shandon-San Juan Water District and Estrella-El Pomar-Creston Water District • San Luis Obispo County, CA	•	•	•		•	•	•
<b>Hydrogeological Characterization and GSP Preparation</b> , Atascadero Basin GSA • Atascadero, CA	•	•	•		•	•	•
<b>Hydrogeological Characterization and GSP Preparation</b> , Cuyama Basin GSA • Santa Barbara and San Luis Obispo Counties, CA	•	•			•		•
<b>GSP Development</b> , Santa Ynez River Valley Eastern Management Area GSA • Santa Barbara County, CA	•	•	•	•	•	•	•
<b>GSP Development</b> , San Antonio Basin GSA • Santa Barbara County, CA	•	•	•	•	•	•	•
<b>GSP Development</b> , Santa Clarita Valley GSA • Santa Clarita, CA	•	•	•	•	•	•	•
<b>SGMA Basin Boundary Modification</b> , Santa Clarita Valley GSA • Santa Clarita, CA	•	•				•	•
<b>GSP Development</b> , Carpinteria Valley GSA • Santa Barbara County, CA	•	•				•	•
<b>GSP Development</b> , San Luis Obispo Valley Basin GSAs • San Luis Obispo County, CA	•	•	•		•	•	•
<b>SGMA/GSP Preparation</b> , Mid-Kaweah and Greater Kaweah GSAs • Tulare, CA	•	•	•		•	•	•
<b>SGMA Basin Boundary Modification</b> , Atascadero Mutual Water Company and Templeton Community Services District • Atascadero, CA	•	•				•	•
<b>SGMA Basin Boundary Modification for the Santa Maria Groundwater Basin</b> , County of San Luis Obispo, CA	•	•				•	•



## Relevant Project Experience

In addition to the SGMA-specific projects listed above, GSI's experts have worked on numerous annual reporting projects. The following projects speak to GSI's ability to deliver comprehensive annual reports that meet state and regional requirements.

### Adjudicated Groundwater Basin Annual Report Preparation

Northern Cities Management Area, Santa Maria River Valley Groundwater Basin,  
San Luis Obispo County, California

GSI manages the preparation and submittal of the court-mandated annual reports for the Northern Cities Management Area of the Santa Maria River Valley Groundwater Basin—which represents the Cities of Pismo Beach, Arroyo Grande, and Grover Beach, and the Oceano Community Services District (CSD). Tasks include sampling and monitoring key sentry wells in the Northern Cities area to assess potential seawater intrusion and providing technical support and report preparation of quarterly and annual reporting required by the Superior Court and by DWR as a result of the Santa Maria Basin adjudication.

---

### GSP Annual Report Preparation

Paso Robles GSAs, City of Paso Robles, California

GSI has developed the first two annual reports for the Paso Robles Basin GSP. As required by SGMA, the annual reports provide an overview of groundwater extractions, surface water use, groundwater elevation trends, change of groundwater in storage, and progress towards basin sustainability which occurred over the prior water year. GSI has delivered each of the first two annual reports on time and under budget.

---

### Groundwater Monitoring and Reporting

Santa Paula Water Recycling Facility, City of Santa Paula, California

For more than a decade, GSI has helped guide the City of Santa Paula to support compliance with groundwater monitoring and reporting requirements provided by the California Regional Water Quality Control Board. This has involved design of water recycling facility percolation ponds and installation of a network of dedicated groundwater monitoring wells and water level transducers. To confirm that the project does not adversely affect groundwater quality of the Santa Paula groundwater basin, we have conducted monthly groundwater sampling and prepared quarterly and annual monitoring reports on behalf of the City, presenting groundwater elevation contours and historical water quality data in compliance with permit requirements.



Santa Paula Water Recycling Facility



## GSP Development

San Luis Obispo Valley Basin, San Luis Obispo County, California

GSI is a lead member of the consultant team helping to develop the GSP for the San Luis Obispo Basin. GSI's primary role is to develop the technical aspects of the GSP, including characterizing basin conditions, developing a coupled groundwater and surface water model, assessing surface water and groundwater interconnections, developing water budgets, assisting in the development of sustainable management criteria, and identifying undesirable results. GSI is also communicating technical information to stakeholders to ensure that the hydrogeologic details and the nuances of the SGMA process are well understood by all parties.

---

## GSP Development

San Antonio Basin GSA, Santa Barbara County, California

GSI is helping the San Antonio Basin GSA prepare a GSP for this predominantly agricultural basin. The GSI team used data and information recently developed by U.S. Geological Survey (USGS) to characterize groundwater conditions in the basin and reduce the cost of preparing the GSP. GSI worked with USGS to use its groundwater model to develop water budgets and assess various groundwater management alternatives intended to recover groundwater to sustainable levels. GSI has also supported stakeholder outreach efforts. GSI was the lead author of the 450-page GSP, which is currently out for public review. It will be submitted to DWR in January.

---

## Project Approach

Section 356.2 of the SGMA regulations outlines the specific requirements of the annual report, which must be submitted to DWR by April 1 of each year following adoption of the GSP. The regulations require that the annual report be based on the preceding water year (a water year covers the period from October 1 to September 30); thus, the Water Year 2021 Annual Report, due March 31, 2022, will be reporting on data and actions from October 1, 2020 through September 30, 2021. However, since the groundwater level readings by San Luis Obispo County (County) are typically performed in April and October of each year, the Water Year 2021 Annual Report should include water level data from November 1, 2020, through October 31, 2021.

DWR requires that the annual report describe the effectiveness of GSP implementation. GSAs can measure effectiveness and demonstrate to DWR that the plan is on track to achieve sustainability through compiling data and information that summarize the results of the monitoring efforts, documenting changes in groundwater supplies, tabulating basin-wide groundwater use, and documenting progress toward meeting interim milestones and (ultimately) basin sustainability.



## Scope of Work

GSI developed the following scope of work based on the requirements in the request for proposals (RFP), the requirements outlined in the SGMA Emergency Regulations, and our experience preparing various other annual reports to meet DWR and other agency standards.

### Task 1 – Data Compilation

The initial efforts will concentrate on developing the data needs, requesting data, and compiling the requirement information and data to prepare the report. All the historical data in the GSP is compiled in the GSP Access® database. We will make data requests of the appropriate agencies to gather groundwater level data and production records. We will update the database files and the requisite data sets for the annual report. The data sources are varied and will require coordination and cooperation from a wide variety of agencies and entities.

### Task 2 – Data Analysis and Representation

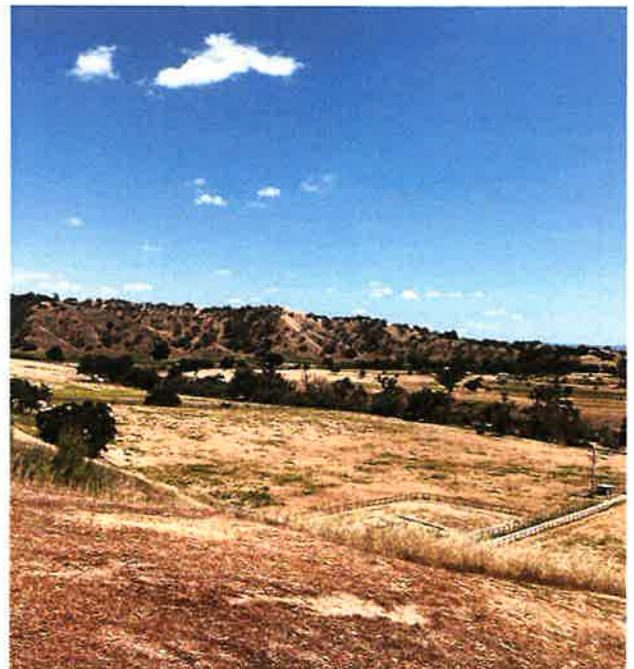
Several discrete data sets are required in the annual report, including the following:

- Groundwater elevation data (for each principal aquifer)
- Groundwater extractions and use
- Surface water supply use
- Total water use
- Change in groundwater in storage
- Precipitation

**Task 2.1 Groundwater Elevation Data.** Historically, basin groundwater elevation data have been collected and compiled exclusively through the County of San Luis Obispo Groundwater Level Monitoring Program, operated by the County Public Works Department with data collected twice a year (typically in April and October). We have worked extensively with the program, the County's data set, and the confidential nature of much of the data. In 2021, the County dataset is being augmented with groundwater elevation data collected through monitoring network expansion efforts of Shandon-San Juan Water District (SSJWD) and Estrella-El Pomar-Creston Water District (EPCWD). These data will be incorporated into the 2021 groundwater elevation analyses, providing an improved understanding of the basin groundwater conditions.

For purposes of preparing water level contour maps of each of the principal aquifers (Paso Robles Formation Aquifer and the Alluvial Aquifer), the entire County water level database can be used if no individual data or data points are shown that would conflict with confidentiality agreements. Groundwater elevation data collected through the monitoring network expansion efforts of SSJWD and EPCWD will also be used. For the Water Year 2021 Annual Report, water level contour maps for each aquifer will be prepared representing groundwater conditions in April 2021 and October 2021.

The GSP monitoring network includes 22 representative monitoring site (RMS) wells, which are a subset of the County monitoring program consisting of wells whose owners have agreed to allow their data to be made public. Hydrographs for each of the 22 RMS wells presented in Appendix D of the GSP will be updated with data through October 2021 in the Water Year 2021 Annual Report.





**Task 2.2 Groundwater Extractions.** Groundwater extraction data through September 2020 were compiled and represented in the first two annual reports. These data will be updated for Water Year 2021, including the estimates of extractions and general locations, the water use by sector, and methodology of measurement. Updated groundwater extraction information will be estimated using crop coverage information and water use factors used in the groundwater model. We will follow the same methodology used in the GSP and in the first two annual reports. We will prepare estimates of groundwater use by sector and method of measurement, and will provide a map showing general locations and volumes of extraction.

**Task 2.3 Surface Water Supply.** The regulations require that a description of surface water supplies be incorporated into the report. Use of surface water in the Basin is relatively small and limited to a very few sources. These data will be compiled, described, and incorporated into the total basin water use data compilation and descriptions (see Task 2.4).

**Task 2.4 Total Water Use.** We will compile and present total basin water use information, including water sector, water source type, method of measurement, and a relative representation of accuracy of the measurement methodology (DWR standards require qualitative judgments of accuracy such as “high,” “medium,” or “low”).

**Task 2.5 Change in Groundwater in Storage.** Calculations of changes in groundwater in storage in each of the principal aquifers as presented in the GSP were performed through use of the groundwater flow model. To perform similar calculations for the annual reports would require updating the model every year, which is neither planned nor advised. An alternative standard method for calculating changes in groundwater in storage from one year to another is to create water level contour maps for each year of interest (see Task 2.1) and calculate the volume changes between years. An ArcGIS® tool will be used to compute the volume difference between the initial groundwater surface and the following year’s groundwater surface. By applying a storativity factor (for the semi-confined Paso Robles Formation) or specific yield (for the unconfined alluvial aquifer) value, we can compute a change in the volume of water present in each aquifer. Following is a step-by-step process that we used for preparation of this task in the first two annual reports, and that we intend to apply this year to estimate change in storage in both the Alluvial Aquifer and Paso Robles Formation Aquifer:

1. Create a water level contour map for October 2021 using groundwater level elevation data from the basin-wide monitoring program and Surfer® contouring and 3D surface mapping software.<sup>1</sup>
2. Import the Surfer file into ArcGIS and adjust the contoured water level elevation surface to fit the boundaries of the Basin. We will use professional judgment to adjust contours in places that do not make sense.
3. Using ArcGIS, compute the difference in the water surface elevation between October 2020 water level data (which was prepared for the Water Year 2020 Annual Report) and October 2021 water level data and compute the change in volume of saturated aquifer.
4. Multiply the specific yield or storage coefficient values by the volume calculated in Step 3. This is the change in groundwater in storage between October 2020 and October 2021.
5. Determine whether this makes technical sense and identify where the biggest changes (plus or minus) are occurring.

Note that the resulting calculated change in storage values may be quite different from the values that would otherwise be calculated as a model output if the groundwater model were updated and utilized because the methodologies are quite different and the averaged storativity value may or may not be fully representative of conditions throughout the Basin, both laterally and vertically.

<sup>1</sup> Groundwater elevation data collected from the monitoring network expansion efforts cannot be fully utilized for change in groundwater in storage calculations until 2 years of data collection have been completed from each new monitoring well. These new data can be fully utilized in the Water Year 2022 Annual Report.



### Task 3 – Report Preparation, including Plan Implementation Progress

The overall purpose of the annual report is to update and use the compiled data to assess the progress that the Basin GSAs and various stakeholders are making towards the goal of sustainability. The results of the data analysis will be evaluated and compared with the goals of the GSP implementation plan, then described in the annual report to demonstrate to DWR the efforts of the GSAs and the effectiveness of GSP implementation. GSI will prepare an initial administrative draft report for the GSA staff. The report will be based on data collected and the analysis performed as described above, on other data that may become available, and on ongoing discussions with the GSA staff. The general organization of the report is expected to be the following:

- Executive Summary
- Introduction
- Basin Setting and Monitoring Networks
  - » Subbasin Setting
  - » Precipitation and Climatic Periods
  - » Monitoring Networks
- Groundwater Elevations, including water level contour maps and updated hydrographs
- Groundwater Extractions
  - » Municipal Metered
  - » Agricultural Irrigation
  - » Rural Domestic and Small Public Water Systems
  - » Total Groundwater Extraction Summary
- Surface Water Use
- Total Water Use
- Change in Groundwater in Storage
- Progress Towards Basin Sustainability
- Appendices
  - » A. GSP Regulations
  - » B. Precipitation Data
  - » C. Groundwater Level and Groundwater Storage Monitoring Well Network
  - » D. Potential Future Monitoring Wells
  - » E. Hydrographs
  - » F. Paso Robles Formation Aquifer Storage Coefficient Derivation and Sensitivity Analysis
  - » Additional appendices containing studies significant to progress towards basin sustainability

Deliverables include the following:

- Administrative Draft report, for review and approval by the GSA staff
- Public Review Draft report, for review by the Paso Basin Cooperative Committee (PBCC) and the public
- Final Draft, for approval at the PBCC meeting
- Final report



## Task 4 - Report Submittal to DWR

Following final approval of the annual report by the GSAs and the PBCC, GSI will submit the report to DWR in accordance with the Department's requirements.

## Task 5 - Meetings

GSI has budgeted for the following meetings:

- GSA staff meetings (4), including the kickoff meeting
- PBCC meeting

**Note:** The RFP scope includes five GSA staff meetings, a public workshop, and up to two PBCC meetings. We have found that we have been able to successfully complete this work with fewer meetings, and we have not facilitated a public workshop for either of the first two annual reports. We are recommending we keep this more streamlined approach to meetings to keep costs down.

## Task 6 - Project Management and Administration

The annual report must be completed efficiently to be within budget, and there are limited funds to complete this work, so it is imperative that we stay on track with scope, schedule, and budget to avoid surprises. To achieve this objective, we are proposing a small and focused team led by Nate Page, whose understanding of the Basin and the SGMA regulations has been critical to the successful completion of the first two annual reports, backed up by Jeff Barry as an alternate. Blaine Reely will serve as technical advisor. Blaine's experience from his prior role as San Miguel CSD GSA's representative on the PBCC provides invaluable insight into the collaborative efforts being made to achieve basin sustainability. Nate will be responsible for assuring that our work is completed within budget and on schedule. He will rely on financial performance information provided by GSI's accounting group and will inform the City (and GSAs) on a regular basis regarding the status of scope, schedule, and budget. With our office in Atascadero, we can effectively apply our time and resources to the effort at hand. We will draw upon the full GSI team for expertise in specific areas of need.

GSI's proven project management approach is built on clear and frequent communication with our clients. As such, the team will maintain close communications with GSA staff. We have been fortunate to develop a close working relationship with all members of the GSA staff working group and fully intend to continue that rapport.

## Optional Tasks

- **Upload Groundwater Elevation Readings to DWR:** Upon written approval, GSI shall prepare and upload groundwater elevation readings representing the seasonal low and seasonal high groundwater conditions in the Basin to DWR electronically (23 California Code of Regulations § 354.34(c)(1)(B) and § 354.40) by the Department's deadlines. This optional task is for submittal of the fall 2021 and spring 2022 groundwater level measurements. The budget for this optional task is included in this proposal.
- **Additional Report Materials:** This optional task includes preparing one round of revisions to the annual report to address potential DWR questions and comments. We would develop the scope for this optional task after receipt of DWR comments, as the complexity of this task would depend on the extent of the comments. The scope may include up to two additional GSA staff meetings. If authorized, the work would be performed in accordance with our schedule of fees associated with this project.



## Project Scope and Budget Assumptions

We assume that the GSAs will provide timely assistance in requesting the following data:

- Water levels for April and October 2021
- Groundwater production data for San Miguel CSD, County Service Area 16, and the City of Paso Robles for Water Year 2021
- Pesticide report files and land-use data from the Agricultural Commissioner's office that will enable estimation of irrigation demand for 2021

Our scope includes:

- Four GSA staff meetings, including the kickoff meeting, lasting 2 hours each
- One PBCC meeting lasting 2 hours
- One set of revisions to the Administrative Draft report
- One set of revisions to the Public Draft report
- One set of minor revisions to the Final Draft report
- Submittal of the Final Annual Report



# Section 3

## Staffing

The following key team members will be responsible for the on-time, on-budget delivery of project deliverables. Please see Appendix A for detailed resumes with project descriptions and references.



### **Nate Page, PG** | Managing Hydrogeologist | Atascadero, California

**Role:**  
Project Manager  
and Data Analyst/  
Technical Lead

**Experience:**  
14 years

**Education:**  
MA, Geology;  
BS, Geological  
Sciences

Nate's expertise includes aspects of hydrogeology and geographic information system (GIS) analysis, specifically related to groundwater supply development, groundwater basin analysis, and water resource management. He is experienced in analyzing regional groundwater basins and conducting groundwater quality studies, developing salt and nutrient management plans, supporting GSP development, conducting surface water/groundwater studies, and calculating perennial yield and basin water balance components. Nate has expertise in aquifer testing and analysis, data analysis, and numerical modeling, as well as groundwater and surface water sampling, quality assurance/quality control of laboratory water quality data, and water quality database management. He has provided essential support for the development of technical memorandums, reports, GSP chapters, and other documents and has periodically assisted with technical groundwater issues in the Basin. Nate also has experience in 3D geological modeling and land surveying. For this project, Nate will serve as project manager and data analyst for all tasks described in our scope of work. He will work closely with Blaine to ensure that deliverables meet quality, budget, and schedule expectations.



### **Blaine Reely, PhD, PE** | Principal Water Resources Engineer | Atascadero, California

**Role:**  
Engineering  
Support/Technical  
Advisor

**Experience:**  
35+ years

**Education:**  
PhD, Civil  
Engineering; MS,  
Civil Engineering;  
BS, Geological  
Engineering

Blaine has more than 35 years of experience managing projects related to civil engineering and hydrology, with specific expertise in water supply treatment and distribution, wastewater collection and treatment, and energy efficiency studies. His technical expertise includes stormwater drainage and flood studies, hydrologic/hydraulic modeling, and the development and implementation of cost reduction strategies for water utilities. Prior to joining GSI in 2021, Blaine served as District Engineer for the San Miguel CSD, where he acted as the GSA's representative on the PBCC and was the GSA's staff member responsible for overseeing the development of the Paso Robles Groundwater Basin GSP. For this project, Blaine will provide engineering technical support and serve as an advisor to the project team. Blaine's experience working on the 2020 and 2021 Annual Reports as a member of San Miguel CSD will enable him to bring invaluable insights to the project.





**Jeff Barry, RG, LHG | Principal Hydrogeologist | Atascadero, California**

---

**Role:**  
Alternate Project Manager

**Experience:**  
30+ years

**Education:**  
MS, Hydrogeology/  
Hydrology;  
BS, Resource Management

Jeff is a hydrogeologist with more than three decades of experience conducting groundwater resource development projects and groundwater management programs in California and the Pacific Northwest. Jeff has considerable hands-on knowledge regarding SGMA, having provided SGMA support to several GSAs and water purveyors. This work has involved consulting services for GSA formation, grant writing, groundwater-dependent ecosystem analysis, and successful boundary modification requests to DWR. Currently, he is managing GSP development for Santa Clarita Valley GSA, the San Antonio Basin GSA, and the Eastern Management Area GSA for the Santa Ynez Basin. He also has assisted San Luis Obispo County with several SGMA-related projects and helped to develop its groundwater offset program (water allocation program) to guide the County and landowners on how to mitigate or offset additional groundwater use in the Paso Robles Sub-basin without causing additional water level declines. He has been involved in reviewing various chapters of the Paso Robles Basin GSP and has offered technical input in support of GSI personnel. He is a founding principal at GSI. For this project, Jeff will serve as an alternate to Nate and provide back-up project manager support as needed. He will also serve as an alternate technical advisor.



**Ailco Wolf, PG, CHG | Supervising Hydrogeologist | Claremont, California**

---

**Role:**  
Groundwater Modeling

**Experience:**  
21 years

**Education:**  
MS, Hydrogeology/  
Hydrology; BS,  
Resource Mgmt.

Ailco has more than 20 years of experience in groundwater supply and basin management for clients throughout California. His expertise includes supply development with recycled water, stormwater capture, and artificial recharge projects. An experienced groundwater modeler, Ailco has conducted numerous aquifer and basin-wide studies to determine available groundwater supply by developing groundwater and watershed models to resolve groundwater issues in collaboration with involved stakeholders. Ailco updated the soil water balance model to calculate agricultural irrigation demand for the first annual report and assisted Nate with the same for the second annual report. For this project, Ailco will provide modeling support and serve as backup to Nate on modeling-related tasks.



**Lee Knudtson | Staff Hydrologist | Atascadero, California**

---

**Role:**  
Alternate Data Analyst and Technical Lead

**Experience:**  
7 years

**Education:**  
BS, Natural Sciences

Lee has 7 years of experience working in the groundwater industry. Lee is experienced in merging groundwater data sets from a variety of different sources and developing data analysis methods and tools to produce meaningful information. He has planned and implemented field data collection efforts and is knowledgeable about aquifer characterization, well testing, and groundwater modeling to assist with scenario planning. Lee has experience implementing groundwater monitoring projects for agricultural stakeholders and groundwater sustainability agencies in California in support of compliance with SGMA and California Regional Water Quality Control Board groundwater monitoring requirements. Lee provided technical support for the 2021 Annual Report. For this project, Lee will provide backup to Nate as an alternate data analyst and technical lead.

# Section 4

## Fee Proposal and Schedule

### Fee Proposal

GSI has developed a streamlined approach to preparing the Basin’s annual report. Last year, this approach resulted in our team completing the report \$18,000 under budget—nearly 23 percent lower than our contracted amount. We will continue to apply these same cost efficiencies to the project. As such, we are proposing a reduced budget this year as compared to last year.

The table below presents a task-by-task breakdown of our proposed budget for all required services. We have not included any expenses for travel, lodging, or meals in our cost proposal.

Project Tasks	Labor Hours	Labor Cost	Outside Services	Direct Expenses	Total
<b>Task 1 - Data Compilation</b>	30	\$4,480	\$0	\$0	<b>\$4,480</b>
<b>Task 2 - Data Analysis and Representation</b>	194	\$32,610	\$0	\$0	<b>\$32,610</b>
<b>Task 3 - Report Preparation</b>	119	\$21,410	\$0	\$0	<b>\$21,410</b>
<b>Task 4 - Report Submittal to DWR</b>	4	\$700	\$0	\$0	<b>\$700</b>
<b>Task 5 - Meetings</b>	48	\$9,960	\$0	\$0	<b>\$9,960</b>
<b>Task 6 - Project Management and Administration</b>	16	\$3,120	\$0	\$0	<b>\$3,120</b>
<b>Project Subtotals</b>	<b>411</b>	<b>\$72,280</b>	<b>\$0</b>	<b>\$0</b>	<b>\$72,280</b>
<b>Optional Task - Upload Groundwater Elevation Readings to DWR</b>	4	\$700	\$0	\$0	<b>\$700</b>
<b>Project Totals</b>	<b>415</b>	<b>\$72,980</b>	<b>\$0</b>	<b>\$0</b>	<b>\$72,980</b>

Note: The scope and budget for the **Additional Report Materials** optional task will be developed in the event that DWR provides comments on the Annual Report. The scope may include up to two additional GSA staff meetings. If authorized, the work would be performed in accordance with the following schedule of fees:

Labor Category	Hourly Rate
<b>Technical Professionals</b>	
Principal	\$240 – \$280
Supervising	\$180 – \$250
Managing	\$160 – \$190
Consulting	\$140 – \$170
Project	\$130 – \$150
Staff	\$100 – \$140
<b>Other Services</b>	
GIS/Graphics	\$100 – \$170
Editor/Documents	\$110 – \$140
Administration	\$70 – \$110



## Schedule

Meeting your schedule is a top priority for the GSI team. The following schedule outlines a way to submit the final deliverable by March 31, 2022. Should any schedule deviation occur, the GSI team will address it immediately and propose a solution to the GSA staff.



# Section 5

## Contract Terms

---

GSI accepts all contract terms and conditions presented in the RFP and the Professional Services Agreement.

# Section 6

## References

---

### Atascadero Mutual Water Company (AMWC)

GSI has worked with AMWC on a number of projects, including the Atascadero Basin GSP (described in Section 2 of this proposal), as well as the Atascadero Basin Boundary Modification Request, which entailed a detailed investigation to formally define groundwater basin boundaries through extensive geologic and hydrogeologic mapping and analysis, and well log review.

Reference: John Neil, General Manager, 805.466.2428, [jneil@amwc.us](mailto:jneil@amwc.us)

### Templeton Community Services District (TCSD)

GSI has worked with TCSD on a number of projects, including the Atascadero Basin GSP (described in Section 2 of this proposal), as well as the Atascadero Basin Boundary Modification Request, described in the previous reference. GSI personnel have also supported a number of other projects, including the Bonita Well Replacement and the Creekside Ranch Nacimiento Water Project Recharge and Recovery Project.

Reference: Jeff Britz, General Manager, 805.434.4900, [jbriltz@templetoncsd.org](mailto:jbriltz@templetoncsd.org)

### County of San Luis Obispo

GSI has helped the County on a number of projects since 2015, including GSP development for the San Luis Obispo Valley Groundwater Basin; hydrogeologic characterizations of the Santa Maria Groundwater Basin and the San Luis Obispo Valley Groundwater Basin; and a basin boundary modification request for the fringe areas of the Santa Maria Groundwater Basin.

Reference: Courtney Howard, Water Resources Division Manager, 805.781.1016, [choward@co.slo.ca.us](mailto:choward@co.slo.ca.us)

### City of Pismo Beach

GSI is responsible for the preparation and submittal of annual reports on behalf of the Northern Cities Management Area, which represents the City of Pismo Beach. This project is detailed in Section 2.

Reference: Ben Fine, Director of Public Works/City Engineer, 805.773.7037, [bfine@pismo-beach.org](mailto:bfine@pismo-beach.org)

### Oceano Community Services District

GSI is responsible for the preparation and submittal of annual reports on behalf of the Northern Cities Management Area, which represents Oceano Community Services District. This project is detailed in Section 2.

Reference: Will Ciemens, General Manager, General Manager, 805.481.6730, [will@oceanocsd.org](mailto:will@oceanocsd.org)

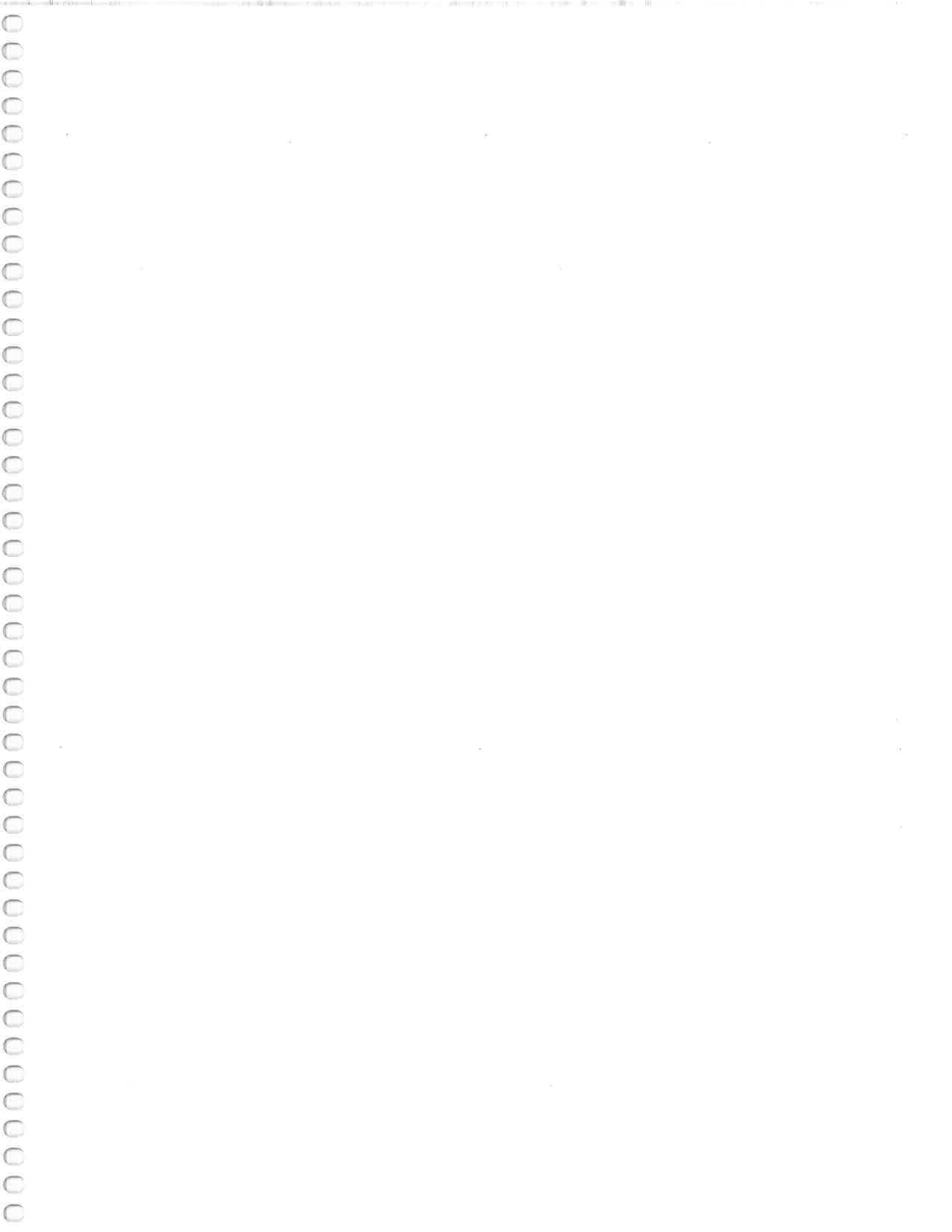
# Section 7

## Disclosures

---

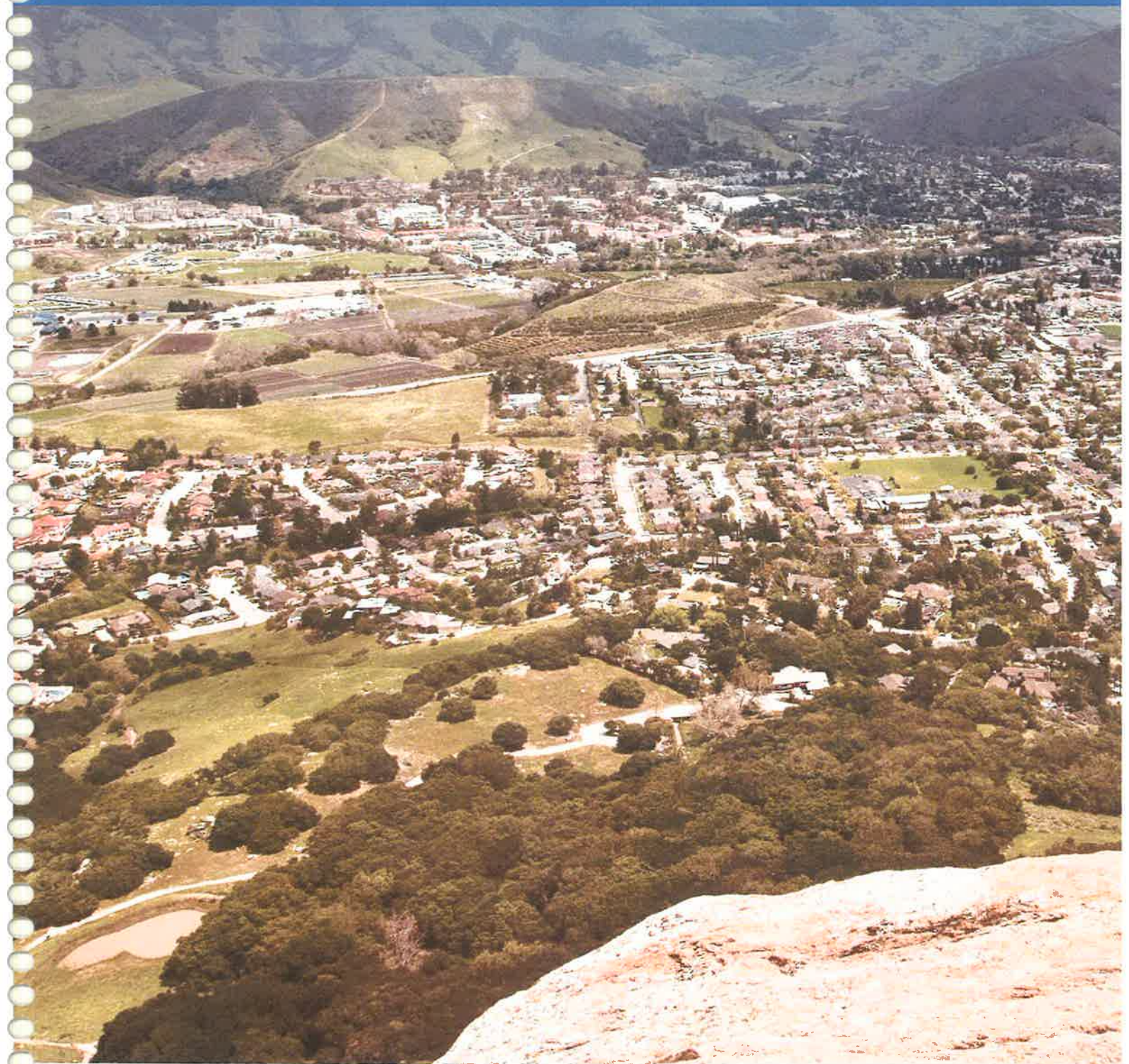
An Oregon client of GSI filed a complaint regarding a well project on December 21, 2018. GSI is working with our insurance carrier, attorneys, and subject matter experts to resolve the complaint with the client. GSI has had no other legal conflicts since its founding.



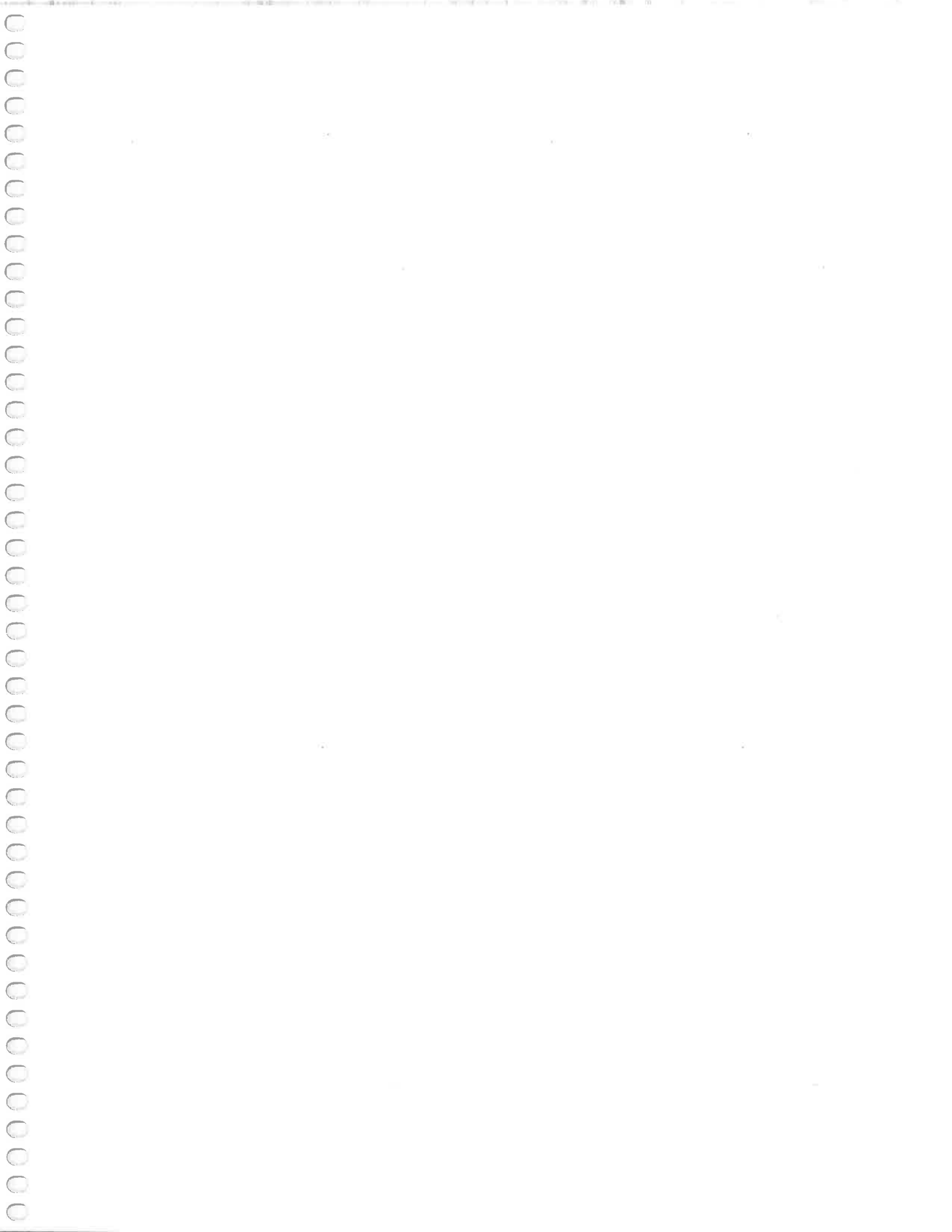


# APPENDIX A

## Resumes







## Nate Page, PG *Managing Hydrogeologist*



Nate has 14 years of experience working with clients to manage water resources. His expertise includes aspects of hydrogeology and geographic information system (GIS) analysis, specifically related to groundwater supply development, groundwater basin analysis, and water resource management. He is experienced in analyzing regional groundwater basins and conducting groundwater quality studies, developing salt and nutrient management plans, supporting groundwater sustainability plan (GSP) development, conducting surface water/groundwater studies, and calculating perennial yield and basin water balance components. Nate has expertise in aquifer testing and analysis, data analysis, and numerical modeling, as well as groundwater and surface water sampling, quality control of laboratory water quality data, and water quality database management. He provides essential support for the development of technical memorandums, reports, GSP chapters, and other documents.

### EDUCATION

MS, Hydrogeophysics,  
Colorado State University

BS, Geology, St. Lawrence  
University

### PROFESSIONAL REGISTRATIONS

Professional Geologist  
(California and Utah)

### DISTINGUISHING QUALIFICATIONS

- ✓ Groundwater sustainability and water resource management
- ✓ Groundwater basin analyses
- ✓ Surface water/groundwater interaction and GDE studies
- ✓ SGMA studies and GSP development
- ✓ Aquifer testing and analysis
- ✓ GIS spatial analysis including NDVI
- ✓ 3D modeling and groundwater model grid development in Leapfrog 3D®

### REFERENCES

- **John Neil**, Atascadero Mutual Water Company, 805.466.2428, jneil@amwc.us.  
Projects: Atascadero Basin GSP; Atascadero Basin Boundary Modification Request
- **Jeff Brittz**, Templeton Community Services District, 805.434.4900, jbriltz@templetoncsd.org. Projects: Atascadero Basin GSP, Atascadero Basin Boundary Modification Request

### REPRESENTATIVE PROJECTS

**GSP Annual Reports, Paso Robles Basin GSP, San Luis Obispo County, California.** Nate has been lead analyst and author of the first two annual reports for the Paso Robles Basin GSP. The annual reports provide an overview of groundwater extractions, surface water use, groundwater elevation trends, change of groundwater in storage, and progress towards basin sustainability which occurred over the prior water year. These reports are required by the Sustainable Groundwater Management Act (SGMA).

**Staff Extension Services and Hydrogeologic Expertise and Input to the Paso Robles Basin GSP, Shandon-San Juan Water District (SSJWD) and Estrella-El Pomar-Creston Water District, San Luis Obispo County, California.** Nate has assisted with GSI's role as technical expert in support of the preparation of a basinwide GSP on behalf of the two agricultural water districts in the Paso Robles Basin (Basin). GSI staff acted as an extension of staff for the SSJWD, which is one of four GSAs in the Basin, representing the district in a working group of staff members from the four GSAs that provides guidance to the GSP consultant team regarding the development of the GSP. GSI's role as SSJWD staff extension and hydrogeological expert support is continuing into the current GSP implementation phase, with a primary initial focus on expansion of the groundwater monitoring network.

**Northern Cities Management Area (NCMA) Annual Monitoring Report, Cities of Arroyo Grande, Grover Beach, and Pismo Beach, and Oceano Community Services District, California.** Nate has prepared annual monitoring reports and overseen quarterly groundwater sampling and reporting for the NCMA technical group. The annual reports are prepared pursuant to the requirements of the Stipulation and Judgment After Trial for the Santa Maria Groundwater Basin Adjudication. The Annual Report provides an assessment of hydrologic conditions for the NCMA based on data collected during the calendar year of record.

**Santa Paula Water Recycling Facility Groundwater Modeling and Monitoring, Santa Paula, Ventura County.** Nate was part of the project team that supported all aspects of planning, monitoring well installation, well development, installation of required groundwater level transducers, hydrogeologic assessment, impacts analysis, and required reporting related to the discharge of effluent to on-site percolation ponds.

**GSP Development, San Luis Obispo Basin, San Luis Obispo, California.** Nate is part of the project team supporting the development of the GSP for the San Luis Obispo Basin. The GSP development is a coordinated effort with Water Systems Consultants. Nate has generated a 3D geological model of the basin and is assisting in development of the basin groundwater model. Nate also performed groundwater elevation analyses in support of the basin groundwater-dependent ecosystem (GDE) assessment.



## Nate Page, PG *Managing Hydrogeologist*

**San Luis Obispo Basin Characterization, County of San Luis Obispo, California.** Nate was part of the project team that collected and summarized all available geologic and hydrogeologic data describing the San Luis Obispo Valley Groundwater Basin. GSI generated cross sections, hydrographs, and water level maps, and summarized all aquifer test data available from stakeholders.

**GSP Development, Atascadero Subbasin, Atascadero, California.** Nate is the lead analyst and author for GSI's effort to develop the GSP for the Atascadero Subbasin. The GSP development is a coordinated effort with GEI Consultants, with GSI being responsible for authoring the basin setting/hydrogeologic conceptual model, groundwater conditions, water budget, and monitoring network sections.

**Santa Maria Groundwater Basin Fringe Area Boundary Modification, County of San Luis Obispo, California.** Nate was part of the project team that completed characterization of five fringe areas in the Santa Maria Groundwater Basin to determine whether San Luis Obispo County should pursue SGMA basin boundary modification process with the California Department of Water Resources (DWR).

**Groundwater Basin Boundary Modifications, Castaic Lake Water Agency (CLWA – now SCV Water), Santa Clarita Valley, California.** GSI helped CLWA identify the type and location of groundwater basin boundary adjustments to meet SGMA regulations for boundary modification. Nate provided groundwater level and quality data research and analysis, GIS analysis, and figure production.

**Fringe Area Basin Characterization, San Luis Obispo County Flood Control and Water Conservation District, San Luis Obispo County, California.** Nate was part of the project team that characterized the fringe areas of the Santa Maria Groundwater Basin. The project involved the hydrogeologic characterization of five geographically distinct areas that are within the basin boundaries defined by the DWR, but were not included in the adjudicated basin area and thus are subject to SGMA management requirements. For each fringe area, GSI generated calculations of groundwater flow direction, Darcy groundwater flow quantities, well construction details, aquifer test results, and irrigated acreage. GSI developed geologic cross sections to understand the extent of hydraulic communication between the fringe areas and the adjudicated basin. Based on the results of the characterization, a basin boundary modification request was prepared for submission to DWR.

**Hydrogeology Study in Support of the Avila Community Plan Update and Associated Environmental Impact Report, Avila Valley Subbasin, San Luis Obispo County, California.** Nate was the lead analyst and author for this hydrogeologic basin study, which included analysis of existing water supply sources and facilities, including imported surface water and local groundwater; a summary of projected future water demand; and an evaluation of the ability to meet these projected demands. This study also identified and discussed feasible mitigation measures that may be included in the project to minimize potential effects related to future groundwater availability. Environmental water demands for steelhead and other sensitive species were considered in the analysis.

**GSP Development, Santa Ynez River Valley Groundwater Basin, Eastern Management Area (EMA), Santa Barbara County, California.** Nate is a member of the team providing SGMA support services and preparing the GSP for the EMA of the Santa Ynez River Valley Groundwater Basin. Nate has contributed significantly to the basin water budget development, working in close partnership with the groundwater model development team, completed the GDE analysis and assisted in development of sustainable management criteria. Nate has also completed a 3-D geologic model of the EMA for visualization purposes and for use as grid input to the basin groundwater model.

**GSP Development, San Antonio Creek Valley Groundwater Basin, Santa Barbara County, California.** Nate is a member of the team providing SGMA support services and preparing the GSP for the San Antonio Creek Valley Groundwater Basin. Nate has contributed significantly to the basin water budget development, completed the GDE analysis and assisted in development of sustainable management criteria. NDVI was used to assess historical health of the Barka Slough (a sensitive GDE wetland area) and to develop related sustainable management criteria.

**Desalination Intake Wells Hydrogeologic Evaluation, City of Morro Bay, California.** Nate was a key member of the project team conducting a hydrogeologic evaluation of the existing Morro Bay desalination wells. Nate provided field oversight for instrumentation and coordination with City personnel for several long-term pumping tests and water quality sample collection. Nate also performed data reduction, including tidal response corrections, and aquifer testing analysis.

## Blaine Reely, PhD, PE

### Principal Water Resources Engineer



Blaine has more than 35 years of experience managing projects related to civil engineering and hydrology, with specific expertise in water supply treatment and distribution, wastewater collection and treatment, and energy efficiency studies. His technical expertise includes stormwater drainage and flood studies, hydrologic/hydraulic modeling, and the development and implementation of cost reduction strategies for water utilities. In 2002, Blaine founded Monsoon Consultants, a civil engineering and hydrology firm that expanded to California's Central Coast in 2005, where Blaine resides. He joined GSI in 2021. Blaine is part of GSI's team of groundwater specialists that helps our clients develop groundwater sustainability plans (GSPs) in compliance with the Sustainable Groundwater Management Act (SGMA).

#### EDUCATION

PhD, Civil Engineering,  
Oklahoma State University

MS, Civil Engineering,  
University of Arizona

BS, Geological Engineering,  
University of Arizona

#### PROFESSIONAL REGISTRATIONS

Certified Civil Engineer:  
California, Arizona,  
Colorado, Illinois, Kansas,  
Missouri, Nevada, New  
Mexico, Oklahoma, Oregon,  
and Texas

Certified Geological  
Engineer: Arizona

#### DISTINGUISHING QUALIFICATIONS

- ✓ Expertise in developing and implementing cost-reduction strategies for water utilities
- ✓ Principal developer of the Water Resources Energy Management System (WREMS), used worldwide to analyze and optimize water utility operations
- ✓ Experience in stormwater drainage and flood studies
- ✓ Expertise in hydrologic/hydraulic modeling

#### REFERENCES

- **Kelly Dodds**, San Miguel Community Services District, 805.291.0815, [kelly.dodds@sanmiguelcsd.org](mailto:kelly.dodds@sanmiguelcsd.org). Projects: San Miguel CSD Machado Wastewater Treatment Plant Upgrade and Expansion
- **Nick Debar**, City of Atascadero, 805.538.9995, [ndebar@atascadero.org](mailto:ndebar@atascadero.org). Projects: Onsite Wastewater Treatment System Local Area Management Program Development

#### REPRESENTATIVE PROJECTS

*(Before joining GSI, Blaine worked on the following projects for another firm.)*

**District Engineer, San Miguel Community Services District, San Miguel, California.** From 2016 to 2021, Blaine served as the District Engineer for the San Miguel Community Services District. In that role, he worked closely with District Board members, management, and utility staff to help maintain the District's water, wastewater, and solid waste infrastructure and services. Projects included the following:

- **Paso Robles Groundwater Basin GSP.** Blaine served as technical advisor to the San Miguel Groundwater Sustainability Agency (GSA) and was the GSA's staff member responsible for overseeing the development of the Paso Robles Groundwater Basin GSP.
- **San Miguel Wastewater Treatment Plant (WWTP) Expansion Planning and Engineering Report.** Blaine was the principal author of the report, which resulted in Board approval to replace the existing 0.2 million gallons per day (mgd) aerated treatment pond system with a new 0.6 mgd Membrane Bioreactor (MBR) treatment system. The new system will be capable of meeting Title 22 recycled water quality standards for groundwater recharge and/or for use as an agricultural irrigation supply.
- **Capital Improvement Plan and Budget.** Blaine served as a contributor for the development of the District's Capital Improvement Plan and associated budget.
- **Water and Wastewater Rate Study.** Blaine was a technical advisor to the team for this rate study, which culminated in the passage of a new water and wastewater rate schedule in the summer of 2018.
- **Proposition 218 Process.** Blaine was intimately involved in the Proposition 218 process and made numerous presentations to the District's customers.
- **Sanitary Sewer Management Plan (SSMP).** Blaine was the principal author of the 2012 SSMP Audit and supported the preparation of the current 2018 SSMP.
- **Tertiary Recycled Wastewater Effluent Evaluation.** Blaine was the principal negotiator for the District with a consortium of large vineyard growers to create an opportunity for delivery of tertiary recycled wastewater effluent to vineyards in proximity to San Miguel. The terms of the future agreement will result in an income source for the District and agreements on the part of the vineyard operators to reduce pumping of existing irrigation wells to enhance sustainability of the Paso Roble groundwater basin in the vicinity of San Miguel.



## **Blaine Reely, PhD, PE** *Principal Water Resources Engineer*

**Machado Wastewater Treatment Facility (WWTF) Expansion and Renovation.** Blaine managed the planning, design, engineering, and permitting of the Machado WWTF expansion and renovation. One of the objectives of the project was to expand and enhance treatment capacity, in addition to ensuring compatibility with SGMA requirements. To accomplish this, Blaine considered multiple treatment alternatives to provide recycled effluent that meets the requirements for either agricultural irrigation or potentially for groundwater recharge purposes. The design and layout of the project, with consultation help from the Utility Department, was optimized to best meet the needs of the operators that manage the plant.

**Atascadero Creek Bank Restoration and Realignment of the Atascadero Lake Water Supply Pipeline, City of Atascadero, California.** Blaine provided construction drawing, details, and specifications for the repair and stabilization of a portion of the bank of Atascadero Creek. A portion of the creek bank near the highway was subject to scour and erosion, exposing part of a water supply line. The creek channel and overbank areas are considered critical habitat to several plant and animal species, which required Blaine to work closely with the project biological consultants to ensure that work provided adequate protection to the local environment. Blaine provided data collection, hydraulic modeling, engineering design, and technical specification preparation services.

**Onsite Wastewater Treatment System Local Area Management Program, City of Atascadero, California.** Blaine prepared a Local Agency Management Program (LAMP) for the City's Onsite Wastewater Treatment System. The project involved extensive spatial analysis using Esri ArcGIS Pro® software to evaluate and characterize multiple geographic zones within corporate limits based on similarities in geology, hydrology, soils, topographic slope, lot size, land use, and population density. This LAMP was one of the first LAMP documents to be approved by the Central Coast Regional Water Quality Control Board.

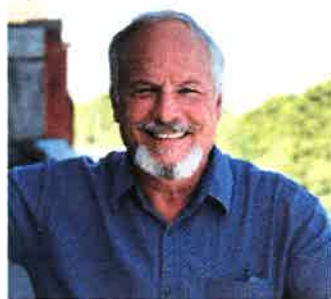
**Stenner Creek Inverted Siphon Replacement, City of San Luis Obispo, California.** Blaine performed a feasibility study to identify and analyze potential improvement alternatives for replacing or eliminating a defective single-barrel 12-inch inverted siphon sanitary sewer crossing at Stenner Creek. Work involved topographic surveying, hydraulic modeling, design of a double-barrel inverted siphon, development of construction documents, and permitting assistance. The project was located on a busy highway right-of-way, so the design had to accommodate construction in a heavy traffic environment. There were also severe environmental risks associated with the project, with impacts to Stenner Creek that could have included spills of untreated sewage. Blaine's completion of the project eliminated the risk of sewage pollution with the design of the updated siphon, and work was completed with minimal impact to the busy highway.

**Manhole Rehabilitation, El Estero WWTP, City of Santa Barbara, California.** Blaine provided design and civil engineering services for the reconstruction and structural rehabilitation of manholes on the primary trunk sewer line that conveys all the wastewater entering the El Estero Treatment Plant from the City of Santa Barbara. The existing manholes, constructed in the early 1950s, were in poor condition and structurally deteriorated. Blaine's performance on this project ensured that no diversion or bypass pumping of influent flows happened while the manhole and structure rehabilitation was underway.

**North Fork of Paloma Creek Hydrologic and Hydraulic Study and Preliminary Design of Channel Realignment for Habitat Restoration/Improvement for a Private Developer, Atascadero, California.** Blaine provided watershed characterization and hydrologic modeling, hydraulic modeling, base map development, topographic surveying, and preliminary design for a proposed commercial development along the north fork of Paloma Creek. The site was particularly challenging because the creek runs through the middle of the undeveloped site on a relatively shallow slope, and a significant portion of the site is within the Federal Emergency Management Agency 100-year floodplain. The site supports an existing seasonal marshland, which is habitat to various aquatic and terrestrial species. Blaine was successful in mitigating the site's drainage and flooding issues by developing a design for diverting the north fork of Paloma Creek around the development, and by providing passive treatment and detention of stormwater runoff from the site before discharging into the north fork of Paloma Creek. The design included a large passive treatment/wetlands basin on the southwest corner of the project site.

## Jeff Barry

### Principal Hydrogeologist



Jeff has more than 35 years of experience conducting groundwater resource development projects and groundwater management programs in California and the Pacific Northwest. He brings substantial expertise in aquifer characterization, production well design and rehabilitation, groundwater monitoring, groundwater/surface water interaction assessment, and aquifer storage and recovery (ASR). Jeff is a recognized leader in the development and sustainable operation of ASR projects and aquifer recharge projects in the U.S. and Korea. Throughout his career, he has managed multi-disciplinary projects that have included critical analysis of a range of data types, successful coordination and negotiation with multiple stakeholders, communicating complex technical information to decision makers, and working within budgetary and timeline constraints. Jeff is a key member of GSI's team of groundwater specialists that helps our clients navigate the complexities of California's Sustainable Groundwater Management Act (SGMA). He is a founding principal at GSI.

#### EDUCATION

MS, Hydrogeology/  
Hydrology, University of  
Nevada at Reno

BS, Resource Management,  
Humboldt State University

#### PROFESSIONAL REGISTRATIONS

Registered Geologist:  
Oregon

Licensed Geologist/  
Hydrogeologist:  
Washington

Certified Water Rights  
Examiner: Oregon

#### DISTINGUISHING QUALIFICATIONS

- ✓ More than 30 years of experience conducting water resources investigations
- ✓ Experienced with development of groundwater management plans and performing safe yield assessments
- ✓ Experienced with monitoring program and groundwater management plan development and implementation
- ✓ Strong working knowledge of state and federal regulatory programs relating to groundwater/surface water influence and water quality protection

#### REFERENCES

- **Willy Cunha**, Shandon-San Juan Water District, 805.674.0788, willy.ssjwd@gmail.com. Projects: Staff Extension Services and Hydrogeologic Expertise and Input to the Paso Robles Basin Groundwater Sustainability Plan (GSP)
- **Matt Young**, County of Santa Barbara, 805.568.3546, mcyoung@co.santa-barbara.ca.us. Project: Eastern Management Area GSP Development

#### REPRESENTATIVE PROJECTS

**Staff Extension Services and Hydrogeologic Expertise and Input to the Paso Robles Basin GSP, Shandon-San Juan Water District and Estrella-El Pomar-Creston Water District, Paso Robles Basin, California.** Jeff is providing technical support to two agricultural water districts during development of the GSP for the Basin. His role is to review work being done by the GSP consultant and provide input on technical aspects of the plan to help make the plan successful and represent, in particular, agricultural groundwater users in the basin.

**GSP, Santa Clarita Valley Groundwater Sustainability Agency (GSA), California.** Jeff is leading a consultant team to develop a GSP for the upper Santa Clara River Basin. He has assembled a team of experts who have been working in the basin for decades. The project includes development of a basin-wide data management system, development of a Hydrogeologic Conceptual Model, identification of groundwater-dependent ecosystems (GDEs), development of sustainability criteria, development of projects and management programs, and preparation of the GSP. A significant technical element of the project includes characterization of the interaction between groundwater and surface water and assessment of GDEs along the Santa Clara River. Jeff is also supporting stakeholder outreach efforts and conducting workshops on various SGMA and GSP topics.

**GSP, Eastern Management Area GSA, Santa Ynez, California.** Jeff is managing the development of a GSP for this GSA. There are a number of complex issues in this basin that must be resolved including potential interconnection of basin aquifers with the Santa Ynez River, complex structural geology and boundaries to flow, assessing underflow to downstream subbasins, and balancing water supply needs of various stakeholders (farmers, ranchers, grape growers, tribal governments, domestic water users). Jeff has led numerous public meetings and workshops on various topics and has worked with the GSA to develop alternatives for sustainable management criteria and projects and management actions.

**GSP, San Antonio Basin GSA, California.** Jeff is managing the development of the GSP for the GSA that represents this predominantly agricultural basin. Jeff's team is using data and information developed in previous studies and by the U.S. Geological Survey (USGS) to characterize groundwater conditions in the basin and reduce the cost of developing the plan. The GSI team developed a detailed water budget and assessed various groundwater management alternatives intended to recover groundwater levels to sustainable levels. A significant element of the plan involves characterizing groundwater conditions in the vicinity of Barka Slough, a GDE. Development of sustainability criteria that maintain habitat in the slough is critical because the slough is the natural discharge location for groundwater in the basin.



## **Jeff Barry** *Principal Hydrogeologist*

**Groundwater Development Project, Los Angeles Department of Water and Power, Los Angeles, California.** Jeff was technical lead for GSI on a team that evaluated a range of water supply planning and investigation projects in the LA Basin with the overall goal of increasing local groundwater supplies and increasing storage. GSI's role on the project was to evaluate the performance of existing well fields and to provide planning, design, and field support for the installation of pumping wells, indirect potable reuse (IPR) injection wells, and ASR wells.

**Basin Modification and Delineation/Definition of the Atascadero Subbasin, Templeton CSD, Atascadero Mutual Water Company (AMWC), San Luis Obispo, California.** Jeff assisted with developing a detailed geologic and hydrogeologic investigation to formally define the boundaries of a groundwater basin through extensive geologic and hydrogeologic mapping and analysis and well log review. The boundary modification request, based on scientific evidence, was one of the few successful scientific applications approved by DWR. In a related matter, Jeff provided expert witness testimony on behalf of the CSD and AMWC in support of their efforts to define the subbasin as separate from the overall Paso Robles groundwater basin.

**Basin Characterization and Boundary Modification, Santa Maria Basin Fringe Areas, County of San Luis Obispo, California.** Jeff is providing senior review for a hydrogeologic characterization project in a number of basin fringe areas in the Santa Maria Groundwater Basin. These areas are predominantly farmed. If appropriate, the team will prepare and submit a basin boundary modification request to the California Department of Water Resources (DWR).

**SGMA Support Services, Castaic Lake Water Agency, California.** Jeff is providing strategic assistance to water providers in the upper Santa Clara River Basin regarding a range of SGMA issues. His consultation has included providing support during GSA formation, development of Proposition 1 grant applications for projects supporting GSP development and implementation, and preparation of a work plan for completion of a GSP.

**Groundwater Management Plan, Goleta Water District, Goleta, California.** Jeff is project manager for updating the District's groundwater management plan. District supplies of imported and stored water are severely curtailed as a result of the ongoing drought in California and the District has had to rely nearly 100 percent on the local groundwater basin for meeting water demands. Key elements of the plan will include development of a pumping plan for drought and non-drought conditions, optimizing the injection program to refill the basin when water is available for recharge, preparation of a salt and nutrient management plan, and developing recommendations for capital improvements for facilities that improve the groundwater supply.

**Groundwater Supply Investigation, Confidential Client, San Joaquin Valley, California.** Jeff is project manager for an investigation to determine whether there are adequate supplies of groundwater to irrigate up to 8,000 acres in the southwestern San Joaquin Valley. The analysis included application of a SkyTem TDEM aerial geophysical survey to identify potentially productive areas both within the alluvium and within the underlying bedrock units. Based on that information, GSI identified locations for drilling zonal test wells to obtain yield and water quality data. Zonal test wells consisted of drilling mud rotary boreholes to as deep as 1,000 feet, conducting borehole geophysics, installing 30 feet of perforated casing, installing temporary seals and filter pack, developing the zone, conducting pumping tests, and collecting water samples. This was repeated up to seven times in each borehole. Information was obtained about which aquifer units produced the largest quantities of suitable quality water.

**Basin Boundary Modification, Upper Santa Clara River Basin, California.** Jeff managed a project for Castaic Lake Water Agency to request a scientific basin modification request to DWR. Geologic maps, groundwater level data, and a basin-wide groundwater model were used as evidence for the request. DWR approved the basin boundary modification and updated the Bulletin 118 basin boundary maps.

**Recharge Feasibility Assessment, Newhall County Water District, California.** Jeff was senior reviewer for a project designed to investigate the operational feasibility of recharging reclaimed water and captured stormwater into a surficial alluvial aquifer at two sites along the Santa Clara River in the Santa Clarita Valley of southern California. The alluvial aquifer is an important source of groundwater supply to the valley, yet some alluvial production wells cannot meet production targets during years of below-normal rainfall and natural groundwater recharge.

## Ailco Wolf, PG, CHG Supervising Hydrogeologist



Ailco has 21 years of experience in groundwater supply and basin management for clients throughout California. His expertise includes supply development with recycled water, stormwater capture, and artificial recharge projects. An experienced groundwater modeler, Ailco has conducted numerous aquifer and basin-wide studies to determine available groundwater supply by developing groundwater and watershed models to resolve groundwater issues in collaboration with involved stakeholders. Ailco is part of GSI's team of groundwater specialists that addresses the complex issues arising from California's Sustainable Groundwater Management Act (SGMA).

### REFERENCES

- **Jim McCord**, Lynker Technologies, 505.261.0837, jtmccord@lynker.com. Project: Eastern Management Area Groundwater Sustainability Plan
- **Michael Cruikshank**, Water Systems Consulting, 949.528.0960 ext. 601, mcruikshank@wsc-inc.com. Projects: San Luis Obispo Groundwater Sustainability Plan and Arroyo Grande Groundwater Sustainability Plan

### EDUCATION

MS, Hydrogeology,  
University of Arizona -  
Tucson

BS, Geology, Pitzer  
College

### PROFESSIONAL REGISTRATIONS

Professional Geologist:  
California

Certified Hydrogeologist:  
California

### DISTINGUISHING QUALIFICATIONS

- ✓ Experience in watershed modeling, and groundwater and transport modeling, salt balance modeling, and developing lithological models
- ✓ Expertise in basin evaluations
- ✓ Expertise in water resource management
- ✓ Experience in well design, construction oversight, and maintenance
- ✓ Expertise in characterization of contaminant plumes
- ✓ Experience in aquifer recharge pilot testing
- ✓ Expertise in water quality sampling and analysis of lab results

### REPRESENTATIVE PROJECTS

**Groundwater Sustainability Plan Development and Modeling under SGMA, Santa Clarita Valley Water Agency (SCV Water), Santa Clarita Valley, California.** Ailco conducted groundwater modeling in support of the development of the Groundwater Sustainability Plan (GSP) for the Santa Clara River Groundwater Basin East Subbasin in Santa Clarita. Ailco applied a multi-layer numerical groundwater flow model using the MODFLOW-USG software to provide flexible gridding to support the technical evaluations required by SGMA rules for GSP development. His work included model construction, water budget analyses, assessments of whether the basin is currently in a long-term sustainable condition, and derivation of quantitative criteria for evaluating future basin conditions.

**Groundwater Model Conversion, SCV Water, Santa Clarita Valley, California.** Ailco helped convert SCV Water's existing basin groundwater flow model from the European MicroFEM groundwater modeling software into the USGS MODFLOW suite of groundwater modeling software. Ailco confirmed that updated USG model water budget components were volumetrically the same as original MicroFEM model and similarly that calibration statistics were still within accepted industry standards.

**SGMA Support Services, San Luis Obispo County, San Luis Obispo, California.** Ailco was the lead modeler for GSI's efforts, using the fully integrated USGS GSFLOW model to represent the complete watershed simulating the surface water, vadose zone and groundwater interactions of the basin. The model results were used to assess strategies for achieving groundwater sustainability. The integrated model addresses climate change assessments to provide predictive scenarios and water budgets for SGMA regulatory requirements.

**SGMA Support Services, Kaweah Groundwater Sustainability Agency (GSA), Tulare, California.** Ailco was the lead modeler for GSI's efforts, which included coordination with and outreach to other GSAs in the Kaweah Subbasin to develop a framework for agreement regarding data and analysis techniques for assessing groundwater elevation, groundwater extraction, surface water supply, total water use, change in storage, water budget, and sustainable yield. The collected data provided the basis for new groundwater model that included climate change assessments to provide predictive scenarios and water budgets. The model results were used to assess strategies for achieving groundwater sustainability. Ailco also provided a review of the draft Mid-Kaweah GSA Groundwater Sustainability Plan.

**Groundwater Flow Model for Lower Morro Bay Basin, City of Morro, California.** Ailco served as lead modeler to assess the basin management strategies for injecting recycled water recharge and determine residence time and feasible injection well locations.

**Model Update for the Regional San Juan Basin Groundwater Model and Refined Focused Model to Determine Source Water Composition for Full Scale Desalination Project, San Juan Basin Authority.** Ailco was the lead modeler to refine and update the Regional San Juan Capistrano Model to determine best potential basin management strategies, such as artificial stormwater and recycled water recharge with rubber dams or injection wells.





## **Ailco Wolf, PG, CHG** *Supervising Hydrogeologist*

**Groundwater Flow and Transport Model for Artificial Recharge Project, Imperial Irrigation District.** Ailco served as lead groundwater modeler to determine management strategies and well placement to optimize and assess water quality impacts as part of an artificial recharge and recovery project using Colorado River water.

**Model Update for the Regional San Juan Basin Groundwater Model and Refined Focused Model to Determine Source Water Composition for Full-Scale Desalination Project, South Coast Water District.** Ailco served as project manager and modeler to refine and update the Regional San Juan Capistrano Model to determine the inflow for the refined focused flow and transport model as part of determining source water composition for full scale desalination project as well as its potential impact on coastal lagoons.

**Model Refinement for Temecula – Murrieta Groundwater Basin, Rancho California Water District Temecula, California.** Ailco developed the Upper Santa Margarita Watershed model using GSFLOW (PRMS) to interface with the groundwater model (MODFLOW).

**Chino Basin Artificial Recharge Evaluation, Jurupa Community Services District (CSD), Chino Basin, California.** Ailco refined a previously established groundwater flow model of the Chino Basin to assess the impact of future pumping scenarios planned by the Jurupa CSD on groundwater levels as well as nitrate and total dissolved solids (TDS) concentrations in the southern Chino Basin.

**Stormwater Capture Analysis of San Bernardino Basin, San Bernardino Municipal Valley Water District, San Bernardino County, California.** Ailco was the lead surface water modeler for comprehensive historical calibrated surface water model, using EPA HSPF, of the San Bernardino Basin area used to determine available flow from 13 natural and developed catchment subbasins for potential artificial recharge.

**Watershed Model for the East San Gabriel Mountains, Wildermuth Environmental, Los Angeles County, California.** Ailco served as lead surface water modeler for the calibrated HSPF surface water model of the East San Bernardino Mountains. The model was used to calculate hydrologic budgets for tributaries to Six Basins, Chino Basin, and Cucamonga Basin and to determine mountain front runoff inflow for the Greater Chino Basin Groundwater Model.

**Tapo Canyon Perennial Yield Evaluation, Ventura County Waterworks District No. 8 and City of Simi Valley, California.** Ailco conducted a detailed geohydrologic analysis of the watershed surrounding Tapo Canyon to develop estimates of maximum perennial yield (i.e., safe yield). Work included the development of a detailed watershed hydrologic model (using EPA HSPF), which was calibrated to streamflow. Ailco provided recommendations for future production wells based on study results.

**Geohydrologic Evaluation of the Gregory Canyon Landfill, City of Oceanside, San Diego County, California.** Ailco conducted a detailed evaluation of groundwater flow and potential impacts to water quality near the proposed Gregory Canyon Landfill. He prepared technical memorandum regarding the findings and the potential water quality impacts on downstream water resources.

**Groundwater Flow Model Calibration to Evaluate Influence of Climate Change on Municipal Wells, City of Redmond, Washington, City of Redmond, Washington.** Ailco calibrated a steady-state flow model using an automated calibration technique with pilot points and singular value decomposition to optimize hydraulic parameters of a complex multiple-layer flow model in reasonable time and within budget. The calibrated results were presented to the City and a group of external stakeholders as part of a predictive modeling analyses that examined the effects of redevelopment (dewatering, underground structures, and stormwater management) and climate change on the sustainability of this shallow but productive aquifer, which supplies nearly half of the City's water.

**Subdrain System Effectiveness Analysis for Pole Creek Debris Basin, Griffin Industries, Fillmore, California.** Ailco altered an existing MODFLOW groundwater model to investigate the effects of a proposed subdrain system on lowering high groundwater levels inside the proposed recharge basin.

**Remediation Strategies for Groundwater Contamination, Confidential Client, San Bernardino Basin, California.** Ailco assisted in the refinement of previous USGS models to better understand, analyze, and evaluate remediation alternatives related to groundwater contamination problems.

## Lee Knudtson

### Staff Hydrologist



Lee has 7 years of experience working in the groundwater industry. Lee has led the design, planning, and implementation of numerous groundwater monitoring programs for groundwater stakeholders across the country. Lee is experienced in merging groundwater data sets from a variety of different sources and developing data analysis methods and tools to produce meaningful information. He has planned and implemented field data collection efforts and is knowledgeable about aquifer characterization, well testing, and groundwater modeling to assist with scenario planning. Lee has experience implementing groundwater monitoring projects for agricultural stakeholders and groundwater sustainability agencies in California in support of compliance with the Sustainable Groundwater Management Act (SGMA) and California Regional Water Quality Control Board (RWQCB) groundwater monitoring requirements.

### REFERENCES

- **Daniel Heime**, Water Systems Consulting, representing Northern Cities Management Area Technical Group, 805.459.8498, [dheimel@wsc-inc.com](mailto:dheimel@wsc-inc.com). Project: Northern Cities Management Area Annual Report
- **Anna Olson**, San Antonio Basin Groundwater Sustainability Agency, 805.868.4013, [aolsen@sanantoniobasingsa.org](mailto:aolsen@sanantoniobasingsa.org). Project: San Antonio Creek Basin Groundwater Sustainability Plan Development

### EDUCATION

BS, Natural Sciences,  
University of Wisconsin-  
Milwaukee

### DISTINGUISHING QUALIFICATIONS

- ✓ Expertise in groundwater monitoring
- ✓ Expertise in groundwater data analysis and interpretation
- ✓ Experienced in technical report preparation
- ✓ Experienced in aquifer characterization
- ✓ Experienced in groundwater modeling

### REPRESENTATIVE PROJECTS

#### **Adjudicated Groundwater Basin Annual Report Preparation, Northern Cities Management Area Technical Group, Santa Maria Groundwater Basin, San Luis Obispo County, California.**

Lee gathers data in support of the preparation and submittal of annual and quarterly reports for the Northern Cities Management Area (composed of the Cities of Pismo Beach, Arroyo Grande, and Grover Beach, and the Oceano CSD). Lee conducts sampling and monitoring of key sentry wells in the Northern Cities area to assess potential seawater intrusion, provides data analysis and technical support, and assists in preparing the quarterly and annual reports required by the Superior Court as a result of the Santa Maria Basin litigation solution.

#### **Staff Extension Services and Hydrogeologic Expertise and Input to the Paso Robles Basin GSP, Shandon-San Juan Water District (SSJWD) and Estrella-El Pomar-Creston Water District (EPCWD), San Luis Obispo County, California.**

Lee is a member of a team supporting the implementation of a basinwide GSP on behalf of the two agricultural water districts in the Paso Robles Basin (Basin). Lee assists in developing and using a 3-D geophysical model of the Paso Robles Subbasin using data collected by SkyTEM technology. This model is currently being used for scenario planning. Lee also assists in the expansion of the groundwater monitoring network.

**Hydrogeology Study in Support of the Avila Community Plan Update and Associated Environmental Impact Report, Avila Valley Subbasin, San Luis Obispo County, California.** Lee assisted in the Avila Valley Subbasin hydrogeologic basin study—including summarizing groundwater data and analysis of groundwater conditions.

**Arroyo Grande Creek Integrated Model Field Data Collection and Investigation, Arroyo Grande, California.** Lee is a member of a team investigating surface water/groundwater interactions related to Arroyo Grande Creek to characterize the response of the aquifer to releases from Lake Lopez. Lee conducts the groundwater monitoring related to this project.

**Groundwater Sustainability Plan (GSP) Development, San Antonio Creek Valley Groundwater Basin, Santa Barbara County, California.** Lee is a member of the team providing SGMA support services and preparing the GSP for the San Antonio Creek Valley Groundwater Basin. Lee assists in managing the monitoring network, conducts field monitoring efforts, develops digital tools to visualize data collected from the monitoring network, and writes technical memorandums to summarize data-sets and key findings.

**GSP Development, Santa Ynez River Valley Groundwater Basin, Eastern Management Area (EMA), Santa Barbara County, California.** Lee is a member of the team providing SGMA support services and preparing the GSP for the Eastern Management Area (EMA) of the Santa Ynez River Valley Groundwater Basin. Lee has developed tools to visualize groundwater data, analyzed groundwater conditions, and written portions of the groundwater characterization and groundwater monitoring sections of the GSP.





## Lee Knudtson *Staff Hydrologist*

**GSP Implementation, Cuyama Groundwater Basin, Santa Barbara County, California.** Lee is a member of the team providing SGMA support services related to groundwater and surface water monitoring in the Cuyama Groundwater Basin. He deployed a continuous groundwater monitoring network and provided a technical memorandum summarizing the deployment project.

**Injection Testing and IPR Project Development, City of Morro Bay, California.** Lee assists in managing the groundwater monitoring program in Morro Bay in support of the development of a Indirect Potable Re-use (IPR) project to augment the City's water supply.

**Aquifer Characterization and Groundwater Monitoring at Greenfield Wastewater Treatment Plant, Greenfield, California.** Lee assisted in characterizing the aquifer surrounding the Greenfield Wastewater Treatment plant. This characterization included an assessment of the current groundwater monitoring program, creating visualization tools to analyze data, and recommending improvements to the monitoring program to comply with California Regional Water Quality Control Board (RWQCB) groundwater monitoring requirements.

**Groundwater Monitoring and Reporting, Ivanpah Solar Electric Generating Station, Ivanpah Valley, San Bernardino County, California.** At the NRG/BrightSource Ivanpah Solar Electric Generating Station, GSI manages the long-term groundwater and potable water system monitoring program required for permit compliance. Lee conducts quarterly groundwater sampling in compliance with state and federal regulatory requirements. The groundwater wells provide potable drinking water to the facility's staff and water to drive the steam turbines in the centralized solar towers.

**Groundwater Monitoring Services for the Santa Paula Water Recycling Facility, City of Santa Paula, California.** Lee conducts monthly groundwater monitoring and sampling in eight City-owned monitoring wells and a number of nearby residential wells. The sampling is conducted to help the City comply with California Regional Water Quality Control Board (RWQCB) groundwater monitoring requirements.

**Stormwater and Groundwater Monitoring Services, The Management Trust/RiverPark Homeowners Association (HOA), Oxnard, California.** Lee conducts stormwater sampling and annual groundwater monitoring to ensure compliance with residential development conditions that stipulate such monitoring work be done for 5 years after completion of new construction. Stormwater samples are collected during 5 rain events per season at 9 sampling locations and one sample is collected during dry-weather conditions annually.

**Confidential Client, Water Rights Evaluation.** GSI conducted a high-priority water rights and water use due diligence review for agricultural use for a confidential client. The project included site visits to agricultural properties and an analysis of publicly available and proprietary data regarding surface water and groundwater rights, historical water use, reliability of water supply, property information, and details about water diversion and storage infrastructure. Lee performed field data gathering and documentation, data analysis, and technical report writing for this project.

**Historical Water Use Studies, Various Clients, California.** Lee has assisted in preparing historical water use studies for private clients interested in establishing a record of their historical water usage and water infrastructure.